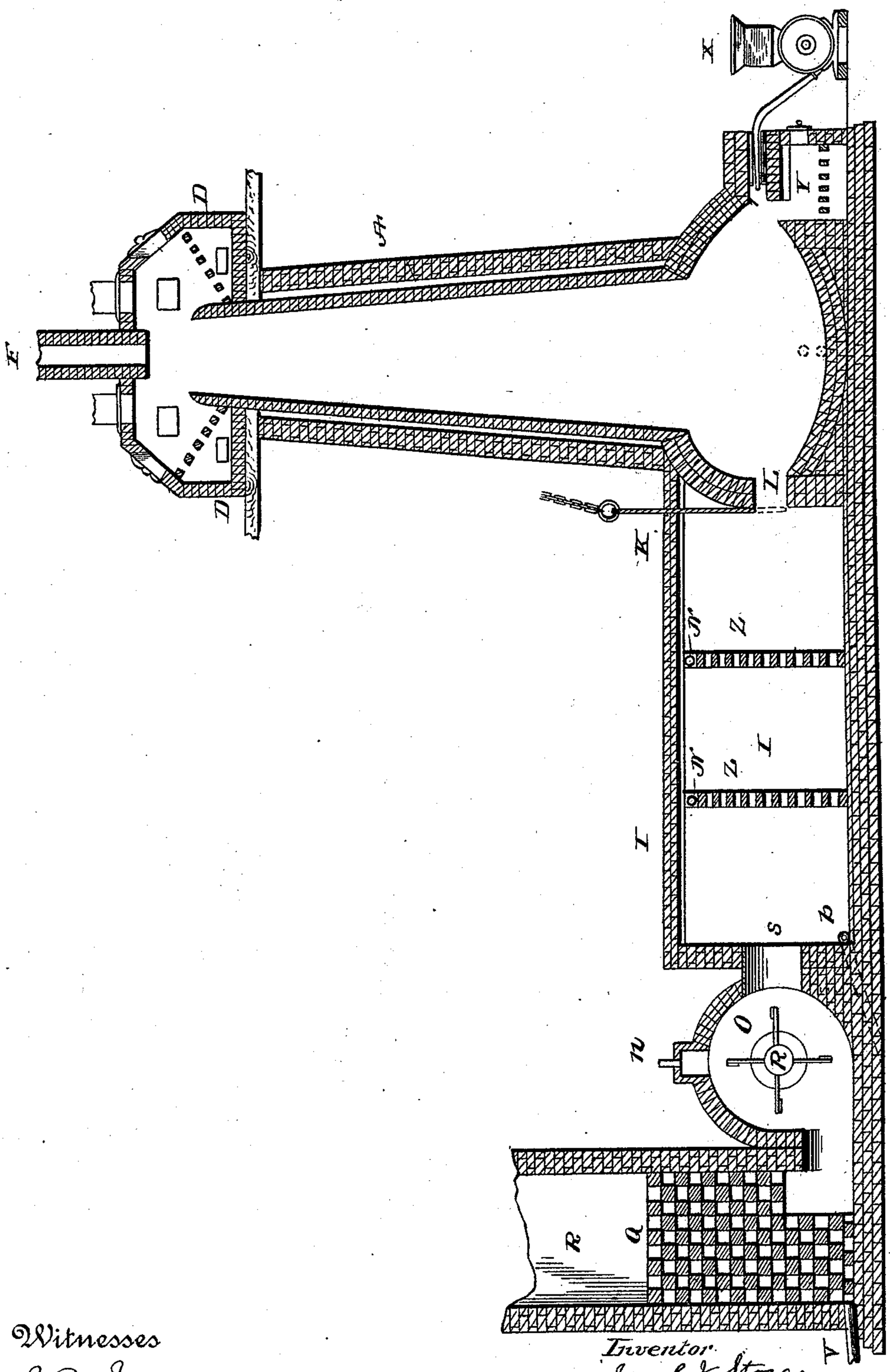
(No Model.)

J. J. STORER.

FUME ARRESTER.

No. 516,664. Patented Mar. 20, 1894.



Witnesses
John Dennis
Thos. E. Robertson

Inventor
Jacob J. Storer
By T. J. W. Robertson Attorney

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JACOB J. STORER, OF HELENA, MONTANA, ASSIGNOR TO THE UNITED MILL AND FURNACE COMPANY, OF MONTANA.

FUME-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 516,664, dated March 20, 1894.

Original application filed March 8, 1893, Serial No. 465,216. Divided and this application filed August 18, 1893. Serial No. 483,475. (No model.)

To all whom it may concern:

Be it known that I, JACOB J. STORER, a citizen of the United States, and a resident of Helena, county of Lewis and Clarke, State of Montana, have invented a new and useful Improvement in Fume-Arresting Devices, of which the following is a specification.

This invention is designed to provide furnaces for smelting and roasting ores, with an improved apparatus for arresting and condensing the gases, dust and fumes; and the invention consists in the peculiar construction, arrangement and combinations of parts hereinafter more particularly described and then definitely claimed.

