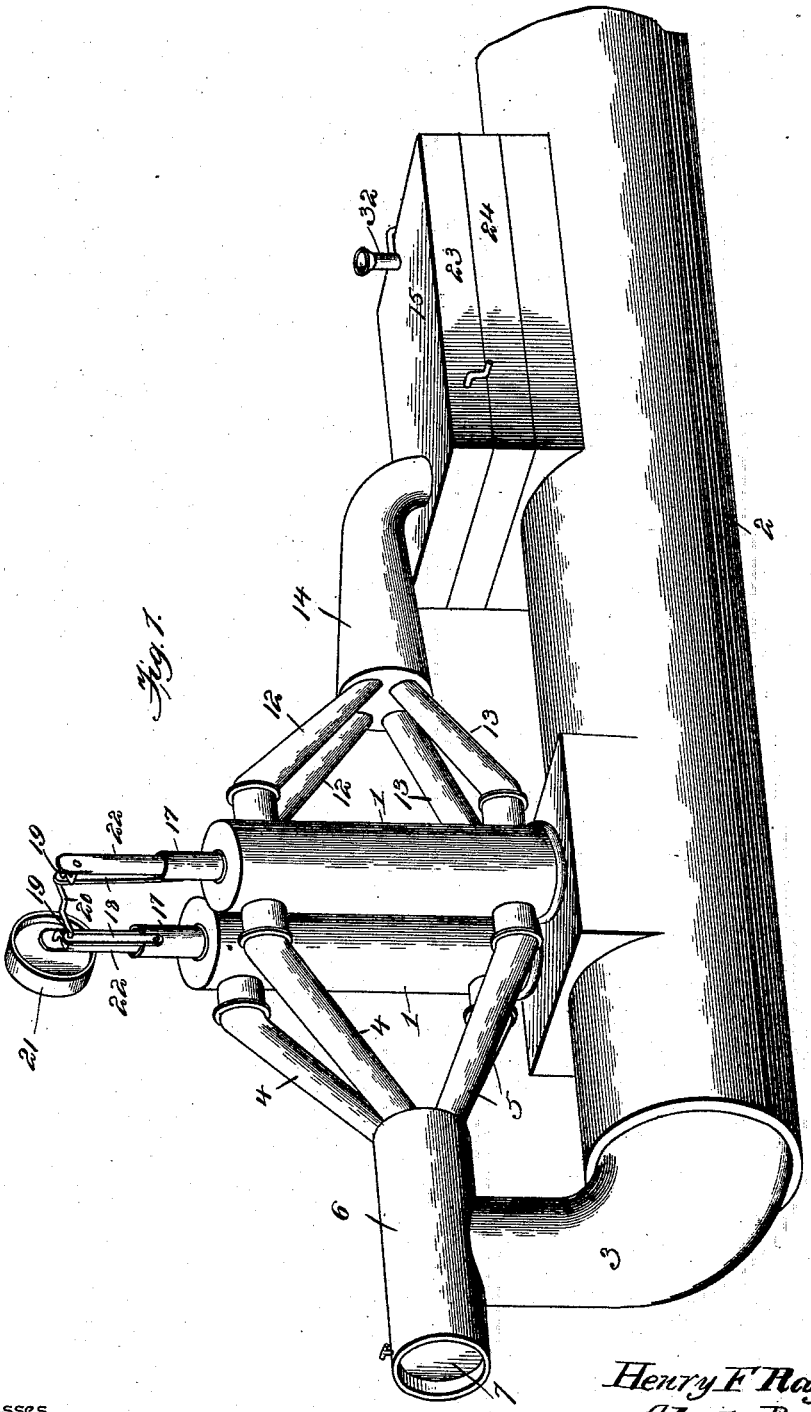
(No Model.) 2 Sheets—Sheet 1.

H. F. RAY & A. DEWEY.

SMOKE CONSUMER.

No. 525,059. Patented Aug. 28, 1894.



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(No Model.) 2 Sheets—Sheet 2.

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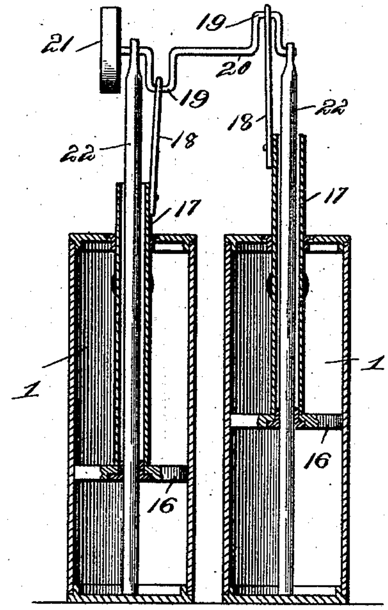


Fig. 2.

