May 30, 1944. A. B. OSGOOD 2,349,831

DUST COLLECTOR

Filed Nov. 3, 1941

Fig. 1

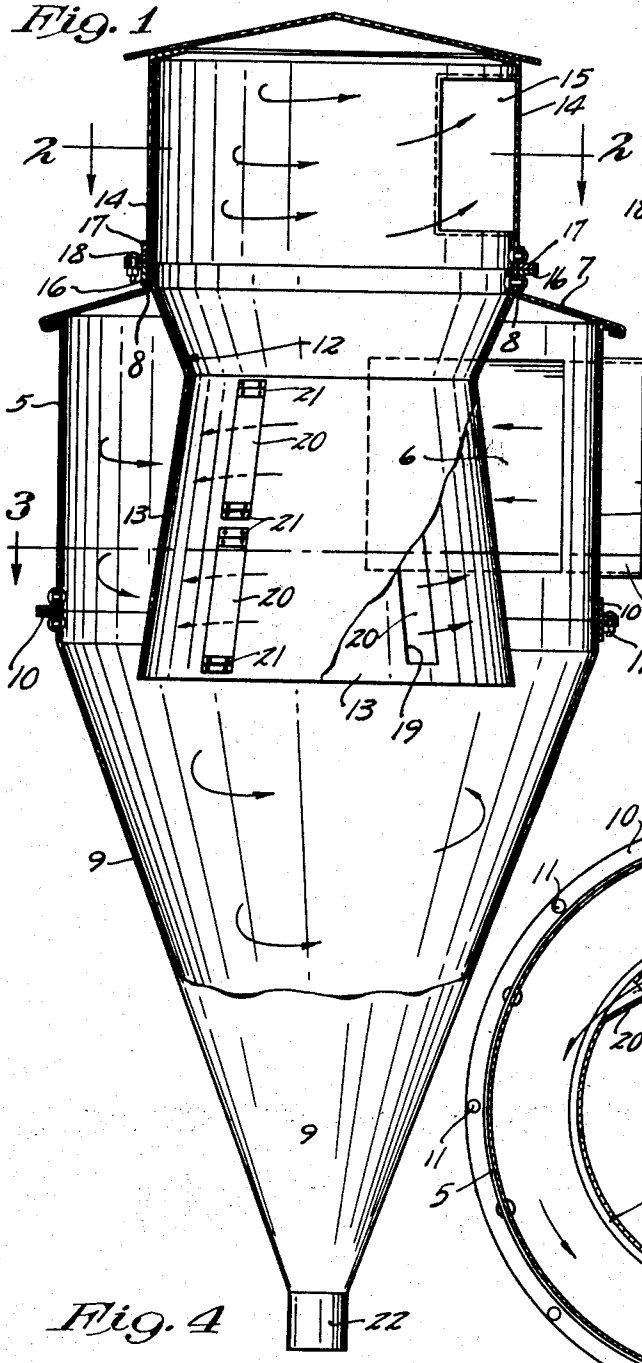



Fig. 2

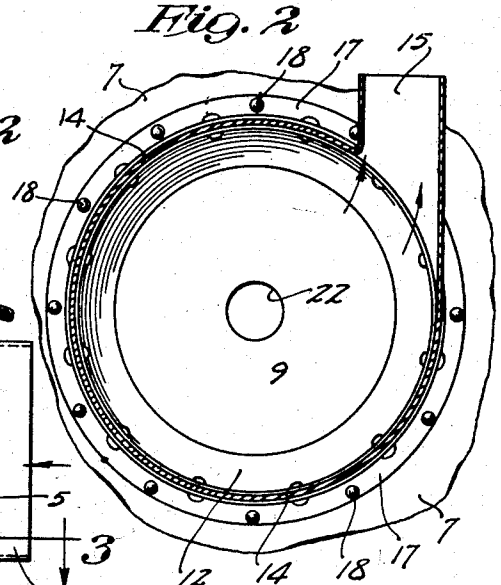



Fig. 3

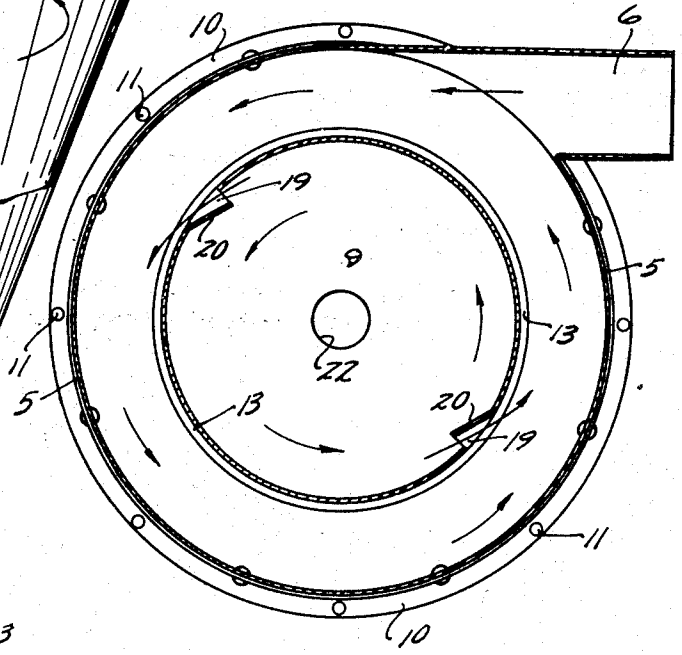
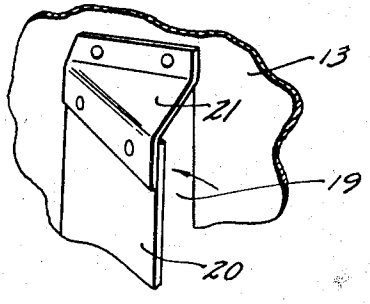



Fig. 4




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# UNITED STATES PATENT OFFICE

2,349,831

## DUST COLLECTOR

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Application November 3, 1941, Serial No. 417,664

4 Claims. (Cl. 183—85)

My present invention relates to dust collectors of the so-called "cyclone or centrifugal type" and is in the nature of an improvement on or modification of the dust collector disclosed and claimed in my prior Patent No. 2,153,270 issued of date April 4, 1939.

Generally stated, the invention consists of the novel devices, combinations of devices, and arrangement of parts whereby improved results are obtained with an extremely simple and relatively low cost apparatus.

In the accompanying drawing, which illustrates my invention, like characters indicate like parts throughout the several views.

Referring to the drawing:

Fig. 1 shows a commercial improved form of the dust collector chiefly in vertical axial section but with some parts in full and with some parts broken away;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1;

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 1; and

Fig. 4 is a fragmentary perspective showing particular triangular caps applied at the ends of the so-called "skimmer caps" or passages.

