

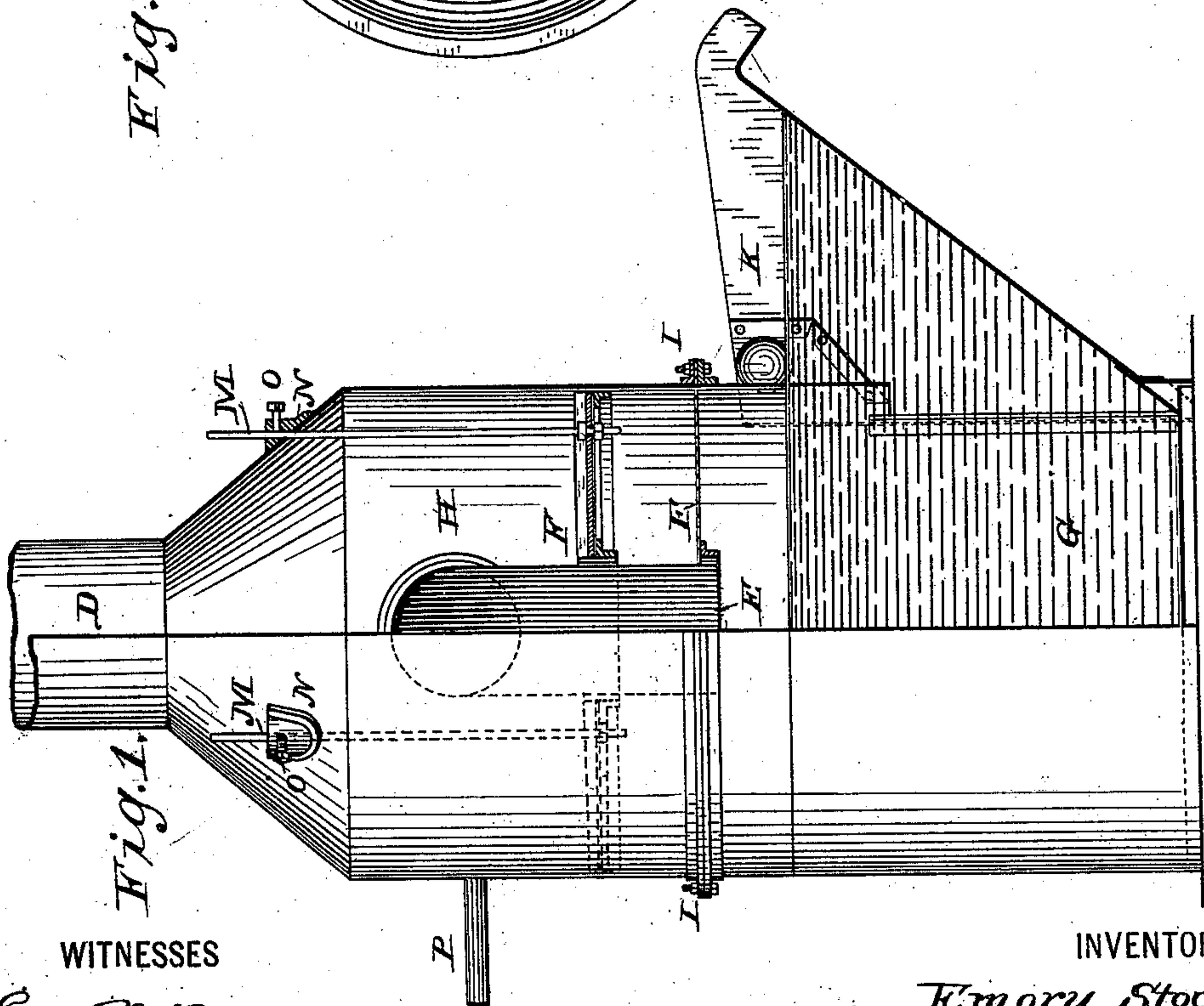
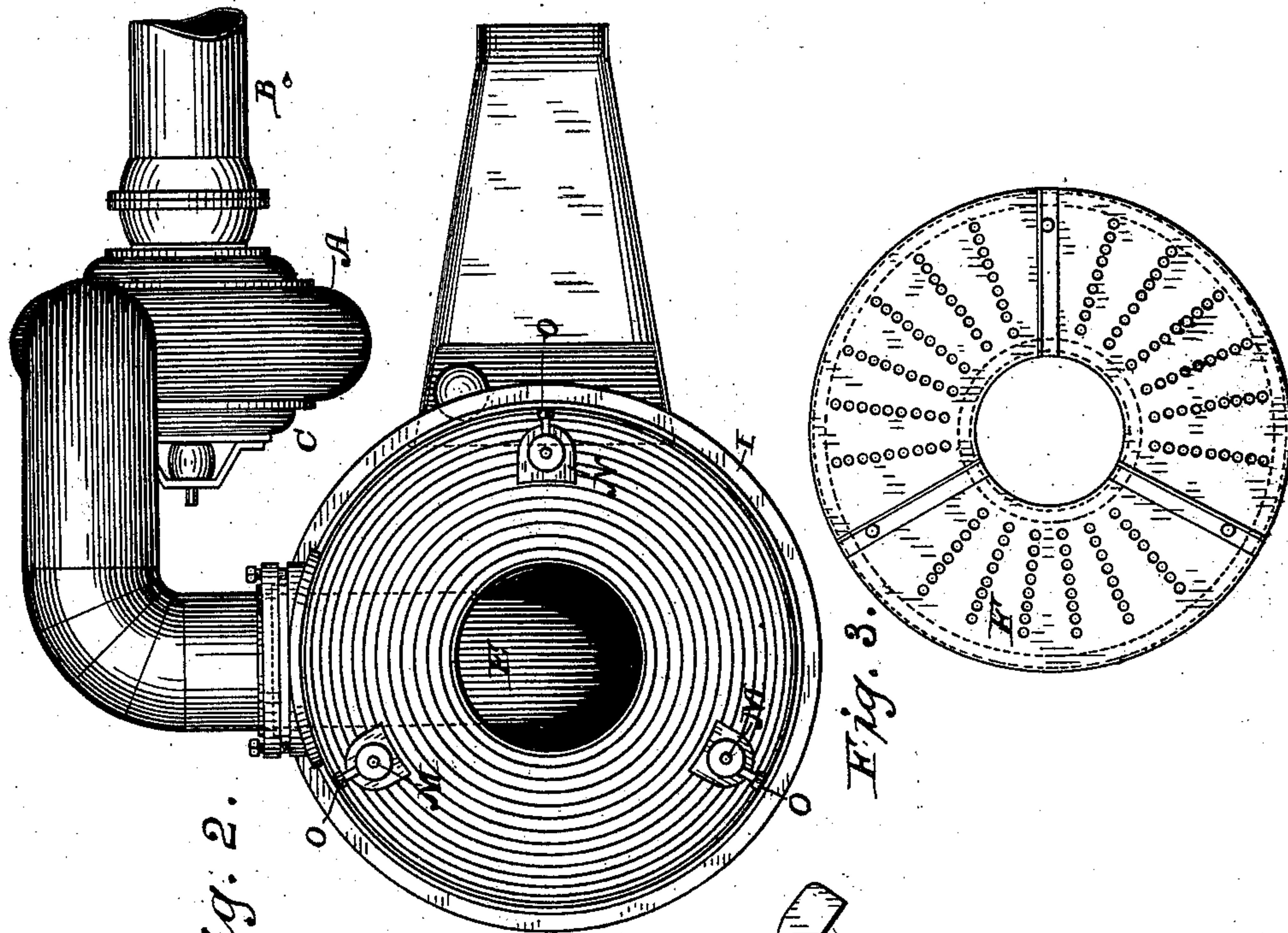
(No Model.)

