

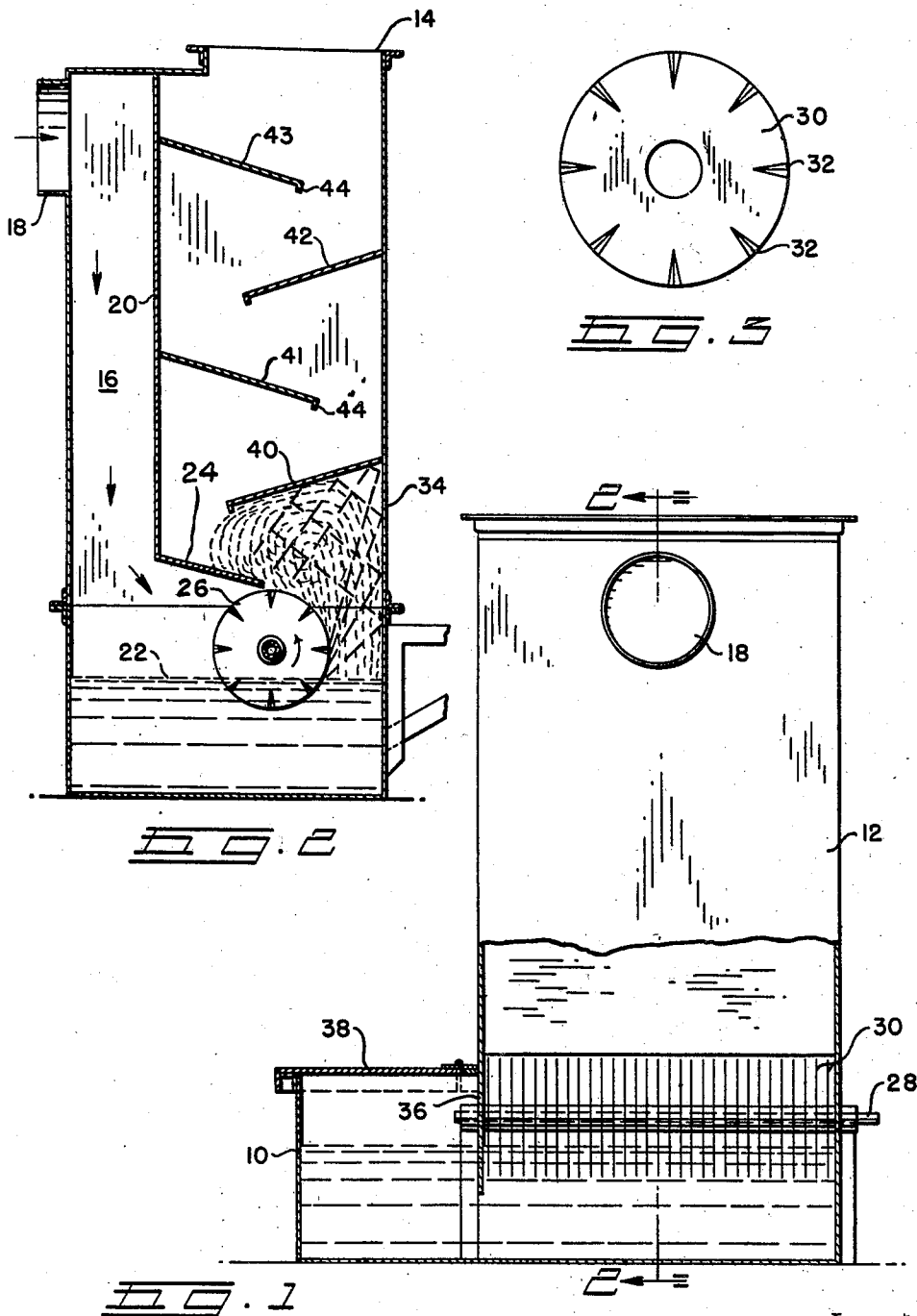
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DUST COLLECTOR

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2,339,982

DUST COLLECTOR

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2 Claims. (Cl. 183—24)

This invention relates to improved apparatus for removing foreign material from air within which it is suspended.

This invention primarily relates to air washing equipment associated with grinding, burnishing or polishing machinery or similar devices. Air carrying foreign material in suspension is caused to enter into my improved apparatus through an inlet and to pass through the apparatus being exhausted through a provided outlet. Water is the preferred medium for washing the air in most instances, but other aqueous and non-aqueous liquids may, if desired, be used instead of water, and wherever the term "water" is used herein it is intended to cover any suitable cleaning liquid.

