I. H. SPENCER.

CLEANING APPARATUS.

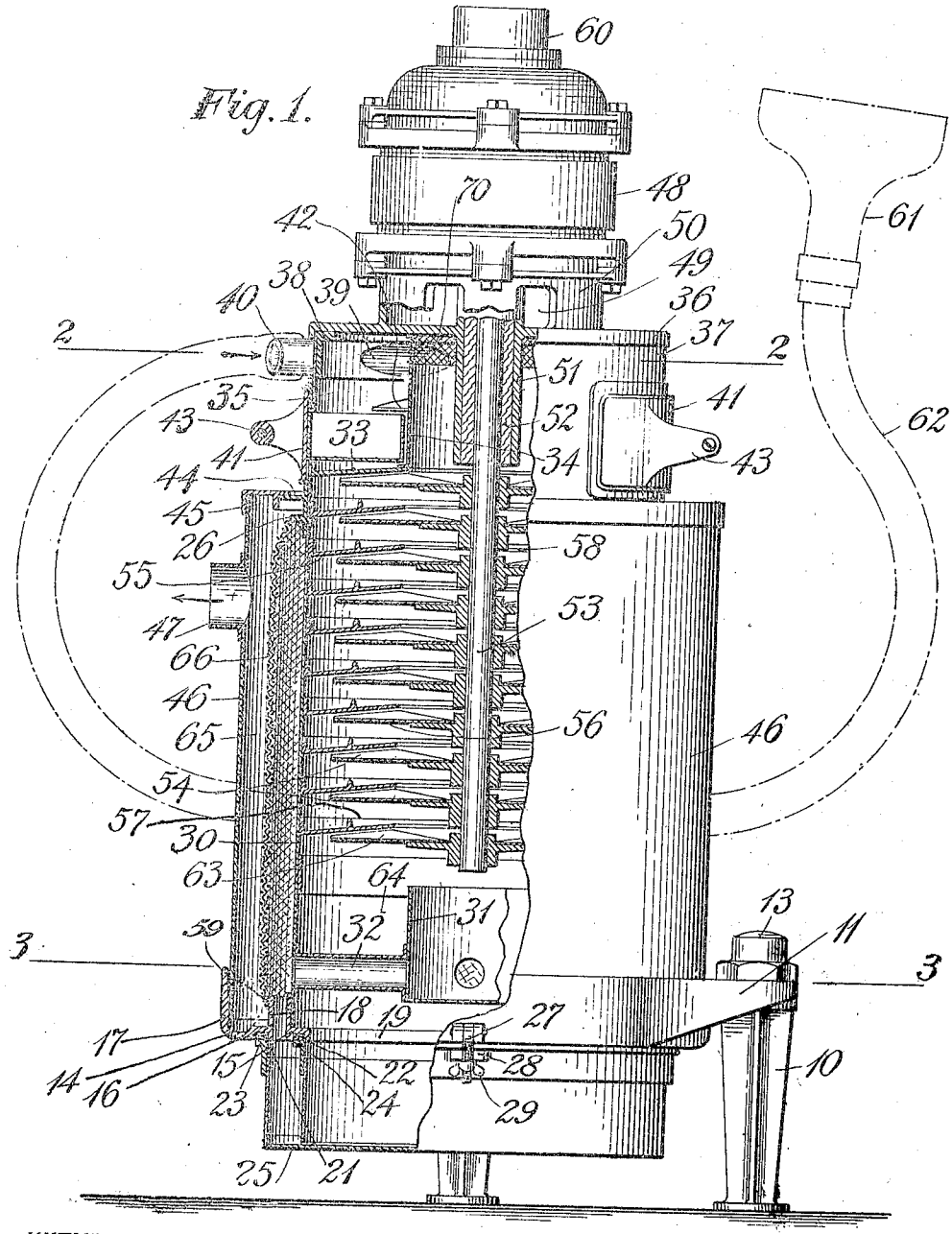
APPLICATION FILED APR. 8, 1908.

1,103,548.

