W. F. PARSONS.

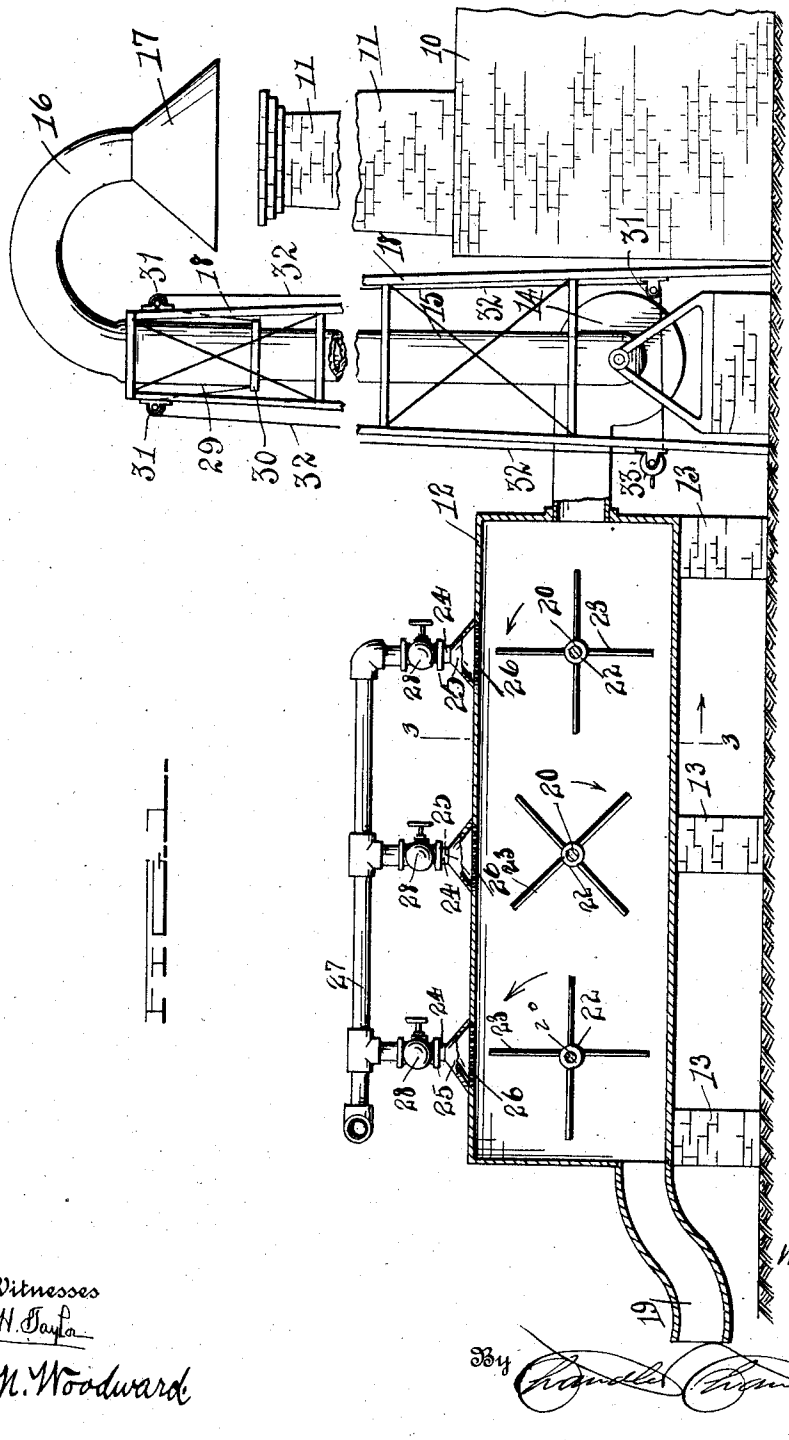
FUME ARRESTER AND SMOKE PURIFIER.

APPLICATION FILED MAY 18, 1910.

972,637.

Patented Oct. 11, 1910.

