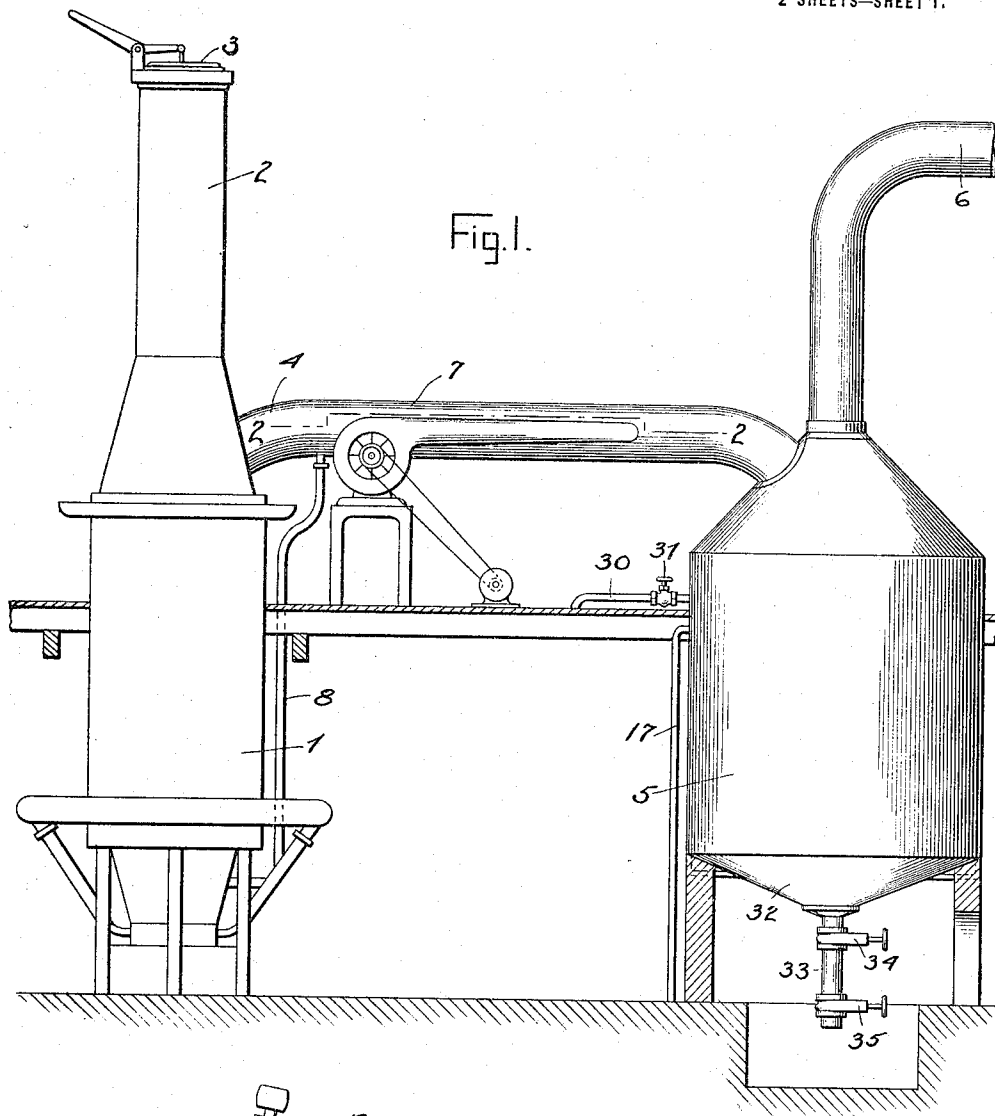
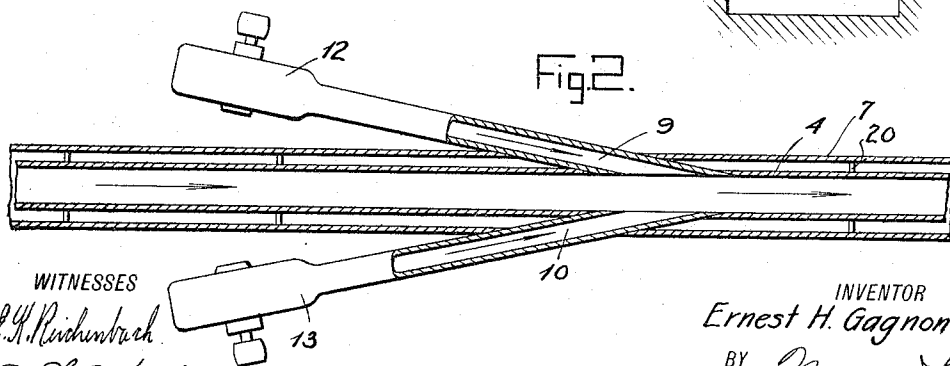


E. H. GAGNON,
FUME AND SMOKE FILTER.
APPLICATION FILED SEPT. 1, 1914.

1,148,508.