Fig. 6.

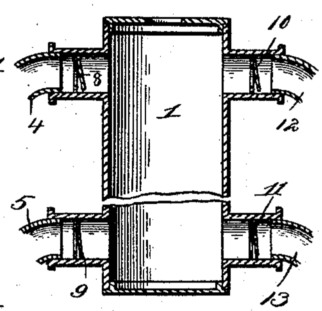


Fig. 3.

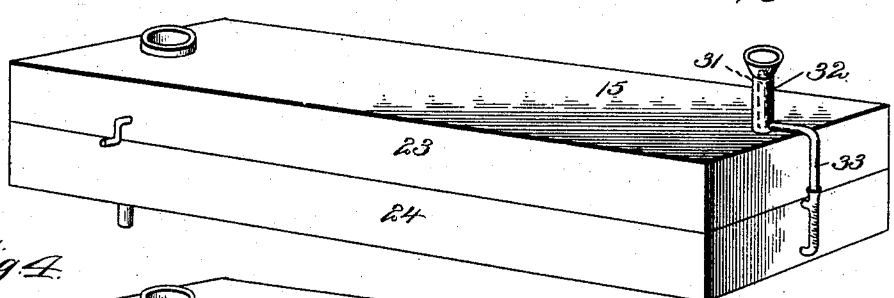
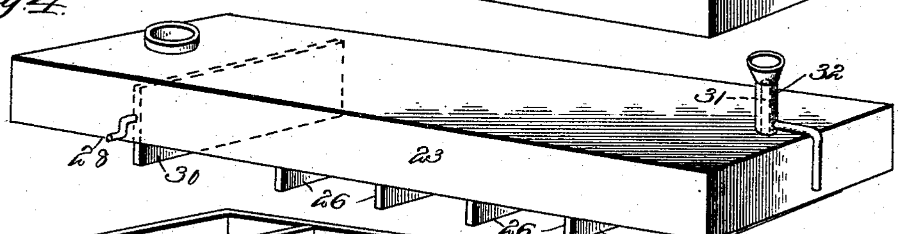


Fig. 4.



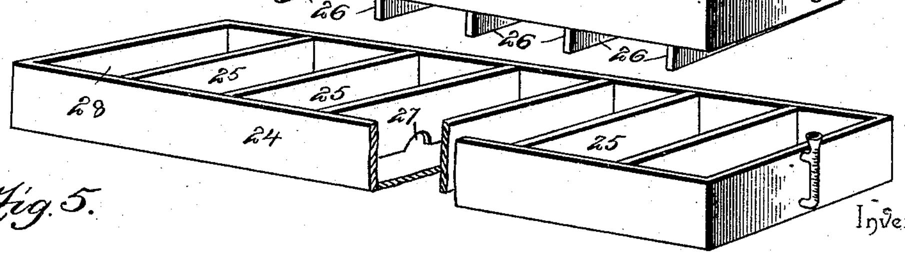


Fig. 5.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 525,059, dated August 28, 1894.

Application filed November 7, 1893. Serial No. 490,275. (No model.)

To all whom it may concern:

Be it known that we, HENRY F. RAY and ALVAH DEWEY, citizens of the United States, residing at Marion, in the county of Crittenden and State of Kentucky, have invented a new and useful Smoke-Consumer, of which the following is a specification.

The invention relates to improvements in apparatus for consuming and controlling smoke and other products of combustion.

The object of the present invention is to provide an apparatus adapted to be employed in connection with any character of boiler or furnace to receive and consume the smoke, sparks, and other products of combustion.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended.

In the accompanying drawings:—Figure 1 is a perspective view of a smoke consuming apparatus embodying the invention. Fig. 2 is a transverse sectional view. Fig. 3 is a detail perspective view of the condensing tank. Figs. 4 and 5 are detail perspective views of the upper and lower portions of the condensing tank. Fig. 6 is a vertical sectional view of one of the pump cylinders showing the several valves thereof.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 1 designate a pair of cylinders preferably vertically disposed and arranged adjacent to a boiler 2, and connected at their front sides with a smoke stack 3, by upper and lower suction pipes 4 and 5 branching from a main suction pipe 6, and arranged in divergent pairs. The main suction pipe 6, is preferably arranged at right angles to the smoke stack 3, and is provided at its front end with a damper 7, adapted to provide an air-tight connection or to lessen the suction and draft if desired. The upper and lower suction pipes 4 and 5, which are branches of the main suction pipe are provided with horizontal extensions communicating directly with the ends of the cylinders 1.

