I. H. SPENCER.

DUST EXTRACTOR AND SEPARATOR.

APPLICATION FILED FEB. 17, 1908.

1,043,264.

Patented Nov. 5, 1912.

2 SHEETS—SHEET 1.

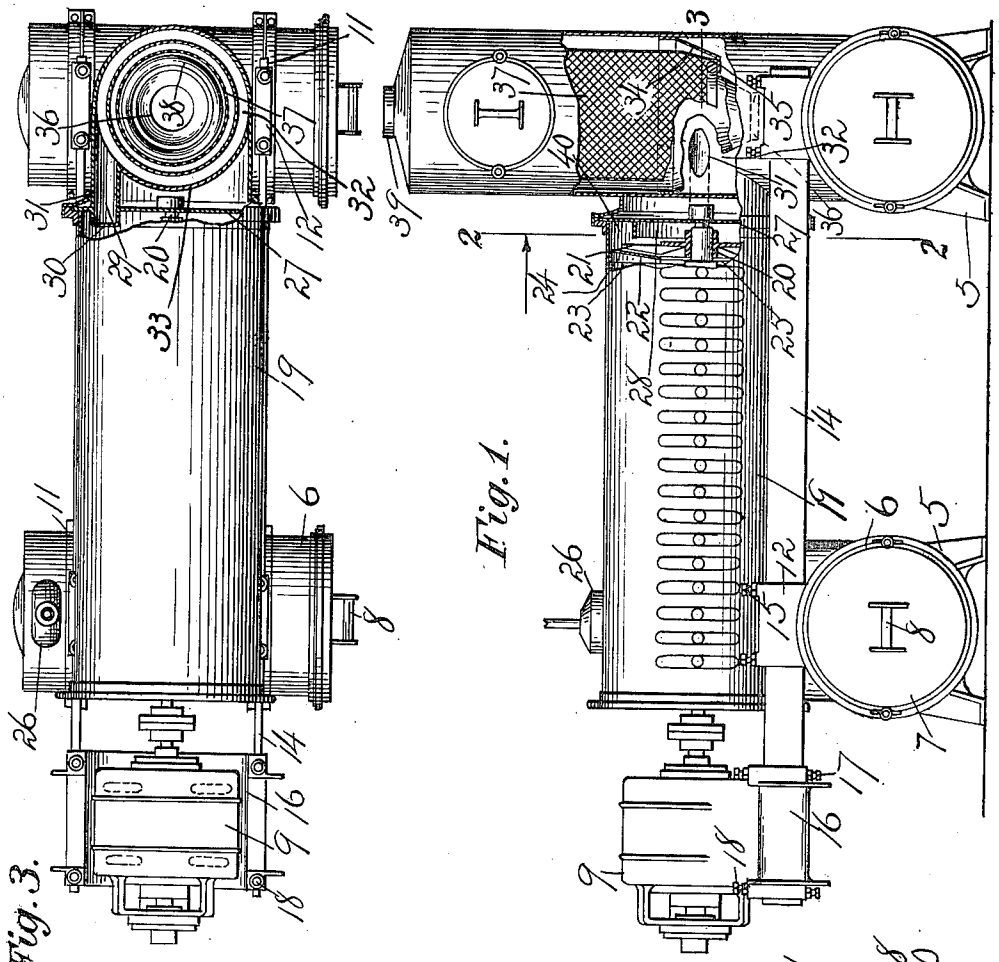


Fig. 1.

Fig. 3.

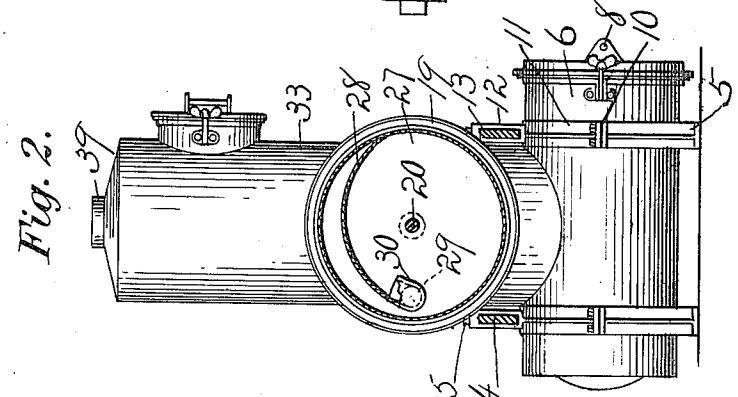


Fig. 2.

