

March 27, 1951

F. N. NIEDERKORN
DUST COLLECTOR

2,546,558

Filed Aug. 22, 1949

2 Sheets-Sheet 1

Fig. 1.

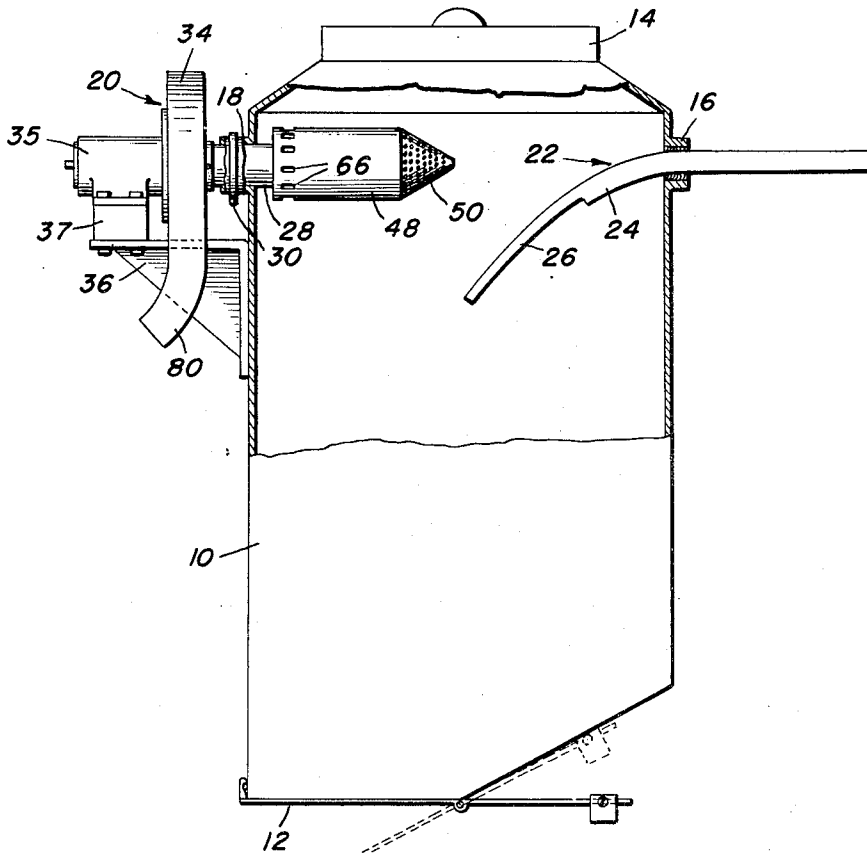
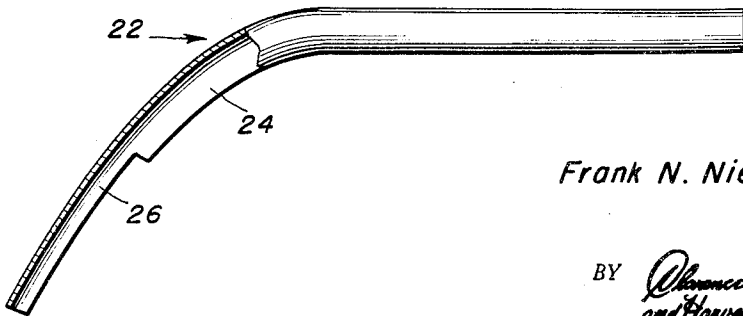


Fig. 7.



