

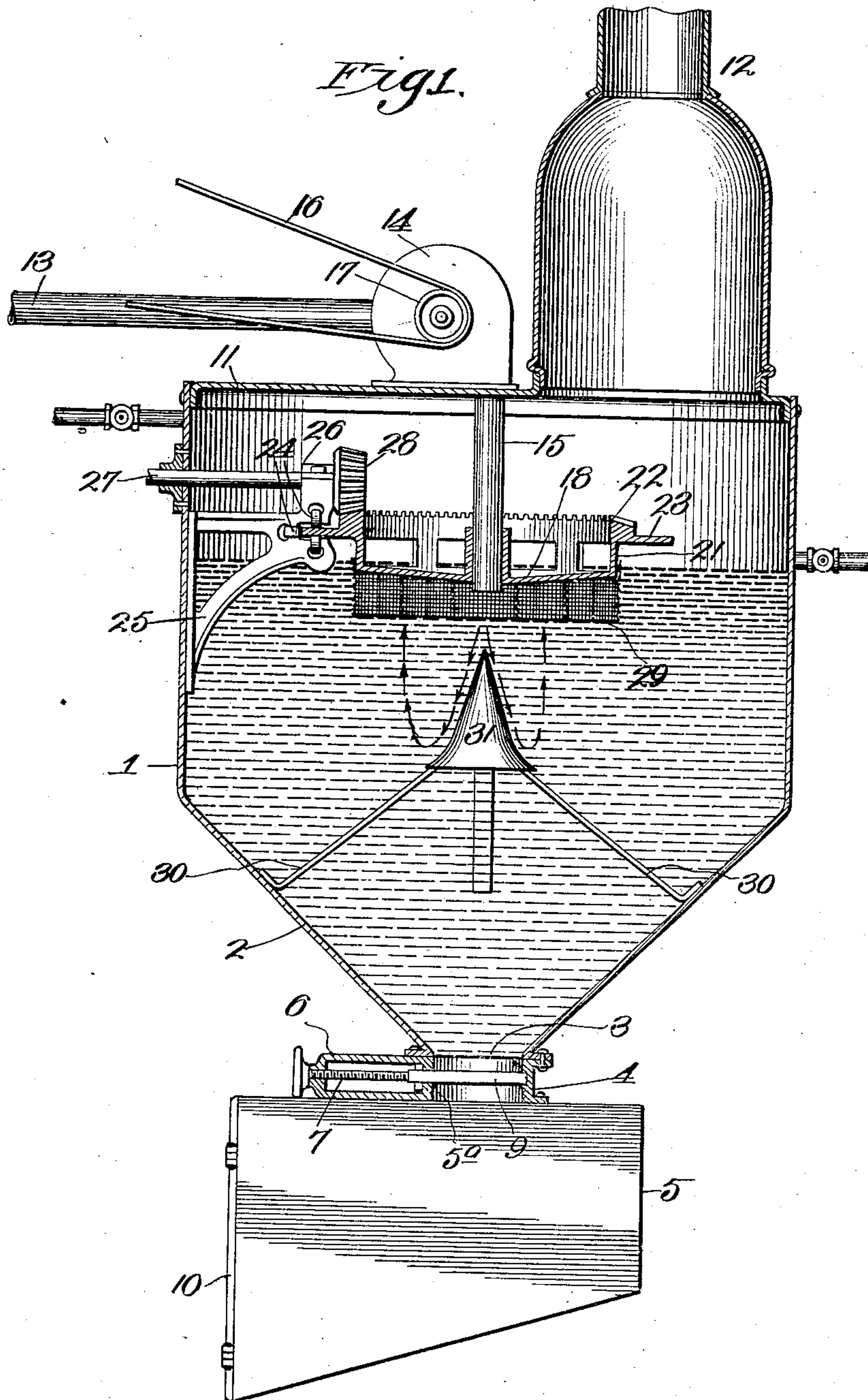
No. 870,329.