WITNESSES:

P. E. Berkowitch

D. Greenwald.

INVENTOR.

Ira H. Spencer.

BY

Arthur B. Jenkins.

ATTORNEY.

I. H. SPENCER.

DUST EXTRACTOR AND SEPARATOR.

APPLICATION FILED FEB. 17, 1908.

1,043,264.

Patented Nov. 5, 1912.

2 SHEETS—SHEET 2.

Fig. 4.

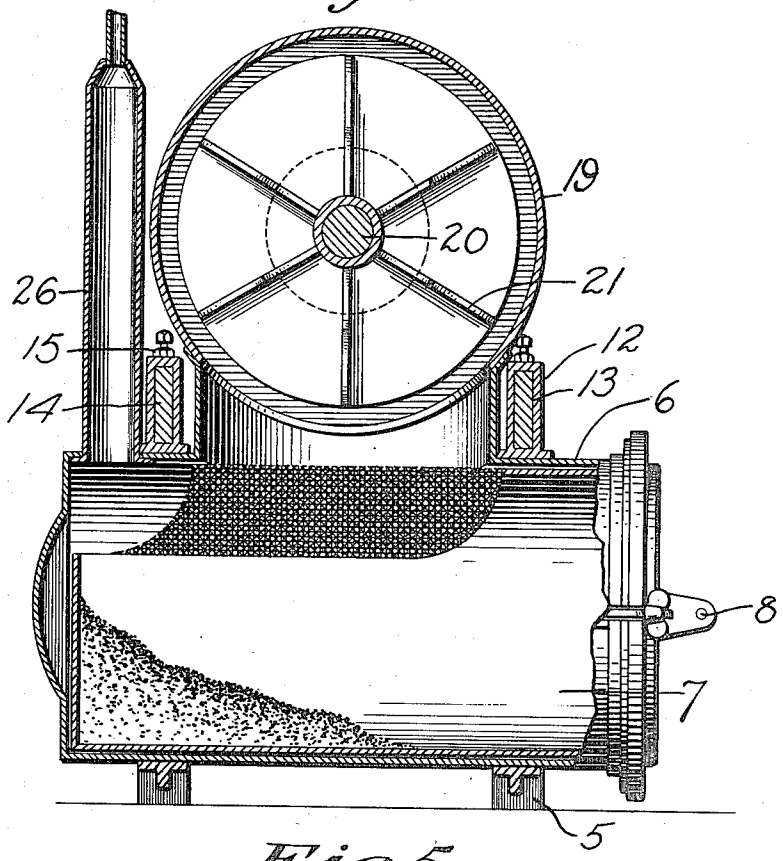
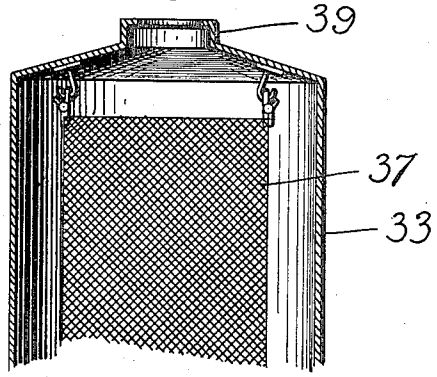


Fig. 5.



Witnesses:

L. L. Grotta

R. B. Berkowitz

Inventor:

Ira H. Spencer.

by Arthur B. Jenkins

Attorney.

UNITED STATES PATENT OFFICE.

IRA H. SPENCER, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE SPENCER TURBINE CLEANER COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

DUST EXTRACTOR AND SEPARATOR.

1,043,264. Specification of Letters Patent. Patented Nov. 5, 1912.

Application filed February 17, 1908. Serial No. 416,324.