The accompanying drawing shows a vertical central section of a furnace constructed according to my improvement; in which—

A represents the ore feeding shaft, which may be of any approved form, but preferably of that shown in the drawing with fireplaces D surrounding the top of the same, a central conductor F above, a concave hearth below, and provided with an auxiliary fire-place Y and a pulverized fuel-feeder or fan X at one side, and a damper K at the other side, but as the parts so far mentioned form no part of the invention herein claimed, and are fully described and the novel parts thereof claimed in my application, Serial No. 465,216, filed March 8, 1893, of which this is filed as a division, no further description is necessary.

At the left hand of the furnace is an exit or smoke-flue I leading to the spray-wheel chamber O, in which revolves the spray-wheel R, which is of such construction that when in operation it causes the downward draft of the hot-air and fumes from the fire-places of the shaft and of the ore introduced into said shaft, and drives the same through the cob or lattice-work Q which fills the base of the smoke-stack S. Water, or water with the proper chemical re-agents in suspension or solution, in sufficient quantity for the production of the requisite amount of spray, is introduced upon the spray-wheel through the pipe *n*, and this spray, with the absorbed gases and dust, is thrown by the wheel R upon and through the cob or lattice-work, and thence drains off through a pipe V into a suitable reservoir. This lattice or cob-work Q may be of any desired dimensions, but the openings should be of sufficient combined area to admit of the free upward passage of the air to be expelled through them. Its great value lies in the extensive condensing and arresting surface which it presents to the escaping steam, water and spray.

At different places along the length of the flue I are perforated walls Z constructed of brick, tile, or other acid-resisting material, laid with wide spaces through them for the passage of the furnace gases; and these walls, being constantly wet and cooled by water from the pipes N, serve to cool and condense the greater portion of the escaping gases, smoke and metallic fumes, and to arrest most of the ore-dust from the volume passing on to the spray-wheel, where the residue is afterward wet down.

I am aware that water sprays, perforated walls kept wet with water and jets of steam have long been used for arresting and condensing the gases, dust and metallic fumes in the flues of ore-roasting furnaces, and therefore do not claim these broadly, for the effect of these, so far as known, separately or in combination, is only partial, for the resulting steam or mist escaping from the furnace flues is found in all cases to contain a very appreciable amount of metallic dust. In order to stop this loss, and to prevent the injurious effects on the surrounding vegetation from this dust deposit, I have combined with these usual condensing devices, an exhaust-fan and spray-wheel upon which cold water alone or water holding chemical re-agents (such as chloride of lime, quick lime, carbonate of soda, chlorides of sodium, chloride of potassium, &c.,) is introduced, to be converted into a fine spray and be thrown forward at a pile of cob or lattice-work, which may partly or completely fill the smoke-stack. By the arrangement of a series of sprays or jets of water constantly dripping over the perforated walls Z, much of the particles of matter are arrested and carried down by the dripping water before it arrives at the spray and draft wheel and thus there is much less work for it to do and hence less power is re-

quired to drive the wheel, as it has not to carry so much of the material carried by the gases. This effect is increased by the use of the perforated walls, although in some cases the simple spray may be found sufficient. This draft and spray-wheel may be made of any desired dimensions and be run at any required speed, and any required supply of water or chemical solution may be introduced upon said wheel while the pile of cob or lattice-work may easily be of such dimensions as to prevent an absolutely effective condensing surface.

I am aware of the expired patents, Nos. 41,250, 59,696 and 136,066, and claim nothing shown therein, for I consider my invention as essentially different from anything shown or described in said patents.

What I claim as new is—

1. The combination with an ore roasting or smelting furnace and with its exit flue, of spraying pipes arranged in said flue, a spray wheel chamber communicating with and intermediate between the exit end of said flue and a smoke stack; a spray wheel in said chamber, and a pipe for spraying the wheel, all arranged and operating substantially as herein shown and described.

2. The combination with an ore roasting or smelting furnace, and with its exit flue, of spraying pipes arranged in said flue; one or more perforated division walls fixed in said flue to receive the spray from said pipes; a spray wheel chamber communicating with and intermediate between the exit end of said flue and a smoke stack; a draft and spray wheel in said chamber; and a pipe for spraying said wheel; all arranged and operating substantially as herein shown and described.

3. The combination with an ore roasting or smelting furnace, and with its exit flue, of spraying pipes arranged in said flue; one or more perforated division walls fixed in said flue to receive the spray from said pipes; a spray wheel chamber communicating with the exit end of said flue and with a smoke stack; a spray wheel in said chamber, and a gas-and-dust-condenser-and-arrester, constructed of lattice or cob work, fixed in the base of the smoke stack; all arranged and operating substantially as herein shown and described.

4. As a means for arresting and condensing the dust, gases, and metallic fumes, escaping from an ore roasting or smelting furnace, the combination with the furnace flue of a spray wheel chamber; a spray wheel set in said chamber and arranged so as to revolve; a water supply for said spray wheel, and an inclosed surface-condenser, composed of cob or lattice work, having interstices both in vertical and horizontal planes; all arranged and operating substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 19th day of July, 1893.

JACOB J. STORER.

Witnesses:
IMLAY MCRAE,
JAMES F. CHESTER.