

(No Model.)

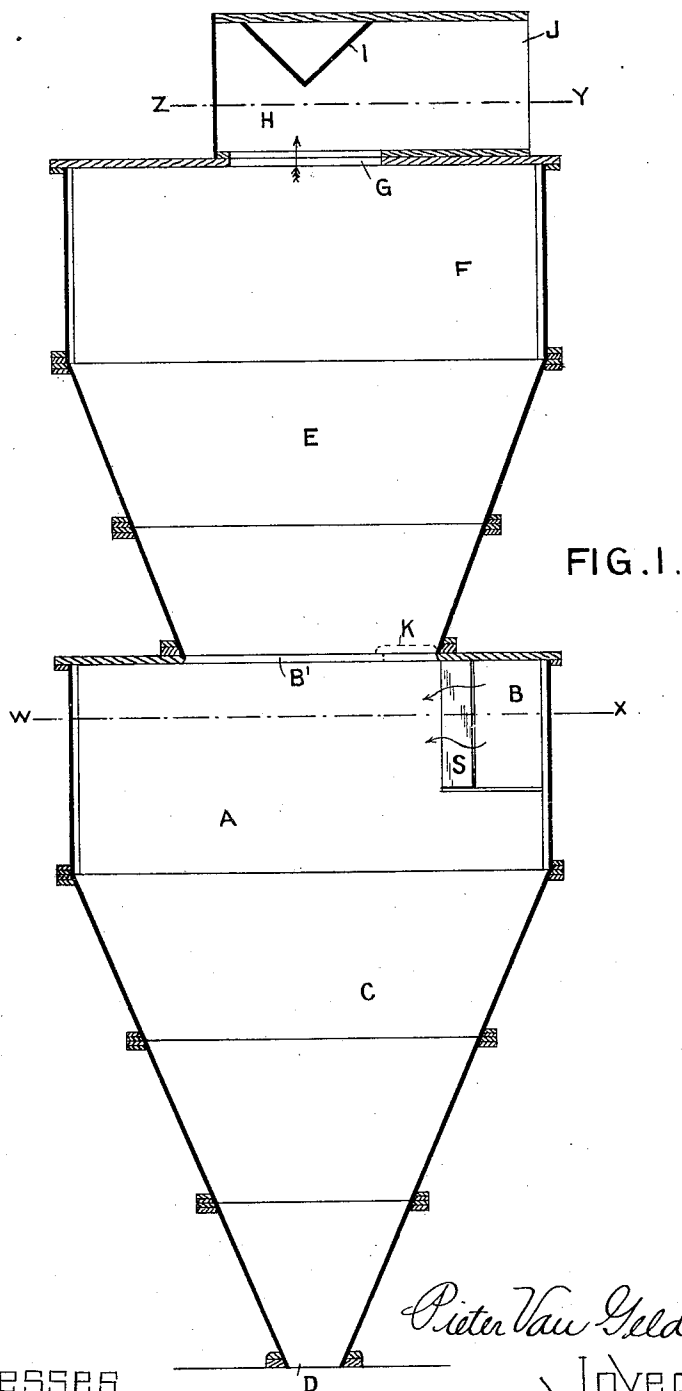
2 Sheets—Sheet 1.

P. VAN GELDER.

APPARATUS FOR SEPARATING DUST FROM AIR.

No. 479,267.

Patented July 19, 1892.



Witnesses
James F. Duhamel
Horace A. Dodge.

Pieter Van Gelder,
Inventor,
by Dodged Lane,
Att'y.