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 Dust Extractor and Separator, of which the following is a specification.

My invention relates to the class of devices now more especially known in the art as suction cleaners, and the object of the invention is to provide a device of the class named having numerous features of advantage and utility.

A form of device in the use of which the object sought may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of a machine embodying my invention with parts cut away to show construction. Fig. 2 is a view in cross-section through the same on the line 2—2 of Fig. 1. Fig. 3 is a view partially in section through the device on the line 3—3 of Fig. 1. Fig. 4 is a detail view in section on enlarged scale through one of the receiver casings. Fig. 5 is a like view in central section through the upper part of the stack showing the method of suspending the separator.

My invention while not limited to any particular kind of apparatus is especially applicable in that class of suction cleaners in which a rotary fan is employed to create a movement of the air current, and for this reason such an apparatus has been selected by me to illustrate my invention.

In the accompanying drawings the numeral 5 indicates standards supporting a receiver casing 6 constructed of any suitable material, preferably sheet metal, and as shown herein preferably round in cross-section. These casings each contain receivers 7 which may be in the form of drawers each having a handle 8 by means of which it may be removed. These drawers are constructed to receive material at the top, as shown in Fig. 4 of the drawings. The standards and casings are of sufficient strength to support the entire apparatus including a motor 9 of any approved form of construction.

In some instances it may be desirable to support the motor 9 in a different manner than as herein shown, and in order to adapt the apparatus to accomplish this result, and at the same time not employ more parts than are actually required, the parts herein shown as adapted to support the motor with its shaft in line with the shaft of the fans comprising the blower are made removable. To this end the upper part of the standards 5 are each formed on opposite sides of the casings 6 with bridge seats 10 on which the bridges 11 rest and to which they are secured as by means of bolts or any other suitable form of attachment. These bridges are preferably in the form of arches fitting the casings 6 and on the top of the bridges socket pieces 12 are located. Although not essential, in the preferred form of construction these bridges are made of cast metal and the socket pieces 12 are integral therewith. Sockets 13 are formed in each of the socket pieces in which sockets are located bars 14 extending between the bridges appurtenant to each of the standards 5 and projecting at one end of the structure to a distance sufficient to receive the motor 9. Clamp screws 15 may be employed to hold the bars in position. A motor support 16 is formed at each end with lengthwise openings through which the bars 14 extend. These openings are somewhat wider than the bars 14 so that the latter may have a movement therein. Adjusting screws 17 and 18 extend respectively through the bottom and top of the motor support as a means of locating the base with respect to the bars and thus provide a vertical adjustment of the support for the purpose of alining its motor shaft with the shaft of the blower. Lateral adjustment may be obtained as by means of bolts extending from the motor support through slots in the motor base, suitable nuts being employed for holding the parts together. It will be seen from this construction that the casings containing the receivers may be of comparatively light construction as the weight of the motor will be received by the bridges and transmitted to the standards 5, thereby relieving the casings from any part whatever of the weight of such motor.

The numeral 19 denotes a blower casing, and by the term "blower" as used herein is meant a device for creating flow of a current of air, whether the working effects of this be utilized from the intake or from the exhaust end of said blower. In the arrangement of the apparatus herein illustrated the effective work of the air current is obtained at the intake end of the blower.

A shaft 20 extends lengthwise within the blower casing 19 and a fan 21 is secured to this shaft. A partition 22 projects from the inner surface of the casing, this partition having an opening 25 near its center through which the air passes to the fan chamber. The casing may be of any suitable length for any special requirement, and wings 24 located at suitable intervals apart project from the partition 22.

An intake 26 to be hereinafter referred to is connected with one of the receiver casings, in the form of structure herein shown that casing located at the end of the shell next to the blower.

Cleaning devices, preferably in the form of tools constructed for application to floors, walls, carpets, and the like, are connected with the intake 26 by any suitable means, the fan or blower serving to create a flow of air inward through said intake and thus produce a suction at the mouth of the cleaning tools by means of which dust is conveyed from the floors or fabrics by the current of air passed through the blower.