Patented July 14, 1914.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

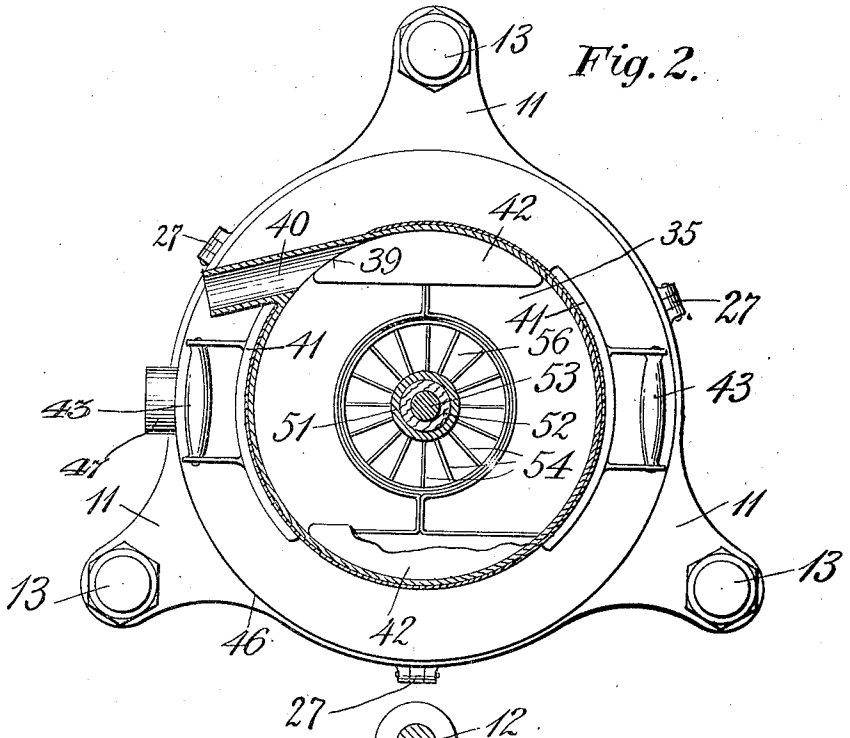
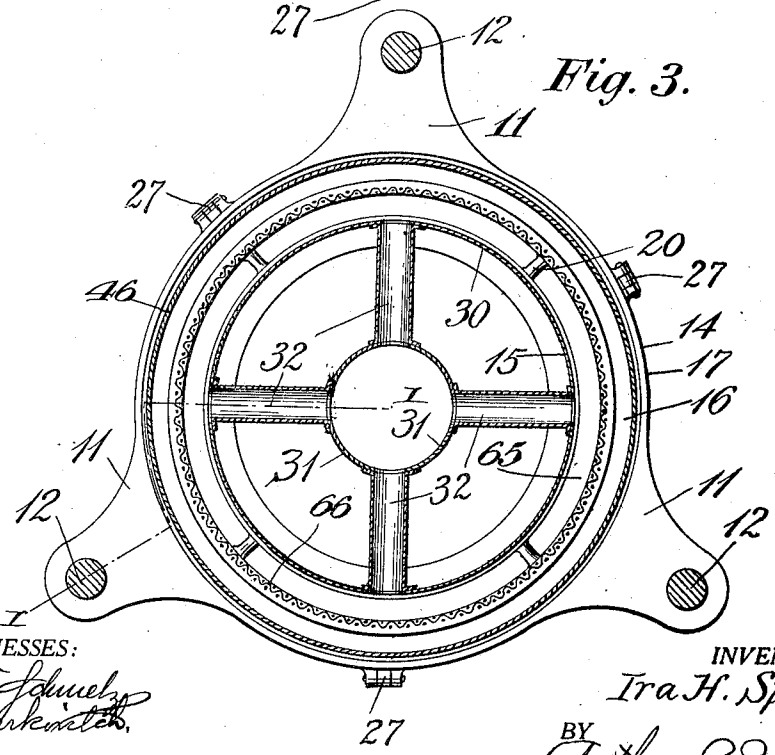


Fig. 3.



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CLEANING APPARATUS.

1,103,548. Specification of Letters Patent. Patented July 14, 1914.

Application filed April 8, 1908. Serial No. 425,966.

To all whom it may concern:

Be it known that I, IRA H. SPENCER, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented a new and Improved Cleaning Apparatus, of which the following is a specification.

The invention relates to the class of devices specified and the object of the invention is to provide a device of this class having numerous novel features of advantage and utility.

One form of device in use of which these objects may be attained is illustrated in the accompanying drawings in which—

Figure 1 is a view in elevation of apparatus embodying my invention with parts broken away in longitudinal section on plane denoted by line 1—1 of Fig. 3 to show construction. Fig. 2 is a view in section through the device on plane denoted by line 2—2 of Fig. 1. Fig. 3 is a view in section through the device on plane denoted by line 3—3 of Fig. 1.

