Aug. 18, 1942. E. F. FISHER 2,293,250

DUST COLLECTOR

Filed Nov. 4, 1941

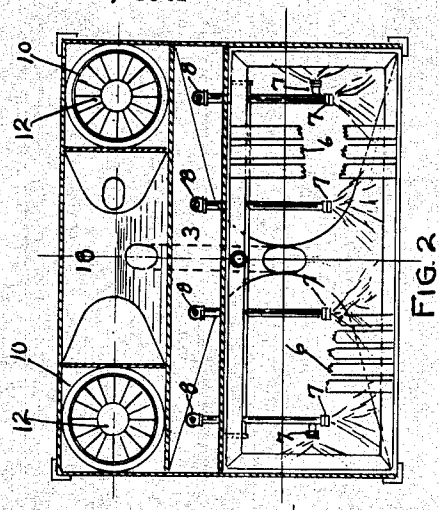


FIG. 2

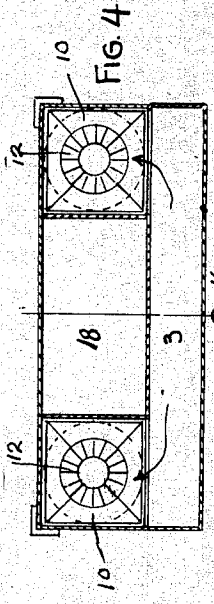


FIG. 4

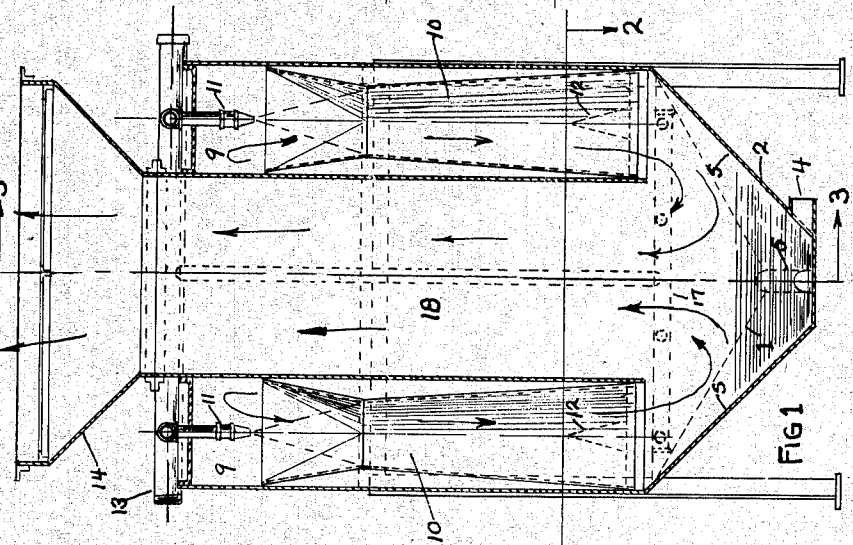


FIG. 1

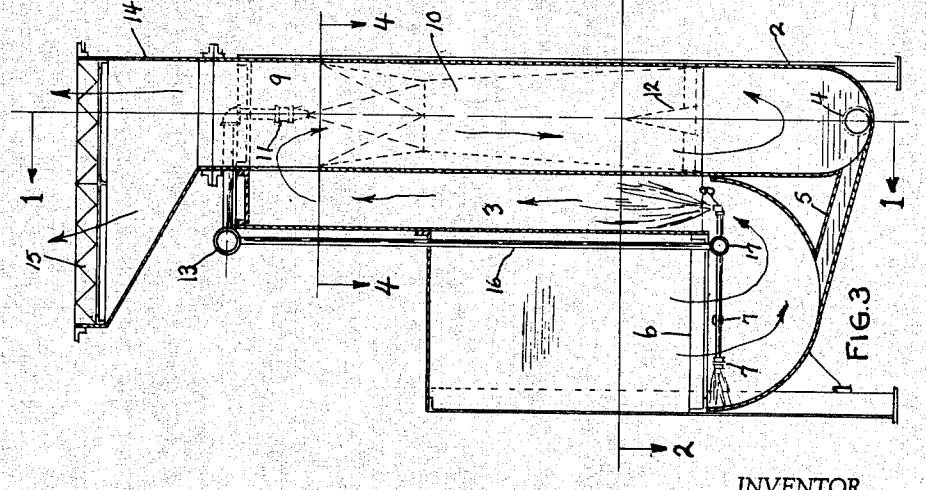


FIG. 3

INVENTOR.

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# UNITED STATES PATENT OFFICE

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## DUST COLLECTOR

Ernest F. Fisher, Passaic, N. J.

Application November 4, 1941, Serial No. 417,805

2 Claims. (Cl. 51—273)

My invention relates to improvements in magnesium grinding and polishing booths which are used in polishing and grinding magnesium castings or other dust creating operations.

Magnesium in the form of dust or powder, being highly explosive, my object is to provide a booth in which grinding and polishing operations on magnesium castings or other dusty operations may be carried on without hazards due to explosion of the dust or to a dusty atmosphere arising from such operations.

Water being one of the best agents for wetting the dust and separating it from the air, I employ this agent in a unique and practical manner. Exhaust fans have been and are being employed for creating a suction in such booths; but because of the hazard attendant upon the use of any moving element to create suction or for mixing the dust laden air with water, I have eliminated all such moving parts in my improved grinding and polishing booth.