A plate 27 is located at one end of the shell 19, and on the fan side of said plate a deflector 28 is arranged. This deflector, as shown in Fig. 2, extends from the outer edge of the plate in a curved direction approaching gradually nearer its axial center the farther it extends. The shaft 20 is supported by this plate projecting through it, the opening in which the shaft is located, however, being protected from the entrance of dust so that the plate is practically closed at this point. In fact, in effect it entirely closes this end of the shell except for an opening 29 extending through the plate preferably at the end of the deflector 28. The deflector is provided at its end with a hood 30 so constructed that a current of air, and the dust or dirt commingled therewith passes within this hood and is thereby guided into the opening 29. A connecting tube 31 leads from the opening 29 into a chamber 32 in a stack 33. The chamber 32 is located at the lower portion of the stack, its location preferably, and as herein shown, being below the line of the axis of the shaft 20, and in the preferred form of construction the opening 29 through the plate is on the horizontal level of the axis of the shaft. The chamber 32 is separated from the upper part of the stack by a wall 34, which wall, however, is of inverted conical shape having a floor or shoulder 35 and a throat 36.

A separator 37 constructed preferably of fabric of comparatively thin mesh is supported within the upper part of the stack 33 and has at its lower end a weight 38 of ring shape resting upon the floor or shoulder 35 to hold the screen or separator in proper position. An outlet 39 is located at the top of the stack 33, to which a pipe may be connected through which the air may be delivered to any suitable point.

The device as herein illustrated and described is particularly compact and the arrangement of the mechanisms for delivering the air from the shell into the stack is such that the latter is not of objectionable length, extending only a short distance above the shell, and at the same time the construction is such that the impurities contained within the air will be separated therefrom to a great extent before the air passes through the screen or separator 37.

In the machine herein illustrated and described and embodying my invention in one form, it will be seen that the action of the fan produces inflow of a current of air at the mouth of the cleaning tools, through the tubing and intake 26, from which it turns upward over the receiver 7 at the left-hand end of the machine, this deviation of the air current causing the heavier portions of dirt and dust with which the air current is laden to be deposited in said reservoir. The current passes through the shell under the influence of the fan into the chamber 40, where, by the action of the fan in that chamber it is given a circular motion. The current coming in contact with the deflector 28 is directed inward toward the axial center of the shell, encountering the hood 30, which causes it to flow through the connecting tube 31, which tube is arranged tangentially to the wall of the circular chamber 32, where it again takes up a circular motion. The throat 36, however, being located below the tube 31, causes the circularly moving current to travel downward and then make an abrupt turn upward through the throat 36 and within the screen or separator 37. The circular movement of the current of air within the chamber 32 causes the heavier portions of dirt or dust to be thrown off by centrifugal force, and the action of gravity causes such portions to drop and be deposited in the reservoir 7 at the right-hand end of the machine. The air current, by the action of the mechanism, is relieved to a very great extent, if not wholly of foreign matter as dust or dirt, and what little remains is removed by the screen 37, so that practically a current of free air passes out through the outlet 39. The deviation of the air current from the chamber 40 to the lower levels of the machine and within the chamber 32 enables the screen 37 to be set low, and thereby an extremely short stack may be employed, providing a very compact apparatus.

I claim:—

1. In a pump and separator, a casing including a shell, a separator chamber located adjacent to said shell, the latter having an opening through its end wall away from the center thereof, and a hood adjacent to said

opening to influence the flow of fluid therethrough.

2. In a pump and separator, a casing including a shell and a stack rigidly secured to one end of the shell and with the axis of the stack extending laterally of the axis of said shell, said shell having an opening through its end wall away from the center thereof, and a deflector extending in a curved direction from the periphery of the chamber in the shell to a point adjacent to said opening.

3. A pump and a separator including a shell and a stack rigidly secured to one end of the shell and with its axis arranged laterally to that of said shell, a fan located within the shell with its axis coincident with that of the shell and the latter having an opening through its end wall away from the center thereof, and a deflector extending in a curved direction from the periphery of the chamber in the shell to a point adjacent to said opening.