An important object of this invention is to provide an improved apparatus for washing air of foreign matter, particularly refuse from grinding, polishing and burnishing machines, which is highly effective in bringing the air and water into a finely mingled state and which quickly removes both the refuse material and water from the air stream. An important feature of the invention is the use of a rotary water impeller comprising a series of discs dipping into a water reservoir and the association of such a disc wheel assembly with a casing containing a series of baffles arranged to provide a restricted area in which the air and water may be violently swirled about. Another important feature of the invention is the proportioning of the air speed to the air passages in the disc wheel assembly and between the baffles so that the air stream passing through the apparatus will pick up the water thrown by the discs and carry it into an area between two of the baffles where it will be violently swirled about.

Various other objects, advantages and meritorious features will become more fully apparent from the following specification, appended claims and accompanying drawing, wherein:

Figure 1 is a front elevation of a machine embodying the invention partially broken away to show the interior arrangement,

Fig. 2 is a vertical sectional view through the structure of Fig. 1, and

Fig. 3 is a side elevation of one of the discs of the water wheel.

In the embodiment of the invention illustrated in the drawing, a water reservoir is indicated at 10. Superimposing this reservoir is a casing 12 which constitutes an air passageway or tunnel having an exhaust opening 14. The air inlet to the casing is indicated in these figures at the top of a chamber 16 and is itself indicated at 18. This chamber 16 is separated from the remainder of the casing and air passageway by a wall 20. The reservoir contains water or any other suitable cleaning fluid to a height indicated in the figures

by the dotted line 22. It is understood that this liquid may be of an aqueous or non-aqueous character as may be desired. Alkali cleaning materials may be used in water. Oil or carbon tetrachloride or whatever fluid is desired for use may be employed.

The wall 20 of the casing is turned inwardly at the bottom as at 24, forming a baffle-like element which terminates within the interior of the casing above a water impeller or wheel indicated as 26. This water wheel is shown in more detail in Figs. 1 and 3. It comprises a shaft 28 upon which are mounted a series of discs 30 held in axially spaced apart relation by collars. This water wheel may be driven by a suitable electric motor not shown, in a manner which is well understood. The discs of the wheel dip into the water in the reservoir 10, as illustrated in Fig. 1, and it will be noted that the upper margins of the discs terminate slightly below the margin of the overhanging baffle 24 as illustrated in Figs. 1 and 2. One of these discs is shown in elevation in Fig. 3. This disc is distorted as at 32 providing laterally projecting flanges which serve as fins to pick up water as the wheel is rotated through the water of the reservoir.

This wheel is rotated in counterclockwise direction as indicated by the arrow in Fig. 2 and creates a shower of water between the margin of the baffle 24 and the rear wall 34 of the casing. An approximation of the character of such shower is indicated by the long dash lines in Fig. 2. These long dash lines indicate diagrammatically the character of the shower before the air stream is drawn therethrough. The short dash lines indicate the character of the shower when the air stream is being drawn through the shower.

Air carrying suspended foreign particles enters the machine at the inlet 18 and flows downwardly through the compartment 16 underneath the baffle element 24 between the disc and flows outwardly and upwardly through the machine as is hereinafter more particularly described. This air stream may be produced by a fan connected with the exhaust outlet such as that indicated schematically at A in Fig. 7 of the United States Patent No. 2,243,839. The fan is operated to draw air through the machine at a rapid rate as hereinafter described.

In the construction shown a wall portion 36 extends downwardly within the reservoir and separates the main portion directly underneath the wheel and forwardly of the wheel from an end portion which is covered by a hinged lid 33. This wall portion thus divides the reservoir into that portion directly underneath the wheel from that what might be termed a still water pool or settling tank at one end as is conventional and old in constructions of this kind. The foreign material deposited in the reservoir will therefore

tend to collect in this settling tank portion and may be removed therefrom by an operator as desired.

The casing proper superposing the water shower creating wheel is provided with a series of staggered baffle elements 40, 41, 42 and 43, as shown in Fig. 2. Each of these baffle elements is shown as having a marginal lip 44. These baffle elements are arranged in a superposed staggered series projecting from opposite walls of the casing interiorly thereof and angularly with respect to each other whereby an air stream drawn through the casing is caused to pursue a zigzag path. The air stream is also constricted as it passes through the reduced passageway between the margin of the flange 44 and upper surface of the baffle therebelow and as is well understood is speeded up as it passes through this restriction.

