

(No Model.)

2 Sheets—Sheet 1.

C. FINK.
SMOKE PURIFIER.

No. 486,247.

Patented Nov. 15, 1892.

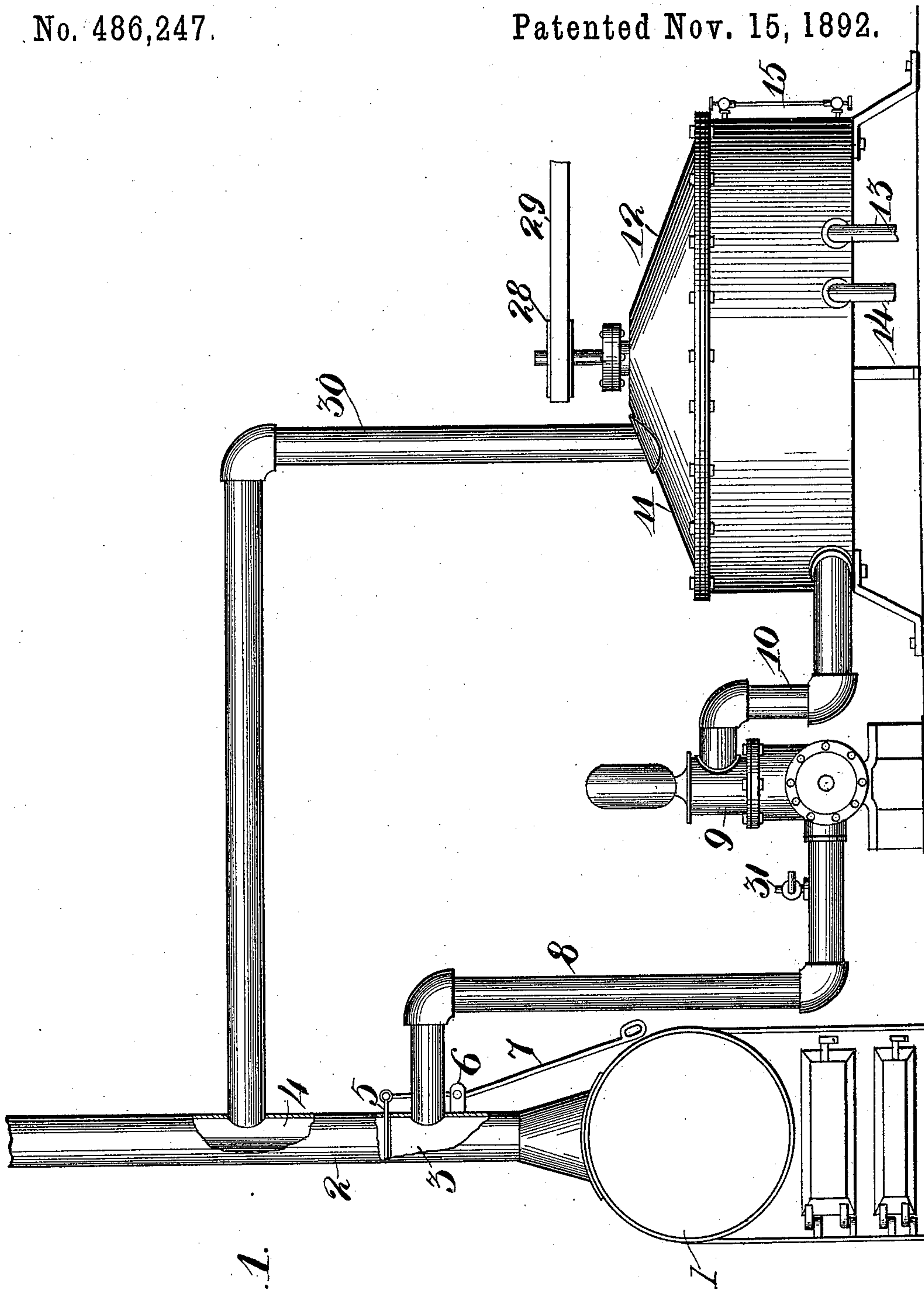


Fig. 1.