E. STOCKWELL.

APPARATUS FOR SEPARATING DUST FROM AIR.

No. 418,542.

Patented Dec. 31, 1889.



WITNESSES
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UNITED STATES PATENT OFFICE.

EMORY STOCKWELL, OF STAMFORD, CONNECTICUT, ASSIGNOR OF ONE-HALF
TO HENRY R. TOWNE, OF SAME PLACE.

APPARATUS FOR SEPARATING DUST FROM AIR.

SPECIFICATION forming part of Letters Patent No. 418,542, dated December 31, 1889.

Application filed December 7, 1886. Serial No. 220,896. (No model.)

To all whom it may concern:

Be it known that I, EMORY STOCKWELL, of Stamford, in the county of Fairfield and State of Connecticut, have invented a certain new and useful Apparatus for Separating Dust from Air, of which the following is a specification, reference being had to the accompanying drawings.

My invention is designed to be used in manufactories where metals are ground or polished. Its object is to efficiently separate the fine metallic particles or dust (caused by grinding and polishing operations) from the atmosphere containing them and to collect them in a water-receptacle. The result of this separation is to leave the air pure and to leave the metallic particles in a mass where they can be withdrawn and saved for use.

My invention accordingly consists of apparatus for separating such particles from atmospheric air impregnated with them.

My apparatus consists in a machine for forcing a current of air carrying fine dust and metallic particles into a body of water, over which there is a perforated diaphragm provided for minutely dividing the water (as it rises through the perforations under pressure of the artificial current of air) into jets, spray, or the like, thus breaking up and agitating it around the place where the air first strikes it, so that the air, after being driven into the water, before it leaves the water-vessel, has to pass up through the divided, jetted, sprayed, sudsed, or spumous mass of agitated water, and is itself minutely subdivided like the water and is thoroughly and intimately intermingled with and saturated by the water, and thus completely washed and cleansed or purified without the aid of air-screens, and the dust and metallic particles are thoroughly wet and separated and collected in the bottom of the water-vessel.

In the accompanying drawings, illustrating a form of embodiment of my invention which I deem the best, Figure 1 is an elevation, partly in section; Fig. 2, a top view, and Fig. 3 a view of a diaphragm.