PATENTED NOV. 5, 1907.

R. H. WEBER & D. W. SMITH.
SMOKE SEPARATOR.

APPLICATION FILED FEB. 7, 1907.

2 SHEETS—SHEET 1.



Witnesses:
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H. C. Rodgers.

Inventors:
R. H. Weber & D. W. Smith.
By George F. Shorpe Atty.

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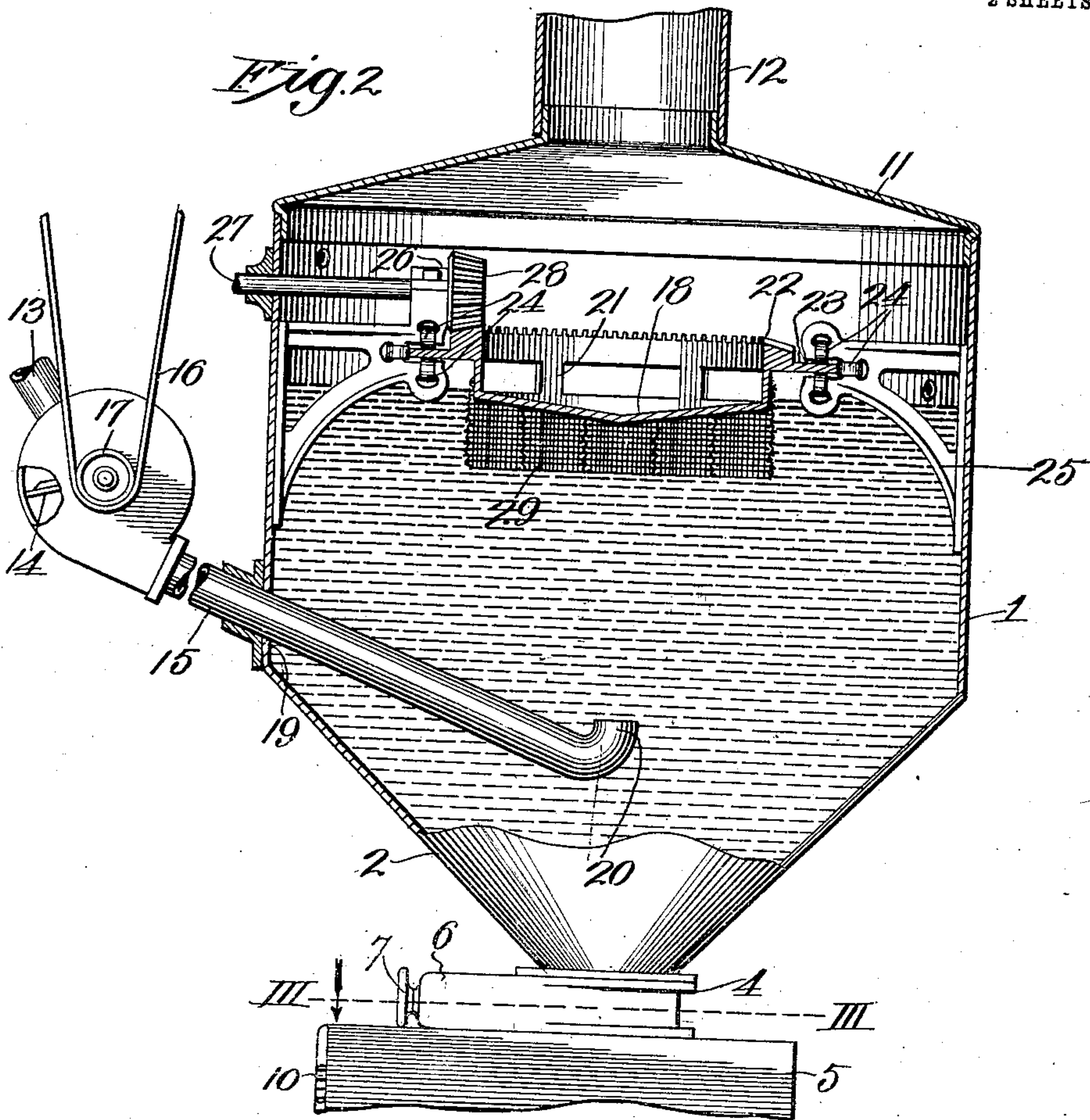


Fig. 3.