Patented Aug. 3, 1915.
2 SHEETS—SHEET 1.



WITNESSES
L. H. Richenbach
A. L. Kitchin

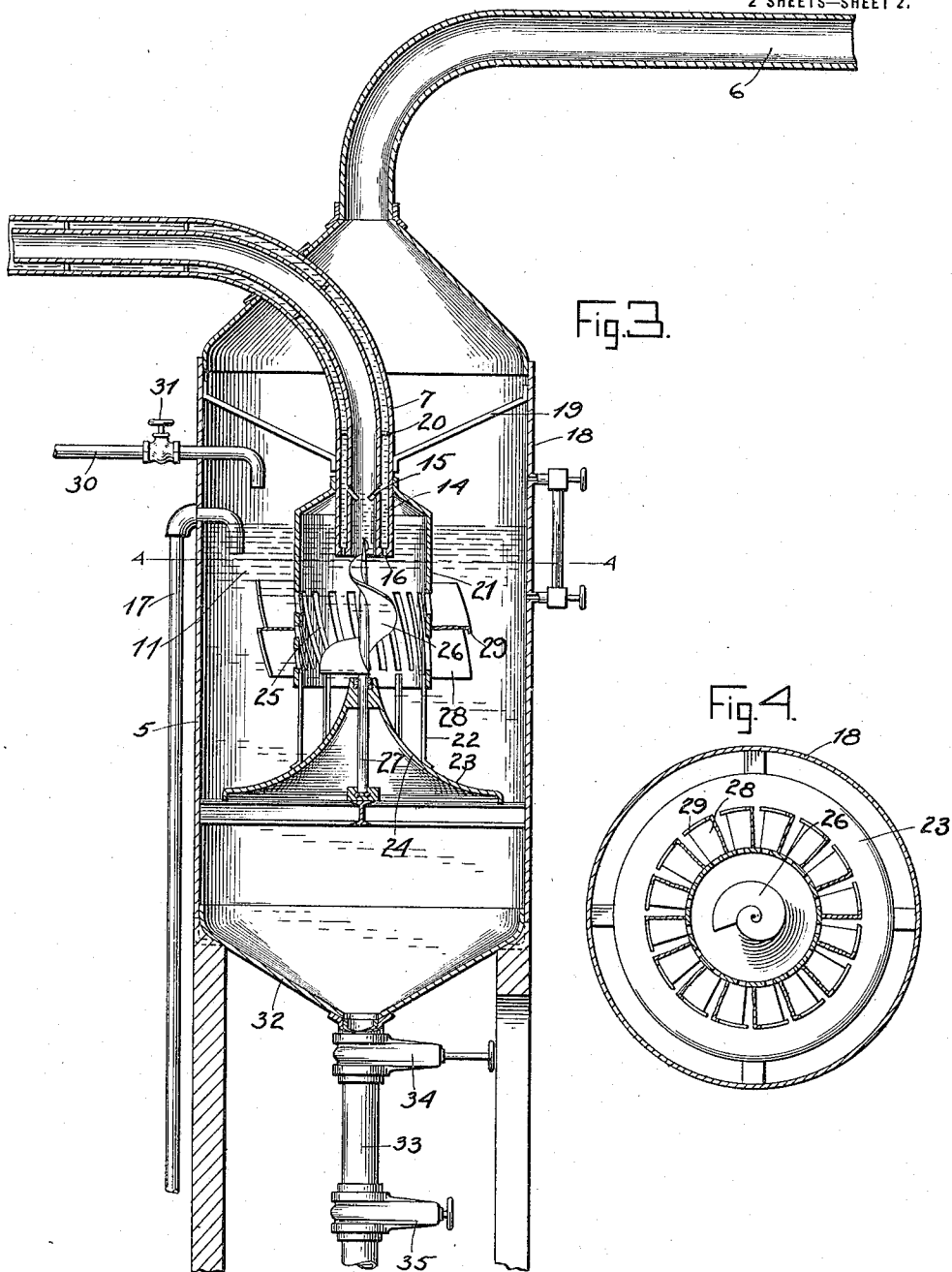
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ATTORNEYS

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WITNESSES
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UNITED STATES PATENT OFFICE.

ERNEST H. GAGNON, OF BILLINGS, MONTANA.

FUME AND SMOKE FILTER.

1,148,508.

Specification of Letters Patent.

Patented Aug. 3, 1915.

Application filed September 1, 1914. Serial No. 859,593.

To all whom it may concern:

Be it known that I, ERNEST H. GAGNON, a citizen of the United States, and a resident of Billings, in the county of Yellowstone and State of Montana, have invented a new and Improved Fume and Smoke Filter, of which the following is a full, clear, and exact description.