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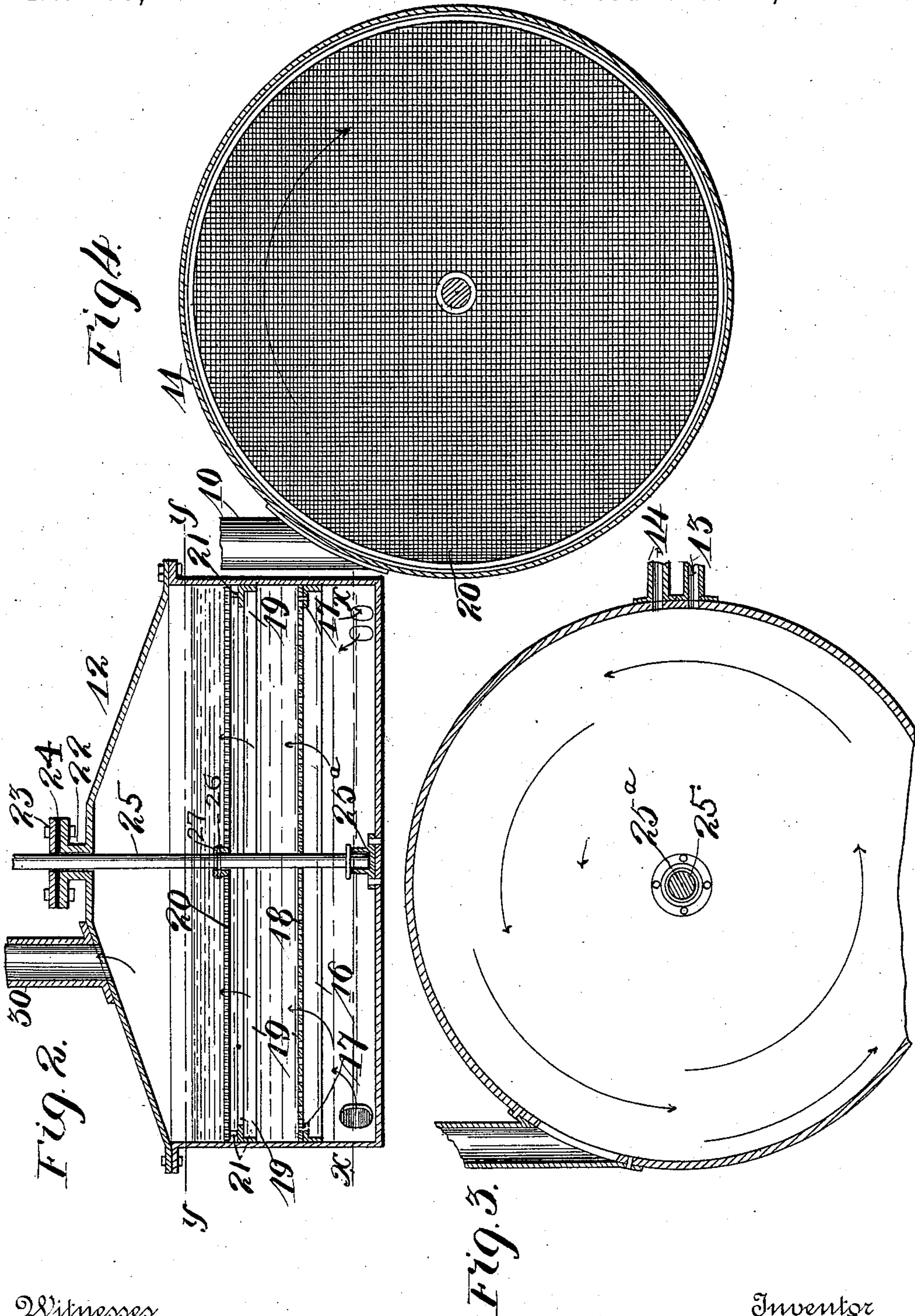
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2 Sheets—Sheet 2.

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SMOKE PURIFIER.

No. 486,247.

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UNITED STATES PATENT OFFICE.

CONRAD FINK, OF ST. LOUIS, MISSOURI.

SMOKE-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 486,247, dated November 15, 1892.

Application filed April 5, 1892. Serial No. 427,905. (No model.)

To all whom it may concern:

Be it known that I, CONRAD FINK, of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Methods of and Apparatus for Purifying Smoke and Precipitating the Products of Combustion Thereof, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in methods of and apparatus for purifying smoke and precipitating the products of combustion thereof; and it consists in the novel arrangement and combination of parts, as will be more fully hereinafter described, and designated in the claims.