In accompanying drawings the numeral 10 denotes legs or like parts upon which the base is supported. The legs and the base are constructed of any desired material, and of suitable form for the special requirements for which the apparatus may be designed. In the form of construction herein shown, ears 11, having openings for the reception of studs 12, project radially from the base, the studs passing freely through the openings and being threaded at their ends to receive a blind nut 13. The base as herein shown consists of an outer or peripheral section 14 and an inner section 15. The outer section is of annular form, having a groove 16 located between the outer and inner walls 17 and 18, and the ears 11 are preferably secured to the upper edge or rim of the outer wall 17.

The inner section 15 of the base is of ring form, having a seat 19 and being supported from the outer base section 14 by struts 20, providing a space between the two sections, as plainly shown in Fig. 1. Grooves are formed in the bottoms of the inner and outer base sections for the reception of packing rings 21 and 22, as shown in Fig. 1 of the drawing, and the upper edges 23 and 24 of the wall and partition of a pan 25 seat against these packing rings forming a tight joint at this point. The pan 25 is divided by the partition 24 into outer and inner compartments, the inner receiving dirt direct from the turbine and the outer receiving dirt from a screen to be hereinafter described. The pan is removably secured in position as by means of links 27 pivoted to the base and engaging slots in ears 28 on the pan, thumb nuts or screws 29 holding the parts against accidental disengagement.

A shell 30, with its axis vertically arranged, is supported by the inner section 15 of the base, this shell extending from the base for a suitable distance to suit the requirements of the machine. A cup 31 is supported by pipes 32 secured to the shell 30, and the pipes 32 afford a passage from inside the cup. A plate 33 is located within the shell near the upper end forming a top for the turbine chamber, a neck 34 projecting from a central opening in this plate into an inlet chamber 35 formed in the upper end of the shell around said neck and underneath a cap 36. This inlet chamber is located in what may be called a dome 37 of the device and constituting that part of the shell projecting beyond an inclosing casing to be hereinafter described. The shell 30 is preferably formed of sheet metal with an inner flanged ring 38 secured to the upper edge, and upon which the cap 36 rests. An inlet opening 39 for an inlet pipe 40 extends through the shell and ring as shown in Fig. 1 of the drawings. The annular space between the neck 34 and side of the dome or shell is occupied by drawers 41 of a shape to fit within said space, and of suitable size to meet the requirements of the device. Shields 42 extending from the side of the dome cover such space within the drawer chamber as may not be occupied by the drawers. Handles 43 serve as a means for removing and replacing the drawers. A flange 44 projects from the side of the shell at the base of the dome, this flange in fact defining the base of the dome, and a lip 45 from said flange receives the upper end of an inclosing casing 46, upon which end said flange rests. This inclosing casing has an outlet 47 and is of proper size to be slipped into place from the top of the machine passing downward and with its lower edge resting within the outer wall 17 of the base of the device. A flange 26 is also secured to the shell 30 and a screen 66 depends from this flange within the screen chamber 65 formed between the

inclosing casing 46 and the shell 30. The lower end of the screen may be secured in any desired manner as by means of a cord passing around the inner wall 18 and underneath a lip 59.

A motor 48 of any desired construction suitable to the purpose in hand rests upon the cap 36. Openings 49 extend through the motor base for the purpose of supplying air within the motor casing.

A bearing neck 51 projects from the cap 36 and contains a bearing 52 for the shaft 53 of the turbine. The turbine includes a number of blades 54 arranged in sets, a number of blades to each set, the sets extending longitudinally of the shaft and each set being located in a compartment, several compartments being formed by the partitions 55 arranged at intervals longitudinally of the shell 30. These blades are secured to disks 56 (represented by a heavy line at the bottom of the blades) located at intervals along the shaft, and deflectors 57, arranged in sets, are located in the compartments between the partitions and on the opposite side of the disks from the blades 54, the deflectors being curved and extending from the periphery of the compartment toward the center of the communicating openings 58 between the compartments.

The action of the compressors creates a condition within the turbine chamber favorable to a great inrush of air thereto, which is extremely unfavorable to the maintaining of lubricant in the shaft bearing in the neck 51, as such inrush of air under the conditions existing in the turbine chamber will occur through the bearing to a degree governed by the amount of space about the shaft and thus remove the lubricant in this bearing.

In order to avoid this objection the bearing 52 is made of wood or such other material as will not require a lubricant to its successful operation. By employing a bearing of this kind the objections herein before mentioned with regard to maintaining lubricants therein are obviated and the dust and dirt passing into the machine in great quantities is effectually prevented from getting into the bearing and being retained therein, which bearing it will be seen constitutes not only a bearing for the shaft 53, but also for the motor, the shaft 53 in fact being extended to form the motor shaft, or the motor shaft being extended to form the turbine shaft, the turbine depending within the turbine chamber, and its bearings being located at the upper end at 52 and 60.

