

UNITED STATES PATENT OFFICE.

JEREMIAH EUGENE MATHEWSON, OF BROADHEATH, ENGLAND.

SAND-BLAST APPARATUS.

SPECIFICATION forming part of Letters Patent No. 773,663, dated November 1, 1904.

Application filed December 9, 1903. Serial No. 184,409. (No model.)

To all whom it may concern.

Be it known that I, JEREMIAH EUGENE MATHEWSON, a subject of the King of Great Britain, and a resident of Broadheath, in the county of Chester, England, have invented certain new and useful Improvements in Sand-Blast Apparatus, of which the following is a specification.

In the accompanying drawings, Figure 1 is a sectional elevation of the apparatus. Fig. 2 is a plan view of the same; and Fig. 3 is a cross-section on the line X X, Fig. 1, of the sieving device.

The use of the sand-blast for cleaning castings is now well known; but it has been found desirable when large castings are to be cleaned to provide a room or chamber in which the castings are placed and in which the attendant stands to direct the stream of sand onto the castings. One of the drawbacks in the use of the sand-blast for this purpose is the large amount of dust produced, due to the pulverization of the cutting or abrading material, the molding-sand, and the scale on the surface of the article to be treated. This pulverized material (dust and very fine sand) if used again absorbs a considerable amount of power to project it and produces but little or no good effect, because of its extreme fineness. The repeated use of this fine sand and dust also causes a cloud of dust to arise in the chamber, which renders it unfit to work in, and, moreover, the operator is unable to see what he is doing.

Now the object of the present invention is to construct a sand-blast apparatus of the most complete character, in which provision will be made to prevent this cloud of sand arising by automatically and continuously separating the cutting and abrading material from the dust and fine sand which hamper its action. To this end a current of air is caused to pass by suction through the working chamber or room from above to below to draw the dust and fine sand downward to collecting-hoppers, into which the cutting-sand will drop by gravity and from which the sand and dust are conveyed by the same current to a cyclone-separator and a sieving device,

so that an entire separation of the air, dust, and fine sand from the cutting-sand takes place.

In carrying out this invention the chamber is formed with suitable inlets in the roof and a perforated floor, below which are the collecting-hoppers in connection by suitable pipes with a suction device of convenient character and with the cyclone and sieving apparatus.

In order that the invention may be clearly understood, I will now describe the apparatus with reference to the accompanying drawings.

A is a pit in which the sand-blast apparatus proper, B, is placed. This apparatus is preferably of the character described in the specification of Letters Patent granted to me, dated December 25, 1894, No. 531,379, in which a pressure of air both above and below the sand is provided to insure the proper running of the sand. Supported on suitable girders over the pit is the working chamber C, which is provided, preferably, with a glass roof D and a door or doors E. In the roof are openings F for the entrance of air, and below the openings are arranged in an inverted position conical baffles G, which have the double function of preventing the outward escape of the flying sand and also of collecting any that may find its way to the roof and return it to the chamber, for which purpose the apex of the cone is removed to leave a small hole through which the sand can pass. The floor of the chamber consists of perforated plates or gratings H, below which are placed hoppers I in connection with an exhaust-pipe J. This exhaust-pipe J is connected with a cyclone apparatus K, into which the current of air carrying the sand and dust enters at a tangent, whereby centrifugal action caused by the exhausting of the air at L is set up. In this apparatus the sand is separated from the air, which carries with it the finest of the dust. The sand thus robbed of the air and a certain proportion of the dust drops into the hopper-shaped bottom of the apparatus K, where it is retained by a sliding valve N until required for use. This valve also serves to regulate the passage of the sand to a mechanical sieving apparatus O, as will be pres-

ently explained. Above the outlet of the cyclone apparatus K is fixed by suitable stays a cone P, which will serve to arrest upward currents of air from the sieving apparatus O and prevent their passing to the exhaust L should the sand in the hopper-bottom of K become exhausted.

The sieving apparatus O consists of an oblong chamber with a trough-shaped bottom having a narrow longitudinal slit, as will be seen in the cross-section, Fig. 3. This chamber is open at one end and is connected at the other end with the exhaust L by a pipe L', in which is a valve L'. Below the inlet O' to this chamber are deflecting-plates Q, which serve to spread the falling sand and dust so as to form a thin "curtain" of sand and dust.

It will be obvious that in this curtain of sand and dust there will be heavier particles and lighter particles, the heavier representing the cutting and abrading sand and the lighter the useless fine sand and dust. The exhaust L being opened through valved pipe L', a current of air will be drawn in at the open end of the chamber O and through this curtain of sand. This current of air will have little or no effect on the heavier or usable or cutting particles, which will drop at once of their own weight to the bottom of the chamber O and thence through the slit into the hopper of the sand-blast apparatus proper, B. The lighter particles will, however, be carried forward by the current of air toward the outlet L' of the chamber and will deposit in the bottom of the chamber at a part which extends beyond the edge of the hopper of the apparatus B, from which part the fine sand and dust are allowed to drop into a pit or container R, suitably arranged to receive them and from which the deposit may be removed by a shovel or in any other convenient manner as and when desired.