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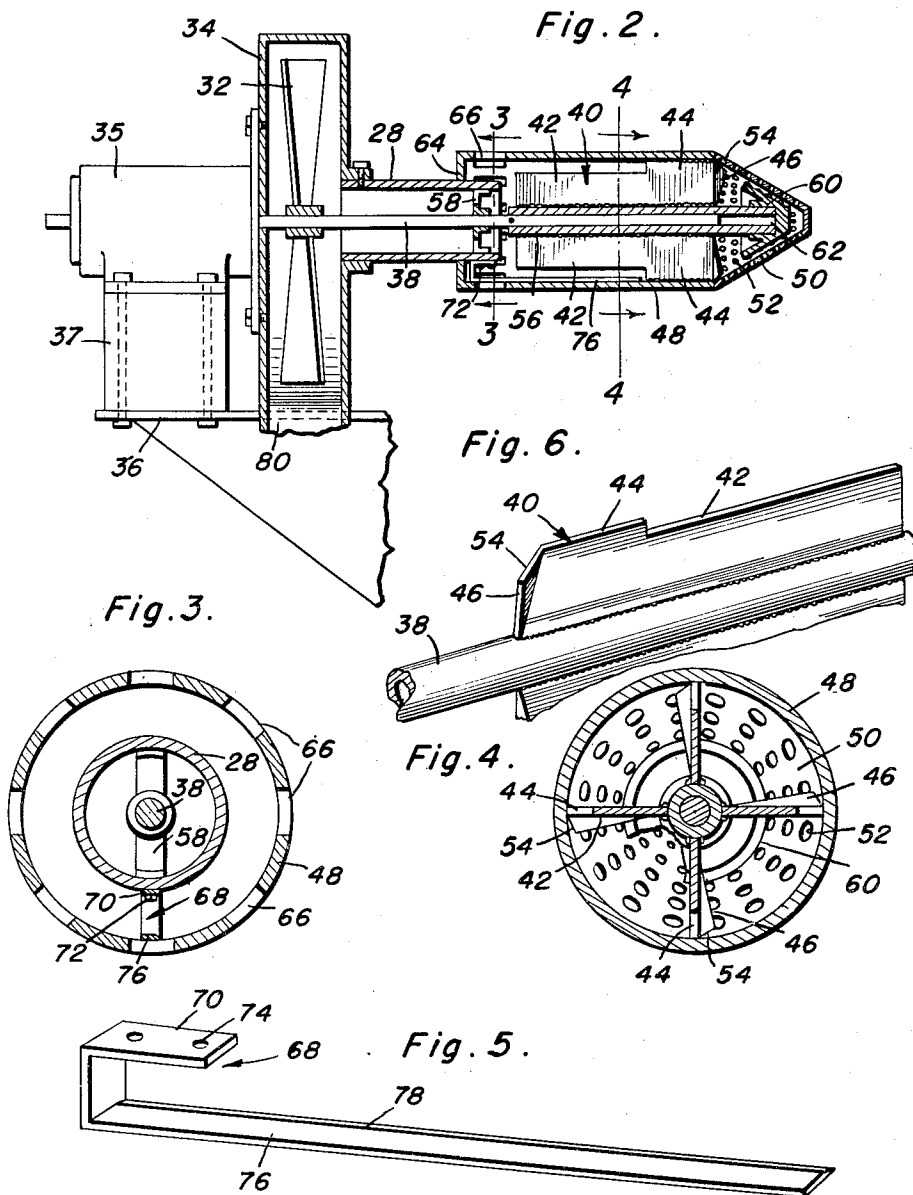
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UNITED STATES PATENT OFFICE

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DUST COLLECTOR

Frank N. Niederkorn, Port Washington, Wis.

Application August 22, 1949, Serial No. 111,727

4 Claims. (Cl. 183—77)

1

This invention relates generally to dust collectors and more particularly to improvements in the subject matter of a patent issued to applicant under the same title, March 15, 1949, bearing No. 2,464,648.

The objects of this invention are generally those recited in the said patent, and in addition to provide improved means to insure against air stalling adjacent to the inner wall of a cylinder of rotary type used in the device, said means being primarily related to the form of radially disposed webs within the said cylinder.

Another object of this invention is to provide an improved scraper construction designed to insure faster and more complete discharge of dust from the cylinder.

Still another object of this invention is to provide a web construction which cooperates with the improved scrapers in a novel manner.

Yet another object is to provide an improved dust collector considered as an assembly of a container, specific inlet construction and specific outlet construction.