In the drawings, Figure 1 is a side elevation of my complete invention as applied to the stack of a furnace. Fig. 2 is a vertical longitudinal section of the tank or receptacle which contains the water and through which the smoke is forced. Fig. 3 is a horizontal section taken on the line $x x$ of Fig. 2, and Fig. 4 is a horizontal section taken on the line $y y$ of Fig. 2.

The object of my invention is to purify as much as possible the products of combustion passing from furnaces and the like by forcing same into a tank containing a body of water, agitating the same or imparting motion thereto in one direction, and further providing the said tank with a suitable number of stationary and revoluble sieves or screens of different-sized mesh, through which the said products of combustion pass, the said revoluble sieves or screens being rotated by any suitable means in a reversed direction to the motion of the water, whereby all particles mixed with or forming a part of the said products of combustion are reduced and caused to be precipitated before being allowed to escape into the open air.

Referring to the drawings, 1 represents a furnace, and 2 a smoke-stack, which is in communication with the said furnace, through which the products of combustion passing from the furnace are adapted to pass, both of which are of the ordinary construction, and to the smoke-stack my invention is easily applied. It will be readily understood, however, that my invention can be applied to

chimneys in a similar manner and with like results without departing from the nature of my invention. The said smoke-stack is divided into two compartments 3 and 4 and is normally divided by a sliding damper or valve 5 for preventing the products of combustion from passing directly into the open air. To one side of the pipe 2 and below the said damper is fixed a bearing 6, to which is movably attached a lever 7, the upper end of which is movably attached to the said end of the damper, by which construction the said damper is manipulated, closing the said damper when the device is in operation and for opening the same when it is desired to start the furnace, in which instance the products of combustion will be allowed to pass straight up the smoke-stack 2 into the open air.

8 represents a pipe one end of which is in communication with the interior of the smoke-stack 2 below the said damper and the opposite end in communication with a pump 9, which may be operated by steam or any other suitable power, through which pipe the said products of combustion are drawn into the said pump and out through the pipe 10, one end of which is also in communication with the said pump.

11 represents a tank or receptacle which is preferably circular in cross-section and is provided with a removable cover 12, which in shape resembles that of a frustum of a cone. The opposite end of the said pipe 10 is in communication with the interior of the said tank or receptacle through the side thereof and adjacent to the bottom of the same, as clearly shown in the drawings, and is arranged in a plane tangential to the circumference of the said tank or receptacle, the object of which will be hereinafter more fully set forth. The said tank or receptacle 11 is constructed to receive a sufficient amount of water, which may be held therein a certain length of time or passed out of the same simultaneously as the water is passed into the same. 13 represents a pipe, which is in communication with any suitable water-supply and also in communication with the said tank, and 14 represents a similar pipe, one end of which is also in communication with the said tank and the opposite end in connection with any suitable

drainage—for instance, a sewer. To the side of the said tank 11 is fixed a water-gage 15, which is in communication with the interior thereof and is adapted to indicate the height or volume of water contained in said tank. Within the said tank is located and arranged any number of stationary and revoluble screens, which are located within the water contained in said receptacle, as best illustrated in Fig. 2, for the purposes hereinafter described, and through which the products of combustion at the different stages of purification are adapted to pass before the same are allowed to escape into the open air.

Referring particularly to Fig. 2 of the drawings, it will be seen that I employ, for the sake of illustration, only two sieves or screens; but said number may be greatly increased in order to more effectually purify the products of combustion without departing from the nature of my invention.

