July 23, 1929. C. H. HEIST 1,721,908

CENTRIFUGAL FLUID CLEANER

Filed March 19, 1926

Fig. 1.

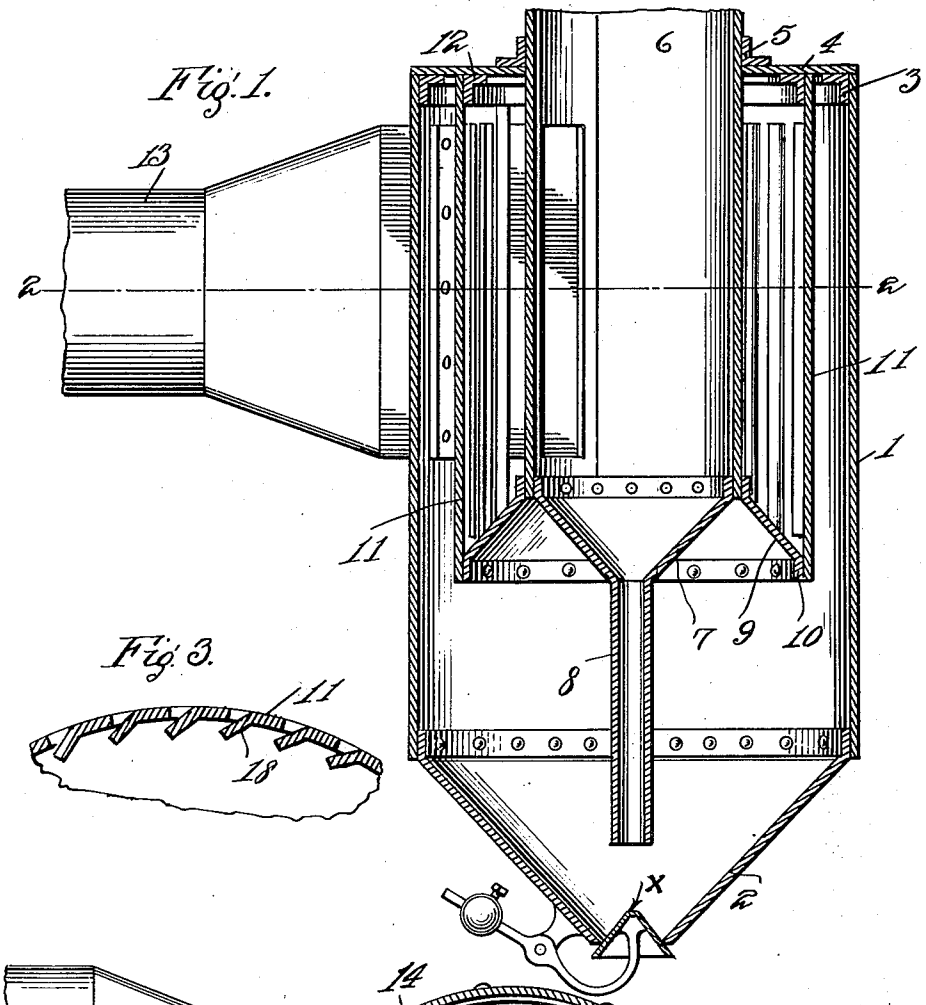
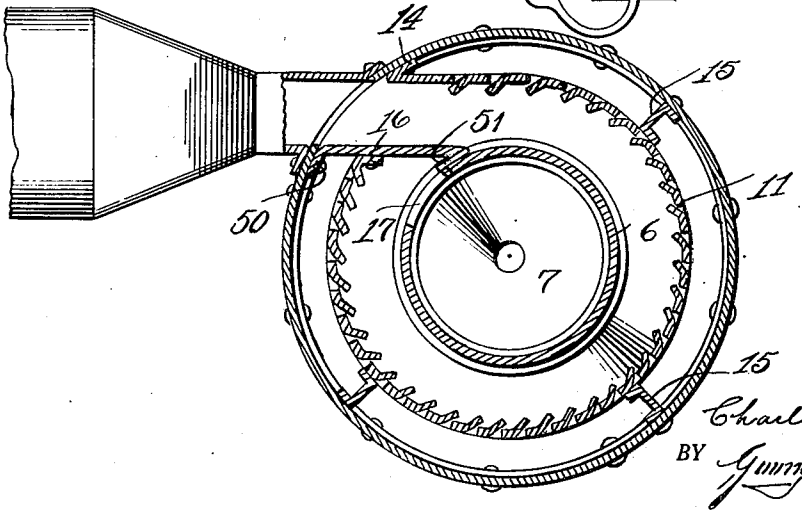


Fig. 3.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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CENTRIFUGAL FLUID CLEANER.

Application filed March 19, 1926. Serial No. 95,988.

My invention relates to improvements in centrifugal fluid cleaners, and is more particularly adapted to that class of cleaner utilized for cleaning gas or air, such as removing particles of foreign matter from gas or air.

The object of my invention is to provide a separator of the class described, wherein the incoming gas or air is given a circular motion, so that the heavier particles will be thrown outward by centrifugal force through a novel arrangement of separating vanes into a compartment where the centrifugal motion is stopped and all other motion of the separated particles halted, thereby allowing them to settle into a receiver from which they may be removed as necessary.

A further object of my invention is to so construct a device of this character that the parts of the device subject to the most wear may be removed and replaced without disturbing or replacing other sections of the device.

Another advantage of my invention is that the device may be constructed in any size, from very small to very large, without any change in the principle of operation or general design.

These and other features will be fully apparent as the description proceeds, in which the novel combination of parts will be hereinafter described in connection with accompanying drawings.