4. In a pump and separator, a casing including a shell and a stack rigidly secured to one end of the shell and with the axis of the stack extending laterally of the axis of said shell, a separator chamber in said stack, said shell having an opening through its end wall away from the center thereof, and a hood adjacent to said opening to influence the flow of fluid therethrough.

5. A casing having a tapered diaphragm with a throat opening below the same and an inlet to the casing between said tapered diaphragm and the side wall thereof, a receptacle located under said throat, a bag suspended in the casing above said diaphragm and surrounding the opening therethrough and means for creating a current of fluid within said casing.

6. In a pump and separator a casing including a shell and a stack rigidly secured to one end of the shell and with the axis of the stack extending laterally of the axis of said shell, said shell having an opening through its end wall away from the center thereof, means for influencing the flow of fluid through said opening, a tapered diaphragm located in said stack with a throat opening below the same, a receptacle below said throat, and a bag suspended in said stack with its open mouth surrounding said throat, the opening through the end wall of said shell entering said stack between said tapered diaphragm and the side of the stack.

7. In a pump and separator, a casing including a shell and a stack rigidly secured to the end of the shell and with its axis arranged laterally to and intersecting the axis of said shell, said stack having a communicating passage opening laterally through the wall between the stack and shell, a fan located within said shell and with its axis extending lengthwise thereof, a wall extending across the stack above said communicating passage and dividing the stack into two compartments, and a throat opening through said wall.

8. In a pump and separator, a casing including a shell and a stack secured to the end of the shell and with its axis laterally arranged to and intersecting that of the stack, the latter having a communicating opening through the wall between the chambers in the stack and shell, a fan located within the shell and with its axis extending lengthwise thereof, a wall extending across the stack above said communicating opening and dividing it into two compartments, and a throat opening through said wall and located below the axial center of the shell.

9. In a pump and separator, a casing including a shell, a fan located within the shell and with its axis extending lengthwise thereof, a stack located at the end of the shell and having a reduced opening communicating with the interior thereof, the axis of the shell intersecting that of the stack, a wall dividing the stack into two compartments, a throat opening through said wall below the axial center of the shell, and a screen with its mouth located above said throat.

10. In a pump and separator, a casing including a shell and a stack with its axis laterally arranged with respect to the shell and rigidly secured to one end thereof, said stack having a reduced opening communicating with the shell, and a wall of inverted conical form located within said stack and opposite the opening to the casing and with the throat of said wall located below said opening.

11. In a pump and separator, a shell, a fan located within the shell, a stack having a chamber of circular form with a passage from the interior of the shell extending tangentially to the wall of the chamber in the stack, and a wall extending across the chamber in the stack and having a tubular extension from the center of the wall terminating in a throat located below the opening from the interior of the shell, said wall dividing the stack into two compartments.

12. In a pump and separator, a casing including a shell and a stack rigidly secured to one end thereof with a thin dividing wall between them and with the axis of the stack arranged laterally to the axis of the shell, said stack having a passage from the interior of the shell extending tangentially to the circular wall of the chamber within the stack, a fan located within the shell, and a wall dividing the stack into two compartments and having a tubular conical extension from the center of the wall extending past said passage from the chamber in the shell and with its lower end located below said opening.

13. In a pump and separator, including a shell, a fan located within the shell, a stack located at the end of the shell, a wall dividing said stack into two compartments, said wall having an opening communicating with the interior of the shell, a throat through the wall in the stack below the opening from the shell, and a deflector arranged on the end wall of the shell and extending from the periphery of the chamber in the shell to a point adjacent to said opening.

14. In a pump and separator, a shell, a fan located within the shell, a stack located at the end of the shell, a wall of inverted conical form dividing the stack into compartments, said stack having an opening from the interior of the shell terminating in the chamber partially formed by said cone-shaped wall, a throat through the wall below said opening, and a deflector located on the end wall of the shell and extending from the periphery of the chamber in the shell to a point adjacent to said opening.

15. In a pump and separator, a shell, a fan located within the shell, a stack located at the end of the shell and having a chamber with a circular wall, a wall of inverted conical shape dividing said stack into compartments, said stack having a passage extending into the interior of the shell through the end wall thereof, a throat extending through the wall in the stack at a point below the opening from the shell, a screen with its lower end arranged about said throat, and a deflector located on the end wall of the shell and extending to a point adjacent to the opening into the stack.