As above set forth, the air stream flowing through the discs underneath the baffle 24 picks up the water shower indicated by the long dashes and carries it up toward the baffle 40 from which it swirls downwardly against the baffle 24 and creates in the restricted zone between the baffle 24 and the margin of the lip 44 of the baffle 40 and toward the rear wall 34 a swirling highly agitated downwardly directed shower of water broken up fine. This rapid finely broken up shower wets the foreign material carried by the air stream passing therethrough and once wetted such foreign material moves with the water from the air stream into the water in the reservoir. Very little water is carried above the baffle 40 and practically no water in suspension passes through the upper series of baffles and out of the exhaust opening. The baffles therefore serve as water eliminators as well as to remove the foreign material originally entrained with the air stream. The lip 44 on the baffle 40 as well as the other baffles augments this downward direction of the water shower.

In operation, the air stream is drawn into the apparatus at a high rate of speed as, for example, at 1000 to 2000 feet a minute. This air stream picks up the water which preferably is discharged into the shower space at a normal rate, which rate would not exceed and probably would be less than that of the air. The shower comprises relatively heavy individual streams and globules together with fine spray. It is relatively sluggish and of slight height and only moderate in character. At 400 R. P. M. of a 15" diameter disc rotor a portion of the spray will be thrown against the baffle 40. The shower is picked up however by this air stream and swirled up above the baffle 24 that surmounts the shower forming mechanism and forms in the restriction above such baffle and below the immediately superposed baffle 40 a finely broken up highly agitated swirling shower of water which carries the suspended material out of the air stream. The suspended water particles are knocked out of the air stream by the baffles so that the air emerges from the outlet at the top of the casing substantially free of water as of other suspended materials.

What I claim:

1. Apparatus for removing from an air stream suspended foreign material comprising, in combination, a water carrying reservoir, an upright casing superposing the reservoir and having a front wall and back wall, said front wall terminating spaced above the water level in the reservoir, a series of baffles extending downwardly and inwardly into the casing in spaced apart alter-

nately staggered overlapping relationship from the front wall and the back walls respectively forming a zigzag upward air passageway through the casing, the lower baffle extending inwardly and downwardly into the casing from the lower margin of the front wall and terminating spaced above the water level in the reservoir and establishing an air inlet into the casing above the water level in the reservoir, a rotatable supporting shaft extending from one side wall to the opposite side wall of the casing and carrying throughout its length a plurality of axially spaced apart discs dipping into the water in the reservoir and positioned in close proximity to the lower margin of the lowermost baffle and extending across the air inlet into the casing, said lowermost baffle substantially restricting said air inlet to the spaces between said discs, means for rotating said shaft to cause the discs to throw a water spray upwardly through the space between the back wall of the casing and the lowermost baffle toward the baffle immediately thereabove, means for drawing air laden with foreign material in suspension through the inlet opening and between said discs into the casing and passing said air upwardly through said casing at such a speed as to shift a portion of the spray forwardly within the casing into the converging space between the lowermost baffle and the baffle immediately thereabove.

2. Apparatus for removing from an air stream suspended foreign material comprising, in combination, a water carrying reservoir, an upright casing superposing the reservoir and having a front wall and a back wall and opposed side walls, said front wall terminating above the water level in the reservoir, a plurality of baffles extending downwardly and inwardly into the casing in spaced apart alternately staggered overlapping relationship from the front wall and the back wall respectively forming a zigzag upward air passageway through the casing, the lowermost baffle extending inwardly and downwardly into the casing from the lower margin of the front wall and terminating spaced above the water level in the reservoir and establishing an air inlet into the casing, a rotatable supporting shaft extending from one side wall to the opposite side wall of the casing and spaced substantially midway between the front wall and the back wall and carrying through its length a plurality of axially spaced apart discs dipping into the water in the reservoir and positioned in close proximity to the lowermost baffle and extending across the air inlet into the casing, said lowermost baffle substantially restricting said air inlet to the space between said discs, said discs terminating spaced from the back wall of the casing a distance substantially as great as the radius of a disc, means for rotating said shaft to cause the discs to throw a water spray against the back wall of the casing and upwardly through the space between said back wall and the lowermost baffle toward the baffle thereabove, means for drawing air laden with foreign material in suspension through the inlet opening and between said discs into the casing and upwardly through the casing at such a rate of speed as to shift a portion of the spray forwardly within the casing and above the discs and between the lowermost baffle and the rear wall of the casing and adjacent to the converging space between the lowermost baffle and the baffle immediately thereabove.

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