The limit of size of the usable particles of the sand may be regulated by means of a chute or inclined plate S. (See Figs. 1 and 3.) This chute S is carried by external flanges on the bottom of the chamber O and can be shifted farther from or nearer to the outlet L', as occasion may require. The chute S will act as a kind of partition to divide the heavier from the lighter particles, and all the lighter par-

ticles carried beyond its upper edge by the current of air will be guided into the pit R, while the heavier particles will drop in front of the partition into the hopper of B.

T is a rod which extends into the room C, by which the workman may operate the valve to allow the sand to pass into the closed chamber of B. U is another rod by which the sand-valve of the apparatus B is operated, also from the room C.

V is the compressed-air pipe, which opens into the apparatus B at two points, as described in the specification of patent before referred to.

W is the blast-pipe, which is provided at its outer end with a flexible pipe and nozzle X. (See Fig. 2.)

V' is a valve-rod extending into the room C for operating a valve in the compressed-air pipe V as and when desired.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a sand-blast apparatus for cleaning castings the combination with a sand-blast machine and a chamber in which the castings are cleaned, having collecting-hoppers and a suction-pipe, of a cyclone-separator for separating the air and the finer dust from the cutting-sand and an air-sieving device arranged to receive the residual sand from said separator and to complete the separation of the cutting-sand from the unusable fine sand and dust, as set forth.

2. In combination with a sand-blast apparatus, the air-sieve apparatus, as shown and described and consisting of an oblong chamber open at one end to the atmosphere and connected at the other to a suction device, having a sand-inlet at top and a longitudinal outlet-slit at bottom, in combination with transverse deflectors to spread the falling sand and a chute adjustable longitudinally along the outlet-slit, as set forth.

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

JEREMIAH EUGENE MATHEWSON.

Witnesses:

H. E. NEWTON,
A. COSTA.

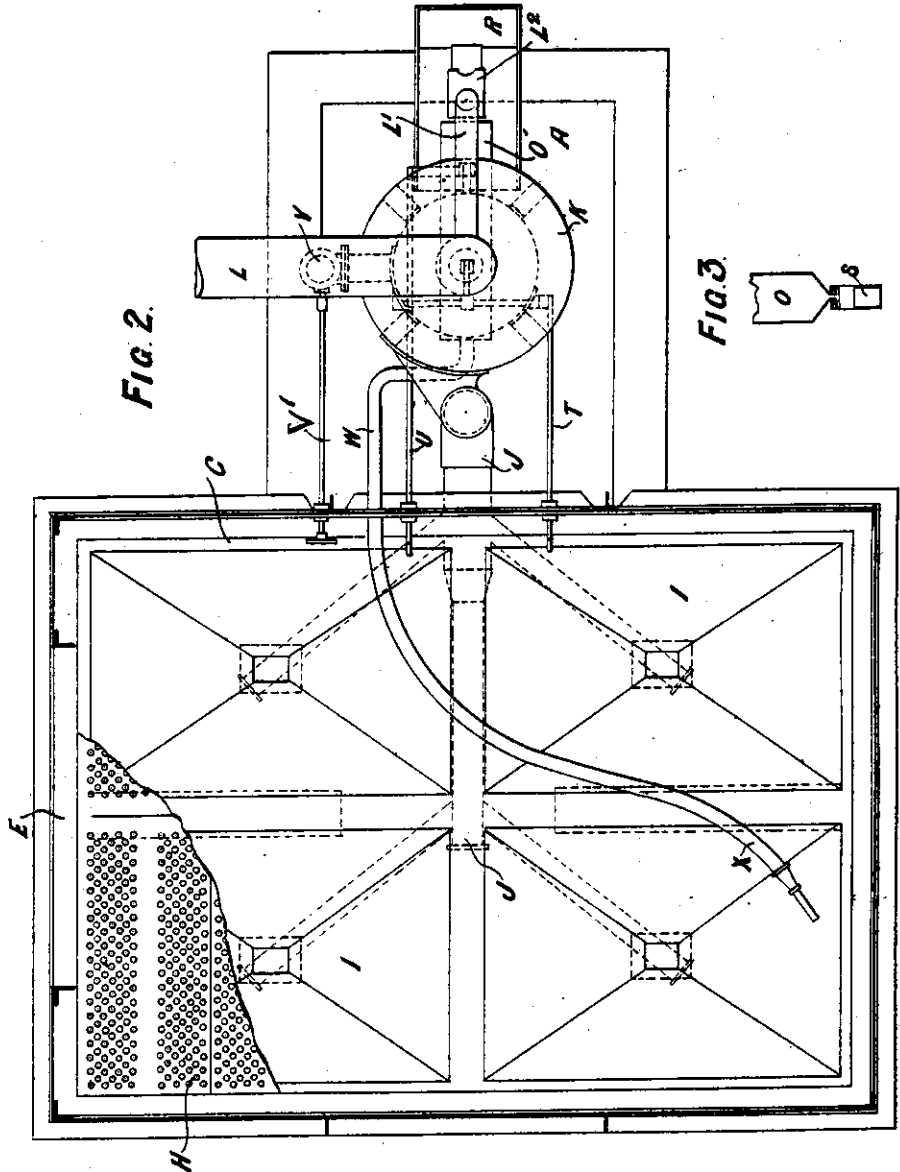
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NO MODEL.