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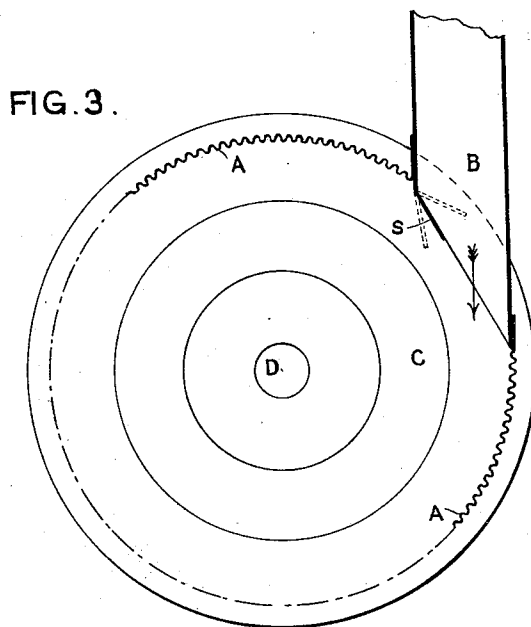
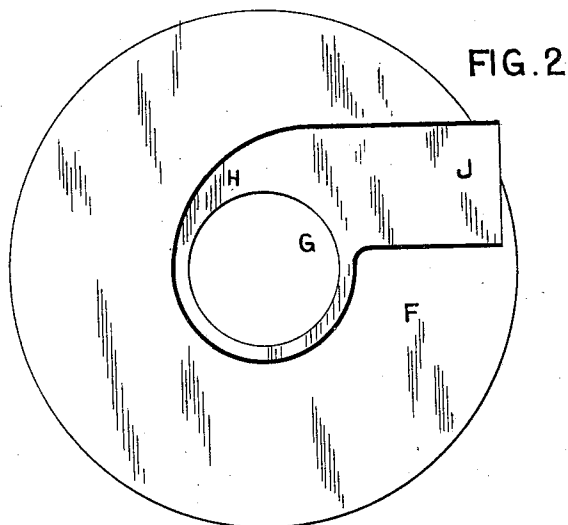
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by Rodger Lons.
Atty.

UNITED STATES PATENT OFFICE.

PIETER VAN GELDER, OF SOWERBY BRIDGE, ENGLAND.

APPARATUS FOR SEPARATING DUST FROM AIR.

SPECIFICATION forming part of Letters Patent No. 479,267, dated July 19, 1892.

Application filed November 4, 1890. Serial No. 370,302. (No model.)

To all whom it may concern:

Be it known that I, PIETER VAN GELDER, milling engineer, a subject of the Queen of Great Britain, residing at Sowerby Bridge, in the county of York, England, have invented certain new and useful Improvements in a Method of and Apparatus for Separating Dust from Air, of which the following is a specification.

This invention relates to certain improvements in that class of dust-collecting apparatus known as "vortex," in which the dusty air passes into a chamber in such a manner as to revolve rapidly therein and deposit the dust in a quiet portion thereof, the object of the improvements being to simplify the apparatus as a whole and to construct it in such manner as to render all internal mechanism unnecessary.

Referring to the drawings, Figure 1 is a vertical section of my improved apparatus, the entirety of which, except the tangential entrance and exit spouts, is preferably circular in section; Fig. 2, a horizontal section on line Z Y, Fig. 1; Fig. 3, a horizontal section on line W X, Fig. 1.

In the drawings, A is a cylinder or regular polygon formed of vertically-corrugated iron and having a wooden top with a large hole B' in the center, as hereinafter described.

B is a tangential opening into cylinder A, into which the air to be purified passes. The inner wall of this opening extends into cylinder A, as shutter S. This is formed of sheet-iron or other suitable material and is bent at any required angle. By this means the area of entrance can be adjusted to suit the volume of air being operated upon, as shown in dotted lines in Fig. 3. A hand-opening covered by a lid K is placed in the roof of a chamber A for the purpose of adjusting the shutter S. If for any given load of air the machine is not working well, the shutter is gradually turned to a different angle until by the absence of dust in the affluent air it is seen that the right angle has been arrived at.

For a fair load for the machine I find the position and relative dimensions shown in full lines in Fig. 3 are best, the opening in the plane of the shutter being then equal to rather more than the cross-sectional area of the entrance-spout.

C is a conical continuation of cylinder A, but formed, preferably, of smooth plates of sheet-iron.