This invention relates to improvements in filtering devices, and particularly to an improved construction for filtering the fumes and smoke from smelters and other similar devices so as to purify the smoke and fumes and to collect the solid matter in the smoke and fumes.

The object in view is to provide a simple effective device for removing the solid matter from the fumes and smoke of a smelter or similar device.

Another object in view is to provide means for filtering the fumes and smoke from a smelter or the like, which means is designed to allow a continuous discharge of the fumes and smoke from the filter.

A still further object of the invention is to provide an improved filtering device for fumes and smoke arranged to effect a thorough mixing of such fumes and smoke with water or other suitable liquid previous to the escape of the smoke, whereby the solid matter will be precipitated and the smoke will be discharged in a condition not injurious to animal or plant life.

In the accompanying drawings Figure 1 is a side view of a smelter and filtering device, the filtering device disclosing an embodiment of the invention; Fig. 2 is a fragmentary enlarged sectional view through Fig. 1 approximately on line 2—2; Fig. 3 is a longitudinal vertical section through the filter shown in Fig. 1; Fig. 4 is a section through Fig. 3 on line 4—4.

Referring to the accompanying drawings by numerals, 1 indicates a smelter of any desired description which may be water-cooled or not as preferred. Connected with the smelter 1 is the usual smoke stack 2 having a removable cover 3. Also connected with the smelter 1 is a pipe 4 which is designed to receive the smoke and fumes from the smelter when the lid 3 is closed and turn said fumes and smoke into the filter 5 where it is washed and thoroughly filtered so that the solid products may be removed at the bottom of the filter 5 and the smoke pass out the discharge pipe 6. After the smoke and

fumes have been washed in water or other suitable liquid in the filter 5 the matter discharged out pipe 6 will be non-injurious to animal or vegetable life so that the smelter may be operated at any desired point and not endanger the surrounding vegetation or the workmen necessary to properly operate the device.

The pipe 4 is provided with a surrounding water jacket 7, which water jacket is supplied with water by a pipe 8 from any suitable source, as for instance from the water jacket of the smelter 1 or from a hydrant (not shown). In order that the fumes and smoke may properly pass through the pipe 4 and be discharged with some considerable force into the water in filter 5 air jets 9 and 10 (Fig. 2) are provided which are set at a slight tangent to pipe 4 whereby as the air is forced into pipe 4 the same will suck or draw the fumes and smoke from smelter 1 and force the same into the water or other liquid 11 in the filter 5 on the order of an injector. The jets 9 and 10 may be supplied with air from any suitable source, as for instance by blowers 12 and 13, said blowers being operated from motors or other suitable sources of power. As the air is forced into the pipe 4 the same moves in the direction of the arrow shown in Fig. 2, and acting as an injector will form a vacuum or a suction for drawing the gases from the smelter until the gases pass the inlet jets 9 and 10, and will then force the same to the discharge point in tank 5. It will be noticed that the jets 9 and 10 discharge into pipe 4 and that the jacket 7 surrounds pipe 4 from the smelter 1 to the lower end of pipe 4, which lower end is normally beneath the water 11 in the filter 5. The jacket 7 is supplied continuously with water from pipe 8 so that the water in the end 14 of jacket 7 may be discharged through notches 15 or apertures 16. This prevents any accumulation of steam or any considerable pressure in the water jacket and provides a cooling agent which acts substantially even at all times. The water 11 is maintained at a predetermined level by an overflow pipe 17 which may be discharged at any point without departing from the spirit of the invention.

From Fig. 3 it will be noted that the lower end of the jacket 7 is held centrally of the casing 18 of filter 5 by suitable brackets or bracing rods 19. The pipe 4 is held cen-

trally of jacket 7 by suitable bracing members 20 arranged at suitable intervals throughout the length of the jacket 7. Arranged below the lower end of pipe 4 and water jacket 7 is a hood or guard 21 having the upper end telescoped over the lower end of said water jacket. The hood 21 may be secured to the water jacket 7, if desired, but preferably is not secured thereto but is supported by suitable uprights 22 connected with a deflecting member 23. The deflecting member 23 is conical in shape with the walls curved at 24 so as to thoroughly spread any smoke or other matter striking the same and thereby distribute said smoke and fumes throughout the water 11. The hood 21 is provided with a plurality of helically arranged slots 25. These slots are designed to allow the water in hood 21 to be forced radially outwardly into the main body of the casing 18 so as to mix with the water therein. The water and smoke and fumes in hood 21 are forced outwardly by a worm propeller 26, which preferably tapers from the lower end to the top though this is not absolutely necessary as in large machines the worm could be of the same width throughout. The worm 26 is secured to a supporting shaft 27 held in place by suitable bearings, the same being preferably of the roller bearing type. When the worm 26 is tapering the upper end is preferably arranged to project into pipe 4 as shown in Fig. 3 so that the smoke, fumes and the forced air from blowers 12 and 13 will easily engage the same, whereby a more or less rapid rotation is provided. The rotation of the worm 26 will naturally cause an outward flowing movement of the liquid including the smoke and fumes. This more or less churning action will thoroughly mix the smoke and fumes with the liquid and thereby allow a thorough washing of the smoke and fumes before the smoke is allowed to escape through pipe 6. Rigidly secured to the hood 21 are a plurality of blades 28 which are formed with turned-over ends 29. These blades are arranged opposite the respective slots 25, and are designed to prevent any appreciable rotary motion of the liquid.