2 SHEETS—SHEET 2.



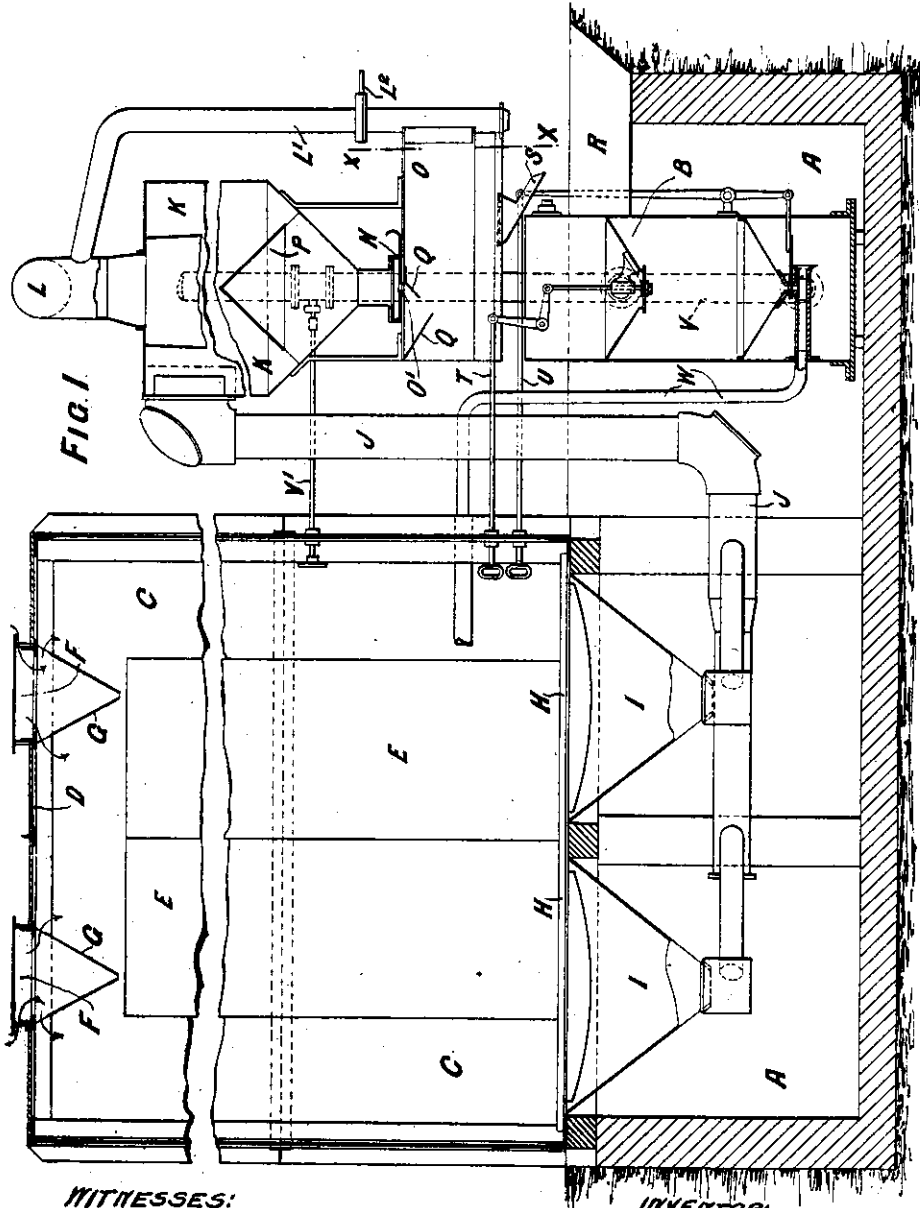
WITNESSES:
Wm. Hunt
R. Williams

INVENTOR:
Jerrish Eugene Mathewson
by *Wm. Hunt*
Francis D. Chambers

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3 SHEETS—SHEET 1.



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 by his atty
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