2 SHEETS—SHEET 1.



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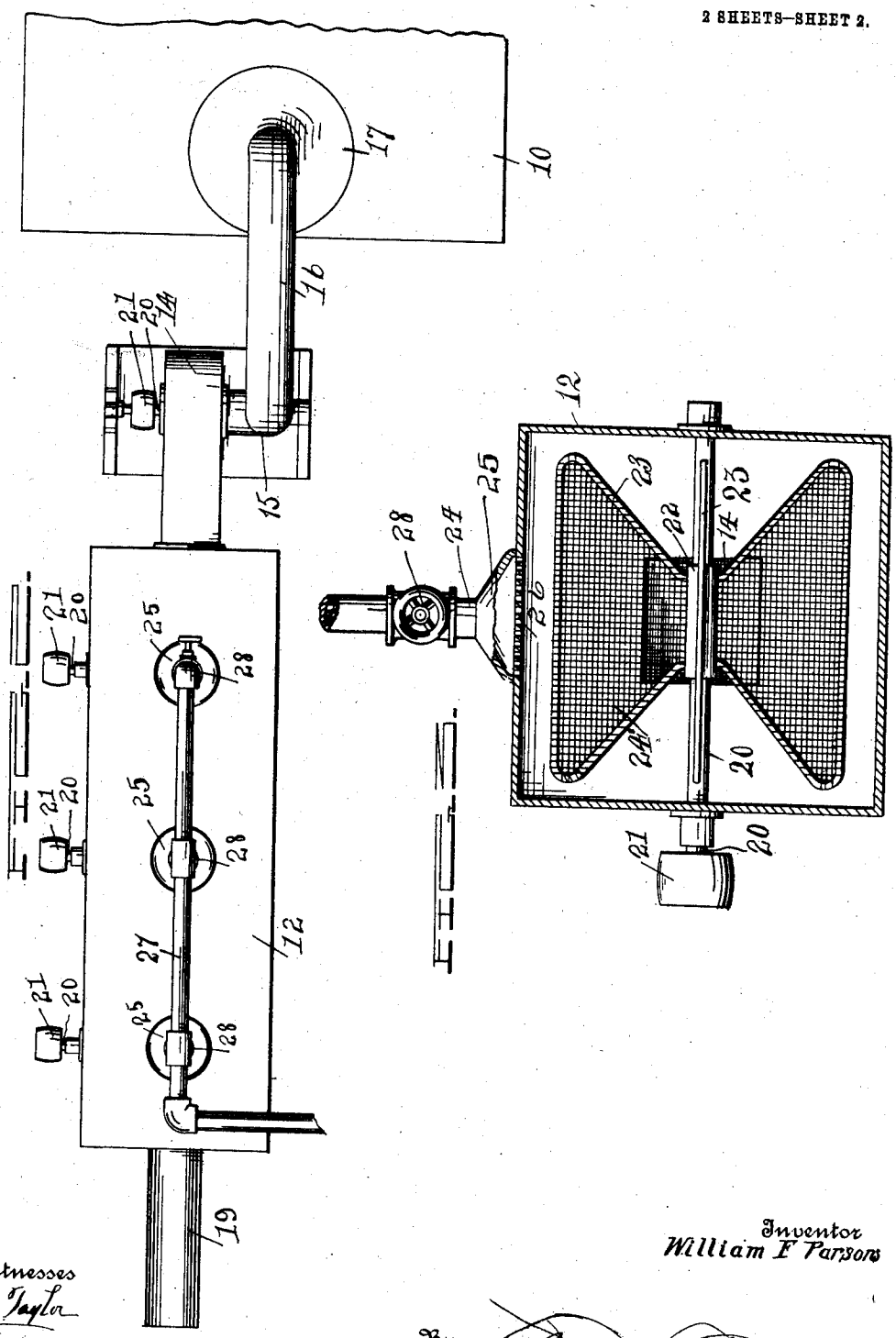

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UNITED STATES PATENT OFFICE.

WILLIAM F. PARSONS, OF IRVINE, KENTUCKY.

FUME-ARRESTER AND SMOKE-PURIFIER.

972,637. Specification of Letters Patent. **Patented Oct. 11, 1910.**

Application filed May 18, 1910. Serial No. 562,086.

To all whom it may concern:

Be it known that I, WILLIAM F. PARSONS, a citizen of the United States, residing at Irvine, in the county of Estill, State of Kentucky, have invented certain new and useful Improvements in Fume-Arresters and Smoke-Purifiers; 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 improvements in devices for arresting and purifying smoke, fumes and other products of combustion, and has for one of its objects to improve the construction and increase the efficiency and utility of devices of this character.

With this and other objects in view, the invention consists in certain novel features of construction as hereinafter shown and described and then specifically pointed out in the claims.

The improved device is designed more particularly for use in connection with smelting and like furnaces and apparatus, and may be adapted without material structural changes to furnaces employed for reducing various kinds of ores, but is designed more particularly for use in furnaces where in the reduction of ores injurious fumes are created, and for the purpose of illustration a conventional furnace is shown with the improved apparatus applied, and in the drawings thus employed, Fig. 1 is a side elevation, partly in section, of the improved apparatus applied, Fig. 2 is a plan view of the same, Fig. 3 is a transverse section, enlarged, on the line 3—3 of Fig. 1 looking in the direction of the arrow.