The cylinders are provided at their front sides with inwardly opening check valves 8 and 9, to prevent the products of combustion from returning to the suction pipes; and at the rear sides of the cylinders are arranged outwardly opening check valves 10, and 11, to prevent the smoke and products of combustion from returning to the cylinders from upper and lower converging pairs or branches 12 and 13 of a main exhaust pipe 14, which communicates with a condensing tank 15.

The cylinders 1, have mounted in them pistons or plungers 16, which have their stems or piston rods 17, connected by a pitman 18, with cranks or bends 19, of a drive shaft or crank shaft 20, rotated by a pulley 21. The pulley 21, may be driven by any suitable power and the crank bends of the shaft 20 are located opposite to each other to avoid a dead center.

The piston rods in order to lessen the friction, are hollow and are arranged on solid rods or supports 22, disposed longitudinally and centrally mounted in the cylinders; and suitable stuffing boxes are provided at the ends of the hollow piston rods and at the upper cylinder head. The pistons reciprocate and create a suction to draw the smoke and other products of combustion into the cylinders, and they also serve to drive the smoke and other products of combustion into the exhaust pipe. The inwardly and outwardly swinging check valves which are arranged on suitable seats prevent the return of the smoke and the parts operate on the principle of a compound air pump as will be readily seen.

The condensing tank consists of upper and lower portions 23 and 24; it is adapted to contain water through which the smoke and other products of combustion are driven; and partitions 25 and 26 of the upper and lower portions of the tank cause the smoke and products of combustion to take a tortuous route or circuit through the condenser tank. The partitions 25 are arranged in the lower portion of the condensing chamber and extend upward to the level of the water and are provided at their bottom with openings 27, to permit a circulation of the water. The partitions 26 of the upper portion of the condensing tank depend below the surface of the water and lie, when the parts 23 and 24 are secured together, about midway between the partitions 25, and thus cause the smoke and

other products of combustion to take a tortuous passage.

At the front end of the condensing chamber where the smoke is introduced is arranged a soot box or compartment 28, which receives most of the soot, and located adjacent to the soot box is a partially rotating partition 30, which facilitates the passage of the soot into the soot box or compartment. An escape pipe 31, for air, is arranged at the rear end of the condensing tank and extend upward therefrom and is surrounded by a larger water receiving pipe 32, having a flaring upper end. The outer enlarged pipe 32, is adapted to catch any water which may blow off and communicates at its bottom with a drain or water discharge pipe 33. A drain pipe designed to lead to a sewer or other suitable place of discharge communicates with the soot box.

The apparatus, it will be seen, is simple and comparatively inexpensive in construction and positive and reliable in operation, and is capable of consuming the smoke and other products of combustion.

The apparatus may be readily changed as to location and arrangement of its parts to accord with the parts of the boiler or furnace or engine with which it is to be used; and we desire it to be understood that changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

What we claim is—

1. In a smoke consuming apparatus, the combination with a smoke stack, of a condensing tank, a pair of cylinders, pistons mounted in the cylinders, a single suction pipe communicating with the smoke stack separated pairs of branch pipes communicating with the cylinders at one end and leading from the single suction pipe, a single exhaust pipe communicating with the tank and separated pairs of branch pipes communicating with the ends of the cylinders and leading to the single exhaust pipe, and the inwardly and outwardly opening check valves arranged in the branch pipes, substantially as described.

2. In a smoke consuming apparatus, the combination with a smoke stack, and a double cylinder pump having opposite upper and lower pairs of inlet and discharge openings; of a single suction pipe connected with the smoke stack, upper and lower diverging pairs of branch suction pipes leading from the single suction pipe and connected with the inlet openings of the pump, a suitably arranged condensing tank, an exhaust pipe communicating with said tank, and upper and lower pairs of converging branch pipes connected with said exhaust pipe and leading from the discharge opening of the pump, substantially as set forth.

3. In a smoke consuming apparatus, the combination of an exhaust pipe, a tank connected with the exhaust pipe and provided adjacent thereto with a soot compartment and having upper and lower partitions forming a tortuous passage and a pivotally mounted partly rotating partition arranged adjacent to the soot compartment, substantially as described.

4. In a smoke consuming apparatus, the combination of an exhaust pipe, a tank communicating therewith and provided with upper and lower partitions, a blow-off pipe arranged at the rear end of the tank, an enlarged outer pipe surrounding the blow-off pipe and adapted to catch water, and a drain pipe communicating with the enlarged pipe, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

HENRY F. RAY.
ALVAH DEWEY.

Witnesses:
J. A. MOORE, Jr.,
OLLY M. JAMES.