In a grinding and polishing booth for hazardous dusts, it is very essential from the standpoint of eliminating the explosion hazard, that all dust created in the grinding and polishing operations be removed immediately and continuously from the interior of the booth and that no part of the interior serve as a lodgement place for the dust. It is also essential when such booths are used in groups of more than one booth, that such booths be not connected to a common air duct leading to a dust collecting apparatus as an explosion in any one booth or in the dust collecting apparatus may be communicated to the other booths. Such a danger is entirely eliminated in my improved grinding and polishing booth as there are no air ducts connected with it and each booth is a separate individual unit whose only connections are a water pipe and a water drain.

Another object of my invention is to provide a booth of the class described that is simple in construction with simple non-mechanical means in the booth itself for producing a powerful air suction necessary to convey the dust and to wet it for separating it from the air stream.

These objects, as well as other advantages inherent in the invention, will be apparent from a detailed description of the same in connection with the accompanying drawing in which: Figure 1 is a vertical section of the booth taken on line 1—1 of Figure 3. Figure 2 is a plan view section taken on line 4—4 of Figure 3.

Referring to Figure 3 for the present, 1 and 2 are water and sludge collecting tanks forming the bottom of the booth. Tank 1 communicates with tank 2 by means of the air passageway 3 and Venturi tubes 10. Tank 1 also communicates with tank 2 by means of the water passageway 5. Therefore tanks 1 and 2 are entirely separated except as just described.

The top of tank 1 is covered with a grille 6 which serves as a table or bench on which the grinding and polishing operations are performed. Directly under the grille 6 are spray nozzles 7 which keep the interior surfaces of the tank 1 copiously flooded. In the lower part of air passageway 3 are spray nozzles 8 which direct spray upward copiously washing the entire surface of passageway 3 and the connecting air passageways 9 which form the upper portion of the Venturi tubes 10.

Spray nozzles 11 located above and centered with Venturi tubes 10 spray a water jet in the form of a cone under high pressure down tubes 10 and the water impinges on vaned cones 12 positioned in the lower ends of tubes 10. The water collects in tank 2 and drains out through conduit 4.

The operation of the grinding and polishing booth is as follows: Water under pressure of 20 pounds or more from manifold 13 is supplied to nozzles 11. The spray from nozzles 11 into Venturi tubes 10 create a powerful air suction which pulls the air through grille 6 into tank 1, upward through air passageway 3, downward through tubes 10 into tank 2, upward through air passageway 18 and thence to atmosphere through expanding outlet 14 and spray eliminators 15.

Dust from the grinding and polishing operations on grille 6 is pulled through the grille by the air suction created by the action of the water jets in the Venturi tubes 10. This dust comes in contact with water sprays 7 in tank 1 where the heavier dust is precipitated and flows with the water into tank 2 through conduit 5. The air with the finer dust continues upward through air passageway 3 contacting water spray from nozzles 8 and the copiously wetted surfaces of passageway 3. Some of the fine dust is precipitated in passageway 3 and is carried back into tank 1. The air and remaining fine dust continue down the Venturi tubes and impinge with the water on the vaned cones 12 which break up the water into a fine mist which effectually suppresses the remaining fine dust. The sloping sides S of tank 2 tapering toward the center of the tank cause the two streams of finely divided water and air to converge and intimately mix in the lower portion of air passageway 18 and

thus effectually wetting the remaining fine dust and precipitating it as sludge in the bottom of tank 2 where it meets the water and sludge from tank 1 and flows out through the drain 4. The cleaned air continues upward through passageway 18 and out to the atmosphere through eliminator plates 15 which separates the fine mist from the air. As nozzles 8 spray upward they assist the flow of air through passageway 3 into tubes 10. It is therefore clear that all surfaces with which the dust comes in contact are copiously flooded with water thus preventing the adherence of dust which is washed to the final drain outlet 4 of tank 2. From this outlet the water and the sludge flow to a sludge dewatering tank where the dust in the form of sludge is separated from the water which may be drained to a sewer or re-circulated through the spray nozzles of the booth.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. A magnesium castings grinding and polishing booth comprising a spray chamber with grilled top serving as a grinding and polishing table, Venturi tubes adjacent to said spray chamber for exhausting air from said spray chamber, a water sprayed passageway connecting said spray chamber with said Venturi tubes, spray nozzles adapted to spray water down said tubes, impingement surfaces positioned in lower end of said tubes, a water and air receiving tank under said tubes, an air passageway communicating with said water and air receiving tank having spray eliminators arranged therein adapted to separate water mist from the air and means for draining water from said spray chamber to said water and air receiving tank.

2. A cleaner for dust laden air, comprising a first air inlet passageway, a second vertically disposed air passageway, for upward travel of the air, communicating at its lower part with the lower part of the first passageway, a third vertically disposed passageway in the form of a venturi, for downward travel of the air, the top portions of said second and third passageways being in communication, impingement surfaces in the lower part of the third passageway for pulverizing liquid impinging thereagainst, means for spraying liquid in each of the three passageways, a fourth passageway having its lower portion in communication with the lower portion of the third passageway, a spray eliminator and a clean air outlet in said fourth passageway, and means, at the bottom of the apparatus, for collecting slurry from the several passageways.

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