In the operation of the device a cleaning tool 61 being applied to the surface being cleaned, the action of the turbine causes a flow of air in at the intake of the tool through the hose 62 and into the inlet chamber 35, through the neck 34 into the turbine chamber. The action of the fan creates conditions within the shell that cause a great inrush of air, so that the flow through the inlet pipe 40 tangentially to the inlet chamber 35 is around the walls of the inlet chamber, the particles of dirt being deposited by centrifugal action within the drawers or receptacles 41. The lighter particles of material pass with the air through the turbine and under the action of the last set of blades constituting a fan 63 in the turbine, are thrown off by the centrifugal action to the periphery of the separating chamber 64, from which they fall by the action of gravity into the inner compartment of the pan 25. The air now containing only the very light particles of dust passes into the cup 31 through pipes 32 and into the screen chamber 65 where it passes through the screen 66 and out at the outlet 47 where the air is delivered practically pure. The dust particles are thrown off by centrifugal action and the form and location of the cup collects the practically pure air at the vortex of the whirl, the location of the cup causing the air currents that have been thrown outward by centrifugal force by the action of the fans to be suddenly diverted and drawn to the center of the chamber and into the cup, the heavier particles of dirt being thus caused to be separated from the air currents and this heavier portion of the dirt is, therefore, prevented from passing with the air current through the pipes 32.

The screen 66 may be readily freed from dust by shaking it in any desired manner, the dust falling into the outer compartment of the pan 25, passing through the opening between the outer and inner sections of the base. A portion of the dust will also be deposited in groove 16 in the outer section of the base. The pan may be easily removed and emptied of the lighter particles of dust or dirt when required.

In order to prevent large pieces of rags and waste or like material from entering the shell and interfering with the fans, a guard 70 is located in the space between the upper edge of the neck 34 and the under surface of the cap 36. This guard is in the form of net work so that the air with the lighter particles of dirt with which it may be impregnated, may pass freely through the meshes.

I claim—

1. A shell having an inlet thereto, means within the shell for creating a flow of air thereinto, a separating chamber located outside the shell, said shell having communicating passages opening from below said flow creating means into said chamber and a separating means located within said chamber.

2. A shell, means within the shell for creating a flow of air thereinto, an inclos-

ing casing forming a separating chamber surrounding said shell, the latter having a communicating passage opening from below said flow creating means into said chamber, and a separating medium located within said chamber.

3. A separating chamber having outer and inner walls, the outer wall having an outlet therefrom and the inner wall forming a shell, means located within the shell for creating flow of air thereinto, said shell having communicating passages opening from below said flow creating means into said chamber, and a separating medium within said chamber.

4. A separating chamber having outer and inner walls concentrically arranged, the outer wall having an outlet therefrom and the inner wall inclosing a central chamber, means within the central chamber for creating flow of air thereinto, said separating chamber and central chamber having communicating passages located below the flow creating means and extending between the separating and central chambers, and a separating medium located within the separating chamber.

5. A shell, means within the shell for creating a flow of air therethrough, a separating chamber surrounding said shell, said shell and chamber having openings communicating therebetween, a separating medium located within said chamber, and an inlet to said shell at the top and an outlet from said chamber near the top.

6. A shell having an inlet opening at one end, means within the shell for creating a flow of air into said shell, a separating chamber surrounding said shell, said shell and chamber having communicating openings extending therebetween, a separating medium located within said chamber, and an outlet extending from said chamber.

7. A shell constituting a fixed member and having an upper and lower chamber with an inlet to the former, a neck extending within the upper chamber, an inclosing casing located about the shell and forming a space between the two, a separating medium located in said space with an outlet therefrom, a receptacle secured to the lower part of the structure, the latter composed of said parts, and means within the shell for creating a flow of air thereinto.

8. A shell having an inlet chamber at one end with an inlet opening thereto, means within said shell for creating a flow of air through said chamber, a separating chamber surrounding said shell with communicating openings between the shell and separating chamber, a separating medium within said separating chamber, and an outlet from said separating chamber.

9. A shell having an inlet chamber with an inlet opening thereto, means within said shell for creating a flow of air through said shell, a receptacle located at the lower end of the shell, a separating chamber surrounding the shell and having a communicating opening with the interior thereof through the side walls at the bottom, a separating medium within said separating chamber, and an outlet from said separating chamber.