16. In a pump and separator, a shell, means for creating a current of air through said shell, a stack located at the end of the shell and having a chamber with a circular wall, and a deflector arranged on the end wall of the shell and extending from the periphery of the chamber therein to a point adjacent to the opening into the stack.

17. In a pump and separator, a shell, means for creating flow of a current of air through the shell, a stack having a chamber with a circular wall, a wall of inverted conical form dividing the stack into compartments, said stack having an opening communicating with the interior of the shell, a throat through the wall in the stack below the opening from the shell, and a deflector arranged on the end wall of the shell and extending from the periphery of the chamber therein to a point adjacent to the opening into the stack.

18. In a pump and separator, a shell having an opening through its end wall, means for creating flow of a current of air through the shell, a deflector arranged on the end wall of the shell and extending to a point adjacent to said opening, a stack located at the end of the shell and having a chamber with a circular wall, a wall dividing said chamber into compartments, the opening through the end wall of the shell communicating with the chamber below said wall in the stack, a throat through the wall in the stack below the opening from the interior of the shell, and a screen located above the wall and with its mouth located about said throat.

19. In a pump and separator, a casing including a stack and a shell rigidly united and with their axes laterally arranged one with respect to the other, the wall between the shell and stack having an opening therethrough, a fan located within the shell and having its axis coincident with the axis of the shell, and a wall dividing the stack into two compartments and having a tubular conical extension from the center of said wall extending past and having its mouth located below the opening from the shell.

20. In a pump and separator, a casing including a stack and a shell rigidly united, the stack to the end of the shell, the latter having an opening communicating with the interior of the stack, and with their axes laterally arranged one with respect to the other, a fan located within the shell and with its axis coincident with the axis of said shell, a wall dividing the stack into two compartments, said wall being located above the opening from the shell and having a tubular extension from its center extending downward and with its mouth located below the opening to the shell, and a screen located in the chamber above the wall and extending about the opening therethrough.

21. In a pump and separator, a casing including a stack and a shell rigidly united and with their axes laterally arranged one with respect to the other, a wall located between the casing and stack, said wall having a passage located away from its center and extending to the chamber in the stack, a deflector extending from the periphery of the chamber in the shell to said opening, a fan located within the shell and with its axis coincident with the axis of the shell, a wall extending across the stack above the opening to the chamber in the shell dividing the stack into two compartments and with an opening through said wall, and a screen located in the chamber above the wall and extending around said opening.

22. In a pump and separator, a casing including a stack and a shell rigidly united, the stack to the end of the shell, the latter having an opening communicating with the interior of the stack, the axes of said shell and stack being laterally arranged one with respect to the other, a deflector extending from the periphery of the chamber in the shell to said opening, a fan located within

the shell and with its axis coincident with the axis of the shell, a wall extending across the chamber in the stack above the opening to the chamber in the shell and with a tubular extension from the center of said wall with its mouth located below the opening to the chamber in the shell, and a screen located about said opening in the upper compartment of the stack.

23. In a pump and separator, a stack with its axis vertically arranged and with a receiver located in the lower end of the stack, a shell secured to said stack above the receiver and with the axis of the shell horizontally arranged, said shell having an opening communicating with the interior of the stack, a fan located within the shell with its axis extending horizontally, said shell having a passage extending into the chamber in the stack, and a wall located above said opening and dividing the stack into two compartments and with a tubular extension from the center of said wall downward toward the receiver.

24. In a pump and separator, a stack with its axis vertically arranged, a receiver located at the lower end of the stack, a casing secured to the side of the stack and with its axis horizontally arranged, said casing having an opening communicating with the interior of the stack, a fan located within the casing and having its axis horizontally arranged, said casing having a passage extending into the chamber in the stack, a wall located above said opening and having a tubular extension projecting toward the receiver and with its mouth located below said opening, and a screen located in the chamber above the wall in the stack and extending about the opening through said wall.

IRA H. SPENCER.

Witnesses:
MAY C. CARROLL,
D. E. SHEA.