16 represents a band, which is provided with an annular inwardly-projecting flange 17, and said band fixed to the inner cylindrical surface of the said tank in any desirable manner. To the upper edge of the said annular flange 17 is fixed a circular sieve or screen 18, which is rendered stationary thereby, the meshes of which may be of any suitable size, but somewhat coarser than the meshes of the rotating sieve or screen hereinafter described. Immediately above the said band 16 or a suitable distance therefrom is fixed a second band 19, which is also located within the said tank and acts as a support for the edge of the said rotating screen. 20 represents the rotating screen or sieve, which is of such a size as to cover the entire space of said tank, but adapted to be freely rotated therein, the annular flange of said band 19 preventing the products of combustion from passing between the edge of the said screen or sieve and the inner surface of the said tank. To the lower surface of the said sieve 20 are fixed any number of pins 21, the lower ends of which normally rest upon the upper edge of the annular flange of the band 19, which causes the said screen or sieve to freely rotate and further hold the same in a rigid position when motion is imparted to the same. The upper end of the said cap 12 is provided with a tubular extension 22, and interposed between the upper edge of the extension and the plate 23 is rubber or other packing 24, to which the vertical operating-shaft 25 passes, forming an air-tight connection between the said tank and shaft. The said shaft, or more properly the lower end thereof, passes through the said sieve 20 and stationary sieve 18 and the terminal end thereof fitted into a socket 25^a, which holds the said shaft in its proper position within the said tank and further allows the same to be rotated therein. The sieve 20 is fixed to the said shaft 24 by a pin 26, which passes through the extension 27 of said sieve and through the said shaft; but the said shaft loosely passes through the sieve 18 and is not in any

way fixed to the same. The upper end of the said shaft 25 may extend any suitable distance above the top of the said tank 11 or to any convenient portion of the building within which the same is located, and fixed to the said projecting end is a belt-pulley 28, around which a belt 29 is passed for imparting motion to the said shaft. The power for imparting motion to the said belt may be of any suitable source—for instance, a small engine, which may be located at any convenient portion of the building—or the said belt may be run by separate machinery, if found desirable.

30 represents a pipe, the lower end of which is in communication with the interior of the tank 11, and said end fixed to the cover 12 of said tank in any desirable manner. The opposite end of the said pipe 30 is in communication with the interior of the smoke-stack 2 above the damper 5, through which pipe the purified products of combustion are adapted to pass and into the stack 2 before the same are allowed to escape into the open air.

It may be found desirable in practice to extend the pipe 30 through the roof of the building and pass the purified products of combustion directly into the open air without passing the same into the stack 2, as previously described and shown.

The products of combustion on passing from the furnace are drawn to the pipe 8 by the pump 9 through the pipe 10 and into the tank 11, in which case the water contained in the said tank will be given a motion in the direction as shown by the arrows in Fig. 3 by the force of the products of combustion upon the said water, and at the same time a vacuum will be created within the stack 2 below the valve 5. The products of combustion being forced into the said tank at the bottom thereof will gradually rise through the water contained in said tank and a portion of said products of combustion or the finer particles pass through the screen 18, the larger particles being prevented from passing through said screen and precipitated at the bottom of the said tank. The products of combustion that have been partially purified by the water and the stationary sieve 18 will next come in contact with the rotating sieve 20 and its particles reduced by the motion of said sieve and the particles precipitated, after which the said purified products of combustion will pass through the water located above the said sieve 20 and out through the pipe 30 into the open air in the form of an exhaust.

When the pump 9 is in operation, I desire to regulate the vacuum in the stack 2 below the valve 5 by means of a valve 31, which is regulated by hand for allowing the air to pass through the same from the outside, and thus reduce the vacuum or draft of the furnace.

The sieves or screens may be constructed of any suitable material and made of strands of wire or from a sheet of metal and the same punched with any suitable number of openings the proper size.

Having fully described my invention, what I claim is—

1. In an apparatus for purifying smoke, the combination, with a circular tank and stationary and rotating screens disposed therein, of an inlet-pipe communicating with the lower end of the tank obliquely to a diametrical plane and an outlet-pipe communicating with the top of the tank, substantially as and for the purpose set forth.

2. A smoke-purifier consisting of a pipe 8 in communication with the flue of the furnace, a pump or other suitable source of draft in connection with said pipe, a pipe, such as 10, in communication with the said pump and with a suitable tank containing a body of water, a stationary sieve, such as 18, fixed within the said tank, a movable sieve 20, also located within said tank and adapted to be ro-

tated in one direction, a flanged band 19, located below said movable sieve for supporting the same, a shaft 25, passing through the said sieves, but fixed to the movable one, means for imparting motion to said shaft, a pipe 30 in communication with the said tank for carrying off the purified products of combustion, a valve located in the flue of the furnace, and a valve, such as 31, located in the pipe 8 and adapted to reduce the vacuum in the said flue when properly manipulated, substantially as described.

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

CONRAD FINK.

Witnesses:

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