The body of the furnace is represented at 10 and the chimney at 11 of the usual construction. The improved device comprises a sheet or plate metal shell or chamber 12, preferably in square oblong box-like form and mounted upon a suitable foundation 13. Connected to the chamber 12 at one end is a suitable suction fan 14 which discharges into the chamber. The intake of the fan is in the form of a tubular conductor member 15 which leads upwardly relatively close to the stack 11 and is turned over at the upper end as shown at 16 and terminates in a relatively large hood 17 which is located directly over the upper or discharge end of the stack, with its mouth spaced a suitable distance above the stack to permit a certain amount of the products to pass from the stack without interference from the hood. The pipe 15 and its hood are supported by a suitable framework 18, as shown. The discharge end of the curved portion 16 of the tube is telescopically connected to the body of the tube 15, as represented at 29, so that the hood may be adjusted vertically to control the distance between the intake terminal of the hood and the discharge terminal of the stack 11, so that the improved device may be adjusted to the draft of the stack. The lower end of the telescopic portion 29 is surrounded by a suitable band 30, while the frame 18 is provided with guide pulleys 31 over which adjusting cables 32 are passed and connected to the band 30, the cables leading downwardly to a suitable windlass 33 attached to the frame 18 at a convenient point near the ground. By this means it will be obvious that by rotating the windlass 33 the hood 17 may be adjusted vertically relative to the stack. The stacks of furnaces of this character are generally of considerable height, and the conductor 15 will be of proportionate length and may be varied according to the height of stacks of the different furnaces with which it will be associated. Leading from the opposite end of the chamber 12 is a discharge tube 19, which is preferably turned downwardly so as to permit a free discharge from the chamber. Mounted for rotation through the chamber 12 are a plurality of shafts 20, each shaft having a belt pulley 21 at one end to enable it to be rotated by a suitable belt. Any required number of the shafts may be employed, but with an ordinary size of apparatus three will be sufficient, as shown.

Connected to each of the shafts is a hub 22, and connected to each hub are a plurality of wire frames 23 of relatively heavy wire, the frames being preferably triangular as shown in Fig. 3, and each frame provided with a covering of foraminous material such as coarse wire netting, represented conventionally at 24'. The shafts 20 will be arranged to be rotated in opposite directions or as indicated by the arrows, the object to be hereinafter explained.

Above the chamber 12 opposite each of the shafts 20 and its wire netting wings is a feed pipe 24, and connected to each of the feed pipes at its lower end is an inverted funnel device 25, and within each of the funnel devices the upper side of the chamber 12 is provided with a plurality of fine perfora-

tions 26, so that streams of water passing through the pipes 24 are transformed into fine sprays and discharged in this condition downwardly upon the revolving wings. The several pipes 24 are preferably connected to a single trunk 27 so that the various sprays may be supplied from one source or reservoir. Each of the pipes 24 is provided with a shut-off valve 28, to enable the flow to be controlled.

With a device thus constructed it will be obvious that when the fan 14 and the shafts 20 are operated at high speed, a strong suction will be created through the conductor 16 and its hood 17, with the result of carrying the smoke, gases and other products of the combustion which rise from the stack 11 into the chamber 12 and against the rapidly revolving wings and drawn into contact with the finely divided sprays falling from the supply pipes 24, and the fumes, smoke and gases thus subjected to a rapid and vital agitation, and the fumes and other products of the combustion thus subjected to the action of the water, which effectually absorbs the fumes and discharges the same through the downwardly directed pipe 19. The gas and water thus thoroughly commingle and the fumes are absorbed by the water and conducted in any required manner at any distance from the chamber. By this simple means the fumes are prevented from passing off from the upper end of the stack, and all danger of any damage from the fumes thus effectually prevented. By arranging the revolving agitators to operate against each other, the sprays are also thrown against each other, and the commingling of the particles thereby materially facilitated, and the utility of the apparatus also materially increased.

The improved apparatus is simple in construction, can be manufactured of any suitable size or capacity, and thus adapted for any size of furnace, smelter, or other similar apparatus from which fumes or other deleterious matter is liable to be ejected.

What is claimed is:—

1. In an apparatus of the class described, an inclosed chamber having a plurality of apertures provided with foraminous closures, an agitator mounted for rotation in said chamber beneath each of said apertures in position to engage liquid flowing therethrough, means for causing induced air currents to pass into said chamber and against said agitators and means for causing said agitators to be rotated in opposite directions and against liquid flowing through said apertures.

2. In an apparatus of the class described, an inclosed chamber having a plurality of apertures spaced apart and provided with foraminous closures through which liquid is caused to flow, an agitator mounted for rotation in said chamber beneath each of said openings in position to engage with the liquid flowing therethrough, means for causing induced air currents to pass into said chamber and against said agitators, and means for rotating said agitators in opposite directions and against the liquid flowing from said apertures.

3. In an apparatus of the class described, a closed chamber having an air intake at one end and a water discharge at the opposite end, a plurality of spray devices in the upper side of said casing and discharging liquid downwardly therein, an agitator mounted for rotation within the chamber and beneath each of said spray devices, means for inducing air currents through said chamber, and means for rotating said agitators in opposite directions and against the liquid falling through the spray devices.

4. In an apparatus of the class described, the combination with a stack, of a closed chamber, a conductor leading at one end into said chamber, a hood located above said stack and having a downwardly directed tubular discharge telescopically engaging said conductor, means for adjusting said hood discharge upon said conductor, means for inducing air currents through said conductor and hood, a plurality of agitators mounted for rotation in said chamber, and means for spraying water in said chamber and against said agitators.

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

WILLIAM F. PARSONS.

Witnesses:
W. M. SNOWDEN,
HAL COCKRILL.