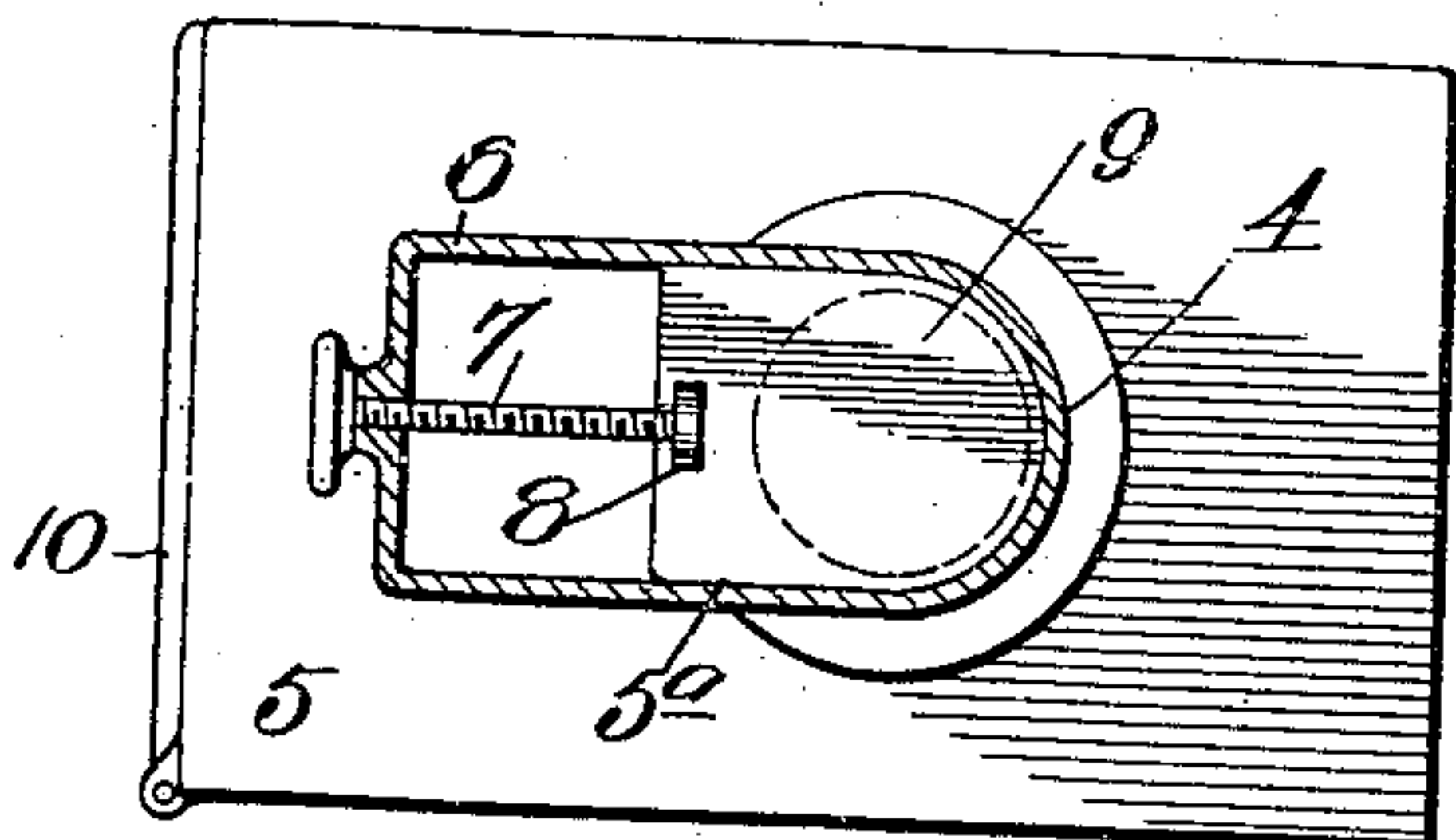