The entrance chamber of the dust collector is formed within a cylindrical shell 5 which has a tangential air intake port 6, and an annular cover plate 7, which latter, at its inner edge, is shown as terminating in an upstanding annular flange 8. Secured to and extending below the cylindrical shell 5 is a downwardly tapered conical shell or hopper 9, the axis of which is concentric to the axis of the cylindrical shell 5. The large upper edge of the conical shell 9 is coincident with the lower edge of the shell 5 and is rigidly attached thereto, preferably by reinforcing angle rings 10 which, as shown, are connected by bolt-equipped nuts 11. The outer edge of the annular cover plate 7, as shown, is clinched around the annular flange of the shell 5.

Concentrically located within the cylindrical shell 5 is an air outlet stack 12, the upper edge of which is riveted or otherwise secured to the flange 8. The upper portion of this outlet stack 12 is downwardly tapered and is provided with a downwardly flaring skirt 13 that is in the form of a truncated cone. The upper edge of the outlet stack 12 is secured to the flange 8 and is substantially coincident with the lower edge of an inverted cup-shaped dome 14 which has a tangential air outlet 15. Preferably this dome 14 is made rotatively adjustable and this is shown as accomplished by providing the flange 8 and the dome 14 with angle iron reinforcing rings, respectively, 16 and 17, and connecting the same by nut-equipped bolts 18 passed through suitable circumferentially spaced perforations in the said rings. This rotative adjustment of the dome may be accomplished in various ways, but in any event, it provides means for setting the tangential outlet spout or passage 15 in various different positions for discharge of the air.