D is an exit for dust, which can be provided with any suitable valve or spout arrangement, whereby the dust as it accumulates shall be relieved, and yet the air cannot pass out in any large quantity; but I prefer it left open entirely without a valve. The cone C can, in some cases, even be cylindrical.

E is a second cone of smooth sheet-iron placed over the hole in the center of cylinder A, and F is a second cylinder of vertically-corrugated metal superimposed on the cone E.

G is the exit from cylinder F.

H is a small sheet-iron cylinder with tangential exit and wooden top, so as to prevent the air rushing straight out upward, but allowing it to continue unimpeded its rotary movement in escaping when the air has to be directed to a particular place, and I is a deflecting-cone of tinued iron or other material. Neither of these two parts H and I is a necessary part of my invention.

In cases where the air does not enter the apparatus with sufficient velocity for the proper working of the same an exhaust-fan may be arranged to draw the air from the exit of cylinder H, or the fan may take the place of said cylinder.

The mode of operation of my apparatus is this: The air entering by the tangential opening B into the cylinder A passes around this cylinder at considerable speed, and the dust flying off tangentially comes into the stiller atmosphere of the concave corrugations and slides down these corrugations to the cone C, continuing its passage down the smooth portion of the cone C to its exit at D. The air, however, being unable to escape from the cone C or cylinder A in any other manner, rises up through the air-exit B' into the cone E until it arrives in cylinder F. The whirling action caused by the air entering the cylinder A tangentially at B continues to this point, and what dust is left in it, being urged by its centrifugal force to the walls of the cylinder F, passes into the quiescent columns of space formed by the interior convex corrugations in said walls, such corrugations having usually about three-fourths of an inch depth of concavity. The dust consequently

falls gradually down the channels of these corrugations to the cone E, and then slides down the said cone to cylinder A. Here it is caught by the air whirling round the cylinder A and enters the corrugations thereof, thence sliding down through the bottom cone C to the opening D. The air, however, is unable to escape from cylinder F in any other direction than through the opening G. Furthermore, through the centrifugal force caused by the rotary motion of the air in cylinder F, the dust still remaining in the said air is chiefly in or near the circumference, the central portion of the air being nearly or quite clear of dust. The air, being unable to escape from cylinder F in any other direction than through opening G, passes up through G, (only the central or purer portion of the air passing.) The air striking the cone I as it enters cylinder H is diverted outward and escapes by the tangential opening J.

In regard to cylinders F and A, I have mentioned only corrugations, because I have found that it is cheaper and more convenient to make the cylinders A and F of corrugated metal, and, further, that corrugated metal answers admirably. It is obvious, however, that other forms of embayments would fill the place of the corrugations. Furthermore, the corrugations can be continued, if desirable, down the cones; but this incurs extra expense, and from my experiment I found it to be practically useless, if not, indeed, positively prejudicial to do this.

I declare that what I claim is—

1. In an apparatus for separating dust from air, a cylindrical casing having a central air-exit in its upper end and peripheral embay-

ments, as described, a tangential air-inlet device adapted to cause the incoming dusty air to whirl around said casing, a downward conical extension of said casing having a dust-discharge orifice at its lower end, a smaller casing communicating directly with said air-exit and having a discharge-pipe tangential to the exit-spout of the smaller casing, and a conical deflector depending from the upper wall of the last-named casing directly above the last-named air-exit, substantially as described.

2. The combination of the cylindrical corrugated casing F, having central air-exit G, the conical extension E, the superposed casing H, having tangential air-exit J and communicating with exit G, the deflecting-cone I above exit G, and an air-inlet opening into the lower end of the casing F, substantially as described.

3. The combination of the cylindrical corrugated casing A, having tangential air-inlet B and central air-outlet B', conical extension C, having dust-discharge opening D, second cylindrical corrugated casing F above casing A, conical casing E, connecting casings F and A, additional casing H, having tangential exit J and communicating with the air-exit G of casing F, and deflecting-cone I above exit G, substantially as described.

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

P. VAN GELDER.

Witnesses:

WM. P. THOMPSON,
H. P. SHOOBRIDGE.