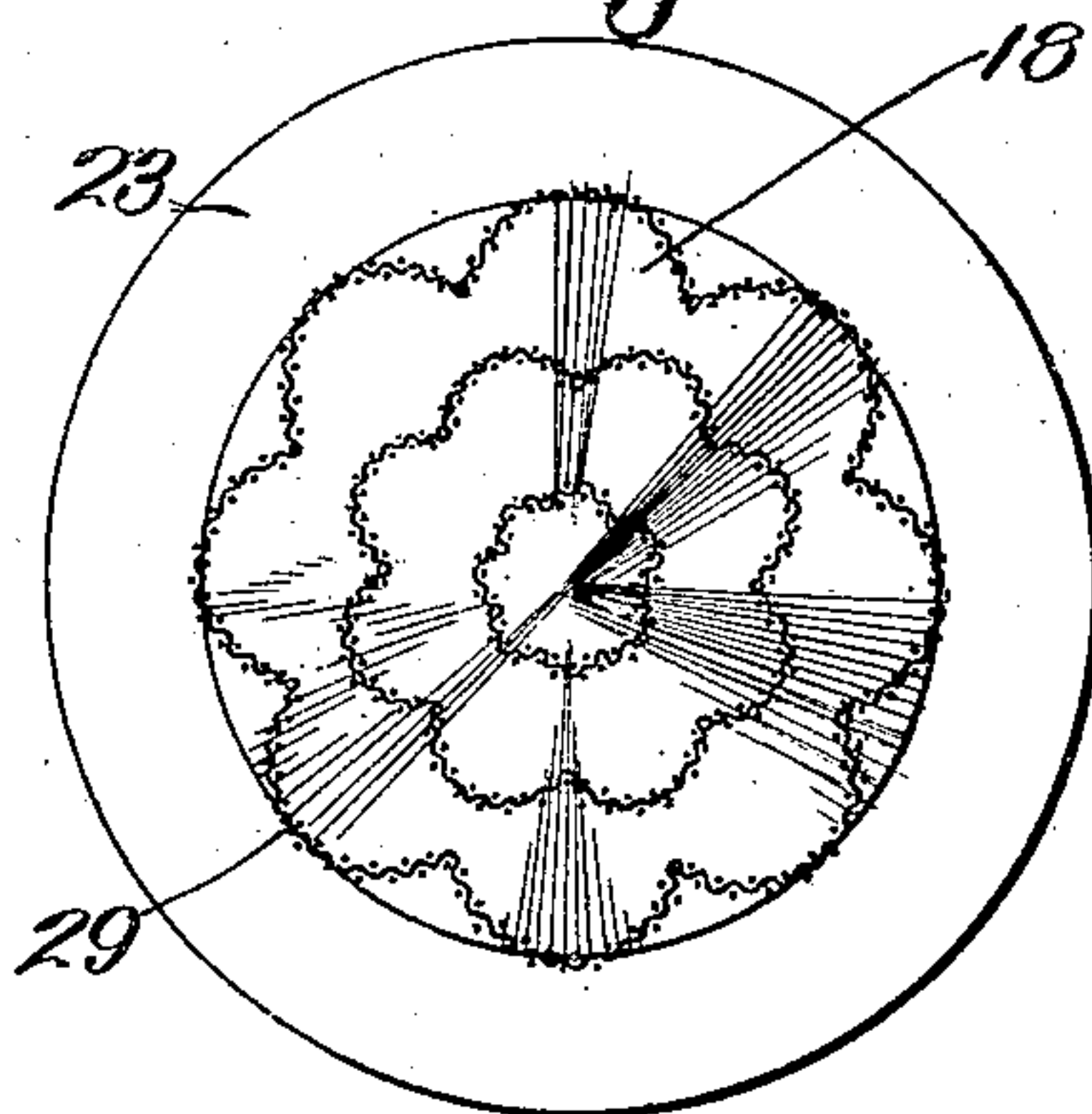