10. A shell having an inlet chamber with an inlet opening thereto, means for creating a flow of air through said chamber, a receptacle located within the inlet chamber, a receptacle at the lower end of the shell, a separating chamber surrounding the shell and having a communicating opening with the interior thereof, a separating medium within said separating chamber and an outlet from said separating chamber.

11. A shell having a top with a central opening and a neck projecting therefrom, forming an annular chamber with an inlet opening thereto, means for creating a flow of air through the shell, a separating chamber surrounding the shell with communicating openings between said chamber and shell, a separating medium within the chamber, and an outlet from said chamber.

12. A shell having an inlet opening and a central chamber, means within the shell for creating a flow of air therethrough, a cup located within the lower part of the shell, pipes extending from said cup through said chamber and through the wall of the shell, a receptacle underlying the shell, a separating chamber surrounding the shell and to which said pipes open, a separating medium within the chamber and an outlet from said chamber.

13. A shell having an inlet opening, means for creating a flow of air through the shell, a cup located within the shell forming an annular chamber therebetween and the wall of the shell, pipes extending from said cup through the wall of the shell, a receptacle having a divided compartment one part underlying the shell and the other underlying a separating chamber, the separating chamber surrounding the shell and communicating with said pipes, a separating medium within said chamber and an outlet therefrom.

14. A shell having an inlet opening thereinto, means within the shell for creating a flow of air thereinto, an inclosing casing secured to the shell and forming a separating chamber between the wall of the shell and the wall of the casing with communicating passages between the shell and chamber and located near the bottom of the former, a separating medium located within the chamber and an outlet from said chamber.

15. A shell having a flange and an inlet opening, means within the shell for creating a flow of air thereinto, an inclosing

casing resting upon said flange and forming a chamber outside the wall of the shell with communicating passages between said shell and chamber and located near the bottom of the former, a separating medium within said chamber, and an outlet therefrom.

16. A shell projecting beyond a casing forming a dome at the end of the shell having an inlet opening, the casing mounted about the shell, means within the shell for creating a flow of air therethrough, a separating medium located in the chamber between the shell and casing with communicating openings therebetween located near the bottom of the shell, and an outlet from said chamber.

17. A shell having an annular chamber at the top with an inlet opening thereto and a lateral outlet opening at the bottom, means within the shell for creating a flow of air therethrough, and a chambered receptacle located at the bottom of the shell.

18. A shell having at one end an inlet chamber with an inlet thereto and a lateral outlet at the opposite end, a chambered receptacle located within the inlet chamber, a receptacle located at the bottom of the shell and means within the shell for creating a flow of air therethrough, said flow creating means being located between said inlet chamber and the receptacle at the bottom of the shell.

19. A shell having an inlet chamber with an inlet thereto, said shell also having a chamber therein and a lateral opening from the bottom of the shell, a neck projecting from the top of said chamber within the inlet chamber, a receptacle located between said neck and the wall of the inlet chamber, means within said shell for creating a flow of air through the shell, and a receptacle located underneath the means for creating a flow of air, said receptacle being located to receive dirt and the like therefrom.

20. A base including inner and outer rings with a space therebetween, a shell rising from the inner ring, an inclosing casing rising from the outer ring, a separating medium located between the shell and casing, a receptacle having a compartment underlying the shell and a compartment underlying the space between said rings, an inlet at the top of the shell, a means within the shell for creating a flow of air therethrough.

21. A base including inner and outer rings with an opening therebetween, a shell supported on the inner ring, an inclosing casing supported on the outer ring, a separating medium located between the shell and casing, a receptacle having a compartment underlying the shell and a compartment underlying the opening between the rings, said compartments being sealed one from the other, means located within the shell for creating a flow of air therethrough, and an inlet to said shell.

22. A shell having an inlet opening, means for creating a flow of air through said shell, means at the lower portion of the shell for concentrating the air currents and with an opening around said concentrating means, lateral passages extending from said concentrating means for the passage of dust through the wall of the shell, a casing entirely surrounding the outer shell, and an outlet from said casing.

23. A shell having a top with a neck projecting upward therefrom forming an annular inlet chamber between said neck and the outer wall of the shell, said chamber having an inlet, means within the shell for creating flow of a current of air therethrough, and receptacles located in said annular inlet chamber to receive dust separated from the air therein.

24. A shell having an inlet thereto at its upper end, means within the shell for creating a flow of air thereinto, a separating chamber located about the shell, and a receptacle located underneath said shell to receive matter separated from the air currents, said shell having communicating passages with said separating chamber, said passages being located between said air moving means and said receptacle.

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Witnesses:
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