Referring to the letters upon the drawings, A indicates an ordinary fan-blower, which is to be connected by means of an inlet pipe

or pipes B with an emery-wheel or grinding wheel or wheels in the usual way to convey off the dust and fine metallic particles.

C indicates an air-reservoir around the blower, the arrangement being such that a current of air conveying the dust and fine particles of metal will be drawn by the operation of the fan into the reservoir and discharged out of the pipe E downward upon water contained in any suitable water-receptacle. The dust-impregnated air, being driven forcibly into the water, which should be only a short distance—say about four to six inches, (more or less,) according to the size of the pipe E and the strength of the blower from the end of the pipe E—the water will yield under the force of the current of air driven against it and will rise around the end of the inlet-pipe E, through one or more perforated or reticulated diaphragms F. These diaphragms will cause the water to be broken up or jetted and agitated, and to bubble up and foam as if boiling. The air, divided and escaping in jets through the openings in the diaphragms, comes in contact with the divided agitated and seething water, and is thoroughly submerged, washed, and cleansed of its impurities, which are completely entrained in the water and collected at the bottom of the water-vessel G.

I prefer to form my water-vessel and air-chamber H in cylindrical form of sheet metal and to bolt them together, as indicated at I, in any usual manner, so that they form practically one vessel provided with an air-inlet opening, an air-outlet opening D, and one or more perforated diaphragms. These diaphragms may be formed of wood or metal, provided with numerous small holes sufficient for the free outlet of the air. I prefer, where two or more diaphragms are used, not to have the holes in the upper diaphragms directly over those in the lower diaphragm. The holes not being in vertical alignment, the water will be more broken up, and its agitation and bubbling, and consequently its washing effect upon the air blown through it, will be improved.

I prefer to use a spout or side extension K, such as illustrated, in order to facilitate

the removal of the mud or metallic mass from the water-box; but that forms no part of my invention.

I provide an ordinary float-valve, partially illustrated in outline diagrammatically in Fig. 1, for opening and closing a cock to let water into the water box and spout.

On account of the volume of water contained in the water-receptacle, the apparatus will operate for a limited period without any fresh supply of water; but, as evaporation is rapid on account of the blast of air forced against the water, it is important to have an automatic arrangement—such as a float-valve, for example—to supply the water whenever it becomes too low in the receptacle. Otherwise the adjustment of the water-supply with reference to the end of the inlet-pipe would soon become seriously disturbed and interfere with the efficient working of the apparatus. The lower perforated diaphragm is fixed in its relation to the water-box, and the water-level is regulated with reference to this diaphragm by filling the water-box, more or less. The upper diaphragm or diaphragms are preferably made adjustable vertically, so that they may be raised or lowered to suit the force of the blower. The means of adjustment shown consists of three or more rods M, secured at their lower ends to the diaphragms, and which pass up through the top of the air-reservoir and through suitable lugs or castings N, provided with set-screws O.

I have found it advantageous to use soap or some saponaceous substance or a chemical that will aid in inducing a spumous condition of the agitated water through which the air is passed, because the material thing is to cause the air to actually pass through the water not in considerable masses, but in finely-divided condition, so as to be intimately mixed or intermingled with the water and become thoroughly saturated, and the more foamy the condition of the agitated water the better. I can employ saturated steam, but preferably generally in conjunction with water, to be jetted or sprayed into the air-chamber or water-vessel, or both, to aid in the saturation of the air or of the dust or metallic particles.

In Fig. 1, P indicates a steam-pipe, (and there may be several,) which may be connect-

ed with a steam-generator, having a great number of minute perforations through which the wet steam may be jetted suitably to aid in the separation of the solid particles from the air; but by my apparatus I can collect all of the particles of solid matter by the use of water alone, so that the air finally escaping is as pure and safe to breathe as the ordinary atmosphere in good condition near the surface of the earth. I do not deem it necessary or profitable generally to use steam; but it is practicable.

If desired in any case, an overflow-opening may be made in the water-receptacle and provision made for a continuous waste and supply of water in place of an intermittent supply by means of a float-valve or otherwise.

Having thus described my invention, what I claim to be new, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus for separating dust from air, a chamber containing water in its bottom and air above the water, an inlet-pipe entering the chamber and adapted to deliver impure air against the water, and a perforated or reticulated diaphragm surrounding the mouth of the inlet-pipe and dividing said chamber into two parts, substantially as set forth.

2. In an apparatus for separating dust from air, a chamber containing water in its bottom and air above the water, an inlet-pipe entering the chamber and adapted to deliver impure air against the water, a perforated or reticulated diaphragm surrounding the mouth of the inlet-pipe and dividing said chamber into two parts, and a ball-valve to automatically supply the water as fast as evaporated, substantially as set forth.

3. In an air-purifying apparatus, the combination, with the chamber adapted to contain water in its bottom and air above the water, of an impure-air-inlet pipe E, a fixed perforated diaphragm around the mouth of said pipe, and an adjustable diaphragm over the fixed diaphragm, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

EMORY STOCKWELL.

Witnesses:

SCHUYLER MERRITT,
GEO. E. WHITE.