Fig. 4.



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UNITED STATES PATENT OFFICE.

RUDOLPH H. WEBER AND DAVID W. SMITH, OF KANSAS CITY, KANSAS.

SMOKE-SEPARATOR.

No. 870,329.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed February 7, 1907. Serial No. 356,286.

To all whom it may concern:

Be it known that we, RUDOLPH H. WEBER and DAVID W. SMITH, citizens of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Smoke-Separators, of which the following is a specification.

This invention relates to smoke separators and more particularly to apparatus for removing the minute portions of carbonaceous matter or soot from the volatile products of combustion, that is such particles as are held in suspension by the gases, and our object is to produce apparatus of this character whereby the gases charged with such carbonaceous matter may be thoroughly washed to effect the precipitation of the latter preliminary to the escape of the gases.

A further object is to produce apparatus of this character which will operate efficiently and which can be built and installed in connection with any furnace, at a comparatively small expense.

To these ends the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawings, in which:—

Figure 1, is a central vertical section of a smoke separating apparatus embodying our invention. Fig. 2, is a similar view of a modified type of construction. Fig. 3, is a horizontal section on the line III—III of Fig. 2. Fig. 4, is an inverted plan view of the strainer or washer.

In said drawings 1 indicates a tank having a downward tapering bottom 2 terminating in a discharge opening 3 connected by a tube 4 to a soot box or receptacle 5. The tube 4 is provided with an opening 5^a and at the same side with an extension 6 in which is mounted a screw 7 swiveled at its inner end at 8 to a slide valve 9 for controlling the passage of tube 4. One side of the box 5 is preferably in the form of a door 10 which is opened when it is desired to effect the removal of soot stored therein. The tank 1 is provided with any suitable air-tight cover 11 and with a discharge pipe 12.

13 indicates the smoke pipe of a furnace, not shown, and 14 a fan, blower or equivalent device for exerting a suction in smoke pipe 13 to produce the required draft therein for the proper combustion of fuel, and provided with a discharge pipe 15 extending into the tank and having its discharge end submerged, by preference, in water contained in the tank, the fan or equivalent device being driven by engaging belt and wheel 16 and 17 respectively, or by any other suitable means.

18 indicates a disk which is preferably of slightly inverted-cone form, and said disk is submerged in the water of the tank and disposed above the discharge end of the smoke pipe, which, as shown in Fig. 1, depends therein, but as shown in Fig. 2, projects into the tank through the side thereof as at 19 and terminates in an up-turned end 20, by preference vertically below the disk 18.

The disk is preferably a rotatable one and in Fig. 1 rotates around and upon the depending pipe 15. To reduce friction to the minimum, the disk is provided with upwardly projecting arms 21, and rigid therewith above the level of the water is a bevel gear 22 and an outwardly projecting annular flange 23, the latter fitting between the vertical and against the horizontal anti-friction rollers 24 journaled in brackets 25 secured to and within the tank, one of said brackets being also equipped with a bearing 26 for a suitably driven shaft 27 extending into the tank and equipped at its inner end with a bevel-pinion 28 meshing with and imparting motion to the bevel gear 22 and consequently to the disk. It will thus be seen that smoke forced downward into the water through pipe 15, or discharged into the water from upturned pipe 19, will be precipitated to the bottom of the tank, that is, all the carbonaceous matter that actually comes into contact with the water will be thus precipitated. A large proportion of the smoke, or of the carbon particles will, however, ascend through the water protected from contact with the latter by inclosing air or gas bubbles, and it is one of the objects of the invention to provide means for breaking or destroying these bubbles before they escape from the water so as to effect precipitation in the tank of all the carbonaceous matter which escapes from the furnace. To this end therefore we provide the disk with a depending skeleton or open-work obstruction or strainer through which it will be practically impossible for the bubbles to thread their way and escape beyond the margin of the disk. This obstruction or strainer we have shown in the form of a series of foraminous fluted walls 29, it being preferred to make the walls fluted as by so doing the water just below the disk will be more effectually and thoroughly agitated by the rotation of the disk, it being understood, however, that we do not intend to restrict ourselves to a rotating disk, as under some circumstances a stationary disk will effect the desired result.