The downwardly flaring or upwardly tapering skirt 13 of the air outlet stack is provided with skimmer acting outlet passages that perform an important function. These skimmer passages 19 are preferably formed by long upright slits formed by inwardly pressed lips or skimmer plates 20. At the upper and lower ends of the slits or gaps 19 the lips 20 are reinforced and definitely positioned by flanged triangular caps 21, best shown in Fig. 4. These flanged caps 21 are preferably riveted to the skirt 13 and to the lips or skimmer plates 20.

The hopper-like shell 9, at its contracted lower end, terminates in a dust discharge spout or neck 22. The fact that the skirt 13 is downwardly tapered or, otherwise stated, upwardly contracted, and is materially smaller in diameter in all points than the entrance chamber 5, is highly important in the operation. The dimensions may be varied, but in the commercial machine, the relative diameters of the said parts are as follows: The skirt in the horizontal plane of its lower edge was 70% of the diameter of the shell 5 and at its upper portion, where it joins with the portion 12, it was 50% of the diameter of said shell 5.

### *Operation*

In the operation of this device the dust-laden air entering through tangential intake port 6 will take up a rapid rotative and downward movement around the skirt 13 and will then be drawn upward into the skirt continuing its travel by an upward rotary movement through the skirt and into the dome, which latter, the relatively clean air, will be discharged through the tangential outlet 15.

As the air makes its rapid turn from a downward rotary to an upward rotary movement, the greater part of the dust or solid material will be precipitated into the hopper-like shell 9, but a considerable portion of the dust, and especially the lighter particles, will be carried upward through the skirt and outlet stack. As this partly cleaned air continues to rotate with an upward trend through the skirt, the particles heavier

than air will be caused to hug the interior of the skirt and will be skimmed off by centrifugal force passing outward through the skimmer passages 19 and back into the main dome of dust-laden air. The contraction of the skirt is highly important because it contracts the circuitous travel of the air and dust and causes an increased adherence of the dust to the interior of the skirt, thereby insuring skimming off of the dust. With the skirt a true cylinder, the dust skimming action would not be nearly as efficient as with the upwardly contracted skirt. This statement has been demonstrated in practice and the present apparatus has been found to be very highly efficient and to have an improved action over that of my prior patent.

It will be noted that the dome is of considerably less diameter than that of the entrance chamber; and that the upper end or top of the skirt 13 is of less diameter than that of the dome, while the lower end of said skirt is approximately the diameter of the dome. With this arrangement, when the air, which has been nearly separated from dust, passes from the contracted upper end of the skirt and continues its whirling motion it will, by centrifugal force, be expanded and reduced in pressure, thereby reducing the resistance to the travel of air through the contracted upper portion of the skirt. In a sense, the skirt and its expanded upper portion have somewhat the action of a Venturi tube.

I have described and illustrated in the drawing the latest commercial form of my improved device, but it will be understood that various alterations may be made within the scope of the invention herein disclosed and claimed.

What I claim is:

1. In a dust collector of the kind described, a drum-like entrance chamber provided with an upwardly extended dome, and an outlet stack extended downward from said dome into said entrance chamber and provided with circumferentially spaced substantially vertically extended skimmer-acting outlet slots, said stack in the portion having said slots being downwardly and outwardly flared.

2. The structure defined in claim 1 in which said skimmer slots are formed by inwardly extended plate-like lips and approximately triangular head-forming brackets applied at the upper and lower ends of said lips.

3. The structure defined in claim 1 in which said dome is of much less diameter than said entrance chamber, the lower end of said downwardly flared stack portion being of considerably less diameter than said entrance chamber and the upper end of said downwardly flared stack portion being of considerably less diameter than said dome and being connected to the latter by an upwardly flaring annular portion of said stack.

4. The structure defined in claim 1 in which said dome is of much less diameter than said entrance chamber, the lower end of said downwardly flared stack portion being of considerably less diameter than said entrance chamber and the upper end of said downwardly flared stack portion being of considerably less diameter than said dome and being connected to the latter by an upwardly flaring annular portion of said stack, said entrance chamber being provided with a depending hopper terminating at its lower end in a discharge neck.

ARTHUR B. OSGOOD.