In operation the casing 18 is filled with water from the supply pipe 30, or at least is filled up to the desired level and then the water is shut off by a suitable valve 31. Pipe 30 may be connected to any suitable source of supply while pipe 17 may discharge into the sewer or any other suitable discharge point. After the water has been supplied to the casing 18 the fans 12 and 13 may be started and the fumes thus drawn from the smelter 1, which fumes pass downwardly into hood 21 where the same are thoroughly mixed with the water previous to their discharge through the slots 25. It will be evident that any excessive movement

of the water may freely escape out the bottom of slot 25 and be spread by the deflector 23, which deflector is supported by suitable supporting bars connected with the casing 18. The washed and filtered smoke is allowed to pass into the upper part of the casing 18 and from thence out pipe 6. As all of the free matter in the smoke and fumes has been removed the smoke discharged out of pipe 26 is therefore not injurious either to animal or vegetable life. The free or solid matter in the smoke and fumes is precipitated and is collected in the bottom 32 of casing 18. Connected with the bottom 32 of casing 18 is a discharge pipe 33 provided with valves 34 and 35, these valves being preferably of the gate type and spaced an appreciable distance apart so that one valve may be open while the other is closed and thereby produce a discharge of the precipitate in measured quantities, and without molesting the water in the casing 18. It is perfectly evident that the water in casing 18 may be emptied by opening both of the valves 34 and 35.

What I claim is—

1. In a device of the character described, a container designed to have maintained therein a predetermined quantity of water, a pipe for discharging smoke and fumes into said container, a hood or casing surrounding the lower end of said pipe and extending into said water, said hood or casing being provided with a plurality of slots and a propeller having a blade tapering from the top to the bottom arranged in said casing and rotated by said smoke and fumes as the same enter the casing whereby the smoke and fumes are mixed with the water and forced through said slots, the small end of said blade being first engaged by said smoke and fumes whereby the direction of movement of the smoke and fumes is changed gradually from a downward movement to a substantially horizontal movement.

2. In a device of the character described, a receptacle designed to contain a predetermined quantity of water, a pipe for discharging smoke and fumes into said receptacle, the lower end of said pipe projecting below the surface of said water, rotatable means operated by said smoke and fumes for forcing the water and the smoke and fumes radially, a hood surrounding said rotating means, said hood being formed with slots and a plurality of baffling members secured to said hood formed with means extending substantially parallel with the hood for preventing a whirling action of the water and smoke after the same has passed through said slots.

3. In a device of the character described, a receptacle adapted to contain a predetermined quantity of water, means for maintaining water in said receptacle, a pipe for

discharging smoke and fumes into said casing, said pipe having the lower end arranged below the surface of said water, a hood surrounding the lower end of said pipe and extending an appreciable distance below said lower end, a plurality of slots arranged in said hood, and a plurality of baffling members arranged exteriorly of said hood, said baffling members having radially extending portions and substantially arc-shaped portions, said arc-shaped portions extending in a plane substantially at right angles to said radial portions.

4. In a device of the character described, a casing adapted to contain a predetermined quantity of water, a pipe extending into said casing and arranged with the lower end thereof below the surface of said water, said pipe being designed to direct smoke and fumes into said casing, a rotating agitating member arranged below the lower end of said casing, a hood surrounding said agitating member, said hood being formed with slots whereby the smoke and fumes together with the water mixed by said agitating device will be forced through said slots, and

means arranged on the exterior of said hood for preventing a whirling or rotary movement of the water in said casing outside of said hood.

5. In a smoke filter of the character described, a tank for receiving a washing fluid, means for directing smoke and fumes into said tank beneath said washing fluid, a hood having one end surrounding said means, said hood having a plurality of slots, a rotating agitating screw arranged beneath said means in said housing whereby the same is rotated by the smoke and fumes passing from said means for mixing the washing fluid with the fumes and smoke, and baffling members arranged on the exterior of said hood for preventing a whirling or rotary movement of the washing fluid exteriorly of the hood.

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

ERNEST H. GAGNON.

Witnesses:

W. D. BOYD,
VAN A. REED.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."