To divide the volatile products of combustion discharged by the vertically depending pipe 15 into the water so as to more reliably effect the separation therefrom of the carbon particles, I preferably support upon arms 30 suitably secured to the tank, the centrally arranged cone or spreader 31, it being obvious by refer-

ence to Fig. 1 that said cone or spreader compels the said products of combustion to pass downwardly around the cone at all sides and then rise in the form of a ring as indicated by arrows, Fig. 1, and enter the obstruction or strainer, which compels it to take a very tortuous course in order to escape from below the disk, this tortuous path of escape being rendered still more irregular when the disk and the obstruction or strainer are rotating. In fact at such time the strainer has a rubbing or beating effect which will tend to more effectually and efficiently break up the gas and air bubbles so as to give the water access to any carbonaceous particles which was contained in such bubbles; the result of such contact being the almost instant precipitation of the particles of soot. The soot will work its way down onto the valve, and when the latter is opened, will be forced by its gravitative tendency and the superposed water to enter the box 10, from which it can be conveniently removed, the valve being of course, closed after the soot and water have been withdrawn, and it is recharged with a new supply of water. It is preferred that the furnace shall be out of commission at the time the accumulated soot is removed, but it is obvious that suitable means may be provided without requiring the exercise of invention, to effect the removal of the soot without the discharge of any material volume of water, and that consequently such removal of the soot may occur without interfering with the operation of the furnace.

From the above description it will be apparent that we have produced a smoke separator embodying the features of advantage enumerated as desirable, and we wish it to be understood that we do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus described the invention what we claim as new and desire to secure by Letters Patent, is:—

1. A smoke separator comprising a tank containing liquid, a smoke pipe having its end submerged in the liquid, a rotary disk mounted horizontally in the tank vertically above the end of the smoke pipe, means for rotating the said disk, and a strainer consisting of fluted foraminous walls depending from said disk. 40

2. A smoke separator comprising a tank containing liquid, a smoke pipe having its end submerged in the liquid, brackets on the wall of the tank, a rotary disk arranged above the end of the smoke pipe and having an annular horizontal flange resting on said brackets and a horizontal gear wheel above said flange, an annular strainer depending from said disk, and a driving shaft mounted in the wall of the tank and carrying a pinion meshing with the gear wheel on the disk. 45 50

3. A smoke separator, comprising a tank containing a liquid, a conical spreader submerged in said liquid, a disk having its lower surface submerged in the liquid above the spreader, and a pipe having its lower end submerged in the liquid above the spreader, and means for forcing the products of combustion from a furnace down through said pipe into said liquid and onto said spreader. 55 60

4. A smoke separator, comprising a tank containing a liquid, an escape pipe communicating with the upper portion of the tank, a spreader submerged in the liquid of the tank, a rotating disk having its lower surface submerged in the liquid of the tank above the spreader and provided with a depending obstruction or strainer, a pipe extending into the tank and down through said disk, a smoke pipe, and means connecting the smoke pipe and the pipe extending down through the disk for the purpose of creating a suction through the former and a blast through the latter to discharge the volatile products into the liquid and upon the said spreader. 65 70

In testimony whereof we affix our signatures, in the presence of two witnesses.

RUDOLPH H. WEBER.
DAVID W. SMITH.

Witnesses:

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G. Y. THORPE.