Figure 1 is a side elevation, partly in section, showing my improved separator.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is an enlarged detailed view illustrating the structure of the separating vanes.

Referring to the accompanying drawings, in detail, wherein like reference characters denote corresponding parts throughout the several views, the Figure 1 designates a cylindrical drum, which may have a cone-shaped bottom 2, while its upper end has connected thereto a cover 4. The central portion of the cover 4 has passing downwardly therethrough a pipe 6. Upon referring to the drawing, Figure 2, it will be noted that pipe 6 is concentrically arranged within drum 1.

As best shown in Figure 1 of the drawings, the cone bottom 2 forms a settling chamber for the dust, or other foreign substance, and the discharge mouth of the same is normally closed by any type of valve, the valve shown being that of the counterweighted conical type, as indicated at X, the same being pivotally connected in any suitable manner to the cone shell.

The lower end of the pipe 6 has connected thereto a cone shaped bottom 7, the apex of which has connected thereto a downwardly projecting pipe 8, the purpose of which will be hereinafter more fully described.

Connected to the lower end of pipe 6, upon its outer face, is a downwardly inclined bottom 9, the outer edge of which is provided with a flange 10 to which are connected in any suitable manner the lower end of the deflecting vanes 11 having inturned lips 18, the upper ends of which vanes are connected to an annular ring 12, which ring is connected to the under face of the cover 4.

The outer drum 1 is provided with a suitable elongated opening which has in connection therewith an inlet pipe 13. The vanes 11, are secured at intervals so as to have a narrow space between vanes, commencing at a point 14 on drum 1 where pipe 13 enters drum 1. This plurality of vanes 11, extending around pipe 6, form a passageway for the gas or air as shown in Figure 2. The passageway from pipe 13 is formed by a plate 16, one end of which is connected to the inner face of drum 1, adjacent to the connection of pipe 13, as indicated at 50, while its other end is connected to pipe 6 at 51. As the circular passageway ends at plate 16 the pipe 6 is provided with an elongated opening 17 through which the cleaned air or gas passes into pipe 6 and is conveyed upwardly therethrough.

Secured at spaced intervals within the drum 1 and between its inner surface and the outer surface of the wall formed by the series of adjacent vanes 11 is a plurality of radially extending baffles 15, which form a plurality of pockets or compartments in the space between vanes 11 and the inside of drum 1. These baffles 15 are connected in any suitable manner to the top 4 and drum 1 and extend the entire length of vanes 11. The compartments or pockets thus formed are open at their lower end.

Having thus fully described this specific form of my invention, I will endeavor now to explain briefly its mode of operation. The air or gas containing foreign particles is admitted through pipe 13, enters the cross-sectionally elongated space between pipe 6 and wall formed of specially constructed vanes 11, where it must take a circular path around

pipe 6 until it reaches opening in pipe 6 at 17 through which it travels upwardly through pipe 6 to point of use. As the air or gas containing foreign particles travels in a circular path the foreign particles, due to centrifugal force, are thrown outwardly against the wall formed by vanes 11. These vanes 11 are of such novel construction that the foreign particles are deflected by the slight inward bend of the vane 11 through the narrow slot between each adjacent vanes 11 into the compartments formed by baffles 15. Due to baffles 15 the air or gas between the wall formed by vanes 11 and drum 1 is practically motionless, allowing foreign particles suspended therein to settle to the bottom of drum 1, whence it may be removed as necessary. As will be further noted hereinafter, due to the air-tight construction of the drum 1, no air current passes through the slots but the foreign particles are thrown through by centrifugal force only. Particles which pass around and into pipe 6 may drop into the cone-shaped hopper 7 and down pipe 8 into the receptacle provided in the bottom of drum 1. The receptacle for separated particles is so constructed in combination with drum 1 as to form with it an air-tight unit. Particles are removed from the receptacle as necessary through a valve or other suitable arrangement. Pipe 8 extends downwardly far enough so that accumulated particles seal the end of it so as to prevent any currents of air from passing between the vanes and then downwardly and upwardly through the pipe 8 with the possibility of carrying some of the separated particles into pipe 6 and thence to point of use. The construction of vane 11 is such that lip 18, of the vane 11, extends into the path of the flowing gas or air just far enough to deflect foreign particles, thrown outwardly by centrifugal force, and not so far out as to deflect a large amount of gas or air. Also, the opening, between adjacent vanes 11, is just wide enough to allow free passage for any foreign particles deflected by lips 18 of vanes 11, and not wide enough to cause counter-currents within the compartments formed by baffles 15 between drum 1 and wall formed by vanes 11.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

A device of the character described comprising an outer drum, a supply pipe in communication with the drum in a tangential direction, a delivery pipe positioned centrally in said drum, a separating wall positioned between said pipe and the outer wall of said drum and arranged concentrically therewith, said separating wall cooperating with said pipe to define an air passage opening at one end to said supply pipe inlet and at its opposite end laterally into said delivery pipe at a point adjacent the inlet end of the passage, said drum having a cover disposed thereon and extending between the peripheral edge of the drum and the exterior of said delivery pipe, said separating wall having its upper end attached to said cover and being formed with a plurality of vertically extending slots and spaced lips extending into the air passage and over said slots, and a downwardly inclined bottom closure plate connecting a portion of said delivery pipe with the lower end of said separating wall whereby to form a downwardly and outwardly inclined bottom for the said air passage, and spaced vertical baffles arranged between the inner wall of said drum and said separating wall to form pockets for the reception of solid particles passed through the slots in said separating wall, said pockets being open at their lower ends into the body of said drum beneath said separating wall and delivery pipe.

In testimony that I claim the foregoing I have hereunto set my hand at Mayville, in the county of Dodge and State of Wisconsin.

CHARLES H. HEIST.