Other objects and advantages will become apparent to those skilled in the art to which this invention belongs, when the following detailed description of an embodiment of the invention is considered.

The improved embodiment of this invention is illustrated in the accompanying drawings, in which:

Figure 1 is an elevational view of the assembled dust collector, the upper portion of the container being broken away in order to show the specific inlet and outlet construction;

Figure 2 is an enlarged vertical sectional view of what will be hereinafter referred to as the rotary separator, with its motor illustrated diagrammatically;

Figure 3 is a transverse vertical sectional view, taken substantially on the line 3—3 in Figure 2;

Figure 4 is a vertical transverse sectional view of the separator, taken substantially upon the line 4—4 in Figure 2, and looking in the direction of the arrows;

Figure 5 is a perspective view of one of the scrapers on an enlarged scale;

Figure 6 is a perspective view of one of the webs; and

Figure 7 is an enlarged view of an improved form of inlet construction, a portion being broken away and the underlying portion being shown in vertical section and in elevation to illustrate the construction thereof.

2

lar or identical elements and portions throughout the specification and throughout the several views of the drawings.

Referring now to the drawings in detail, this invention includes a container 10 of any suitable character which will ordinarily be equipped with a trap door 12 and a removable cover 14. The container will have an inlet 16 and an oppositely disposed outlet 18, preferably positioned near the top of the container and the separator assembly generally indicated at 20 will be mounted in the outlet 18, while the inlet pipe assembly 22 will be mounted in the inlet 16, as by welding or by any other suitable means.

The inlet construction pipe 22 will have a downwardly bent portion 24 terminating in a portion 26 comprising a shield deflector constructed by removing approximately one-half of the terminal portion of the pipe 22, as will be clear from an inspection of Figure 7.

The rotary separator 20 includes a tube 28 fixed within the said outlet 18 by means of a simple clamp 30. A rotary fan 32 is operatively mounted within a casing 34 on one end of the tube 28, and a motor 35 is operatively mounted on the casing 34 and on suitable auxiliary supporting structure such as the angle bracket 36 and spacer block 37. The motor has its drive shaft 38 disposed coaxially of the tube 28.

Radially extending webs 40 of a novel and improved design are illustrated in Figures 2, 4 and 6. These webs each comprise a reduced elongated portion 42 and a radially extended portion 44, and each web also has an inclined portion 46 comprising a propeller blade. A cylinder 48 is rotatably mounted on the tube 28 and rigidly secured, as by welding, to the radially extended portions 44 of the webs. This cylinder 48 has an open end in the form of a perforated cone 50, the apertures in the cone being indicated at 52. The propeller blades 46 have inclined outer edge portions 54 and the blades are thus configured to rotate within the contiguous portion of the cone 50. It may be here stressed that the blades 46 are integral portions of the webs 40, and these blades assist materially in forcing the dust-laden air through the separator 20, being particularly effective in driving sufficient air along the wall of the cylinder 48 to prevent undue accumulation of dust on the inner surface of the wall, or more accurately, to aid in the prevention of such accumulation.

The webs 40 are represented as being welded to a tubular hub 56 secured on the shaft 38 as indicated in Figure 2, and it may be further

Similar characters of reference designate simi- 55

noted that a bearing 58 is provided in the end of the tube 28 remote from the fan 32, this bearing 58 being used to further support the shaft 38.

An imperforate inside cone 60 is rigidly secured to a portion 62 of the tubular hub 56 extending into the cone 50, the inside cone 60 conforming generally in configuration but smaller in dimension than the perforated cone 50, and the inside cone is a rotary deflector designed to drive the incoming dust-laden air toward the wall of the cylinder 48.

As previously mentioned, the cylinder 48 is rotatably mounted at one end upon the tube 28, and it is preferred that the cylinder 48 shall have inwardly turned flange structure 64 which will be reasonably accurately machined for frictional engagement upon the tube 28, which latter functions in this regard as an axle member for the closed end of the cylinder 48.

The cylinder 48 has a plurality of circumferentially spaced apertures 66 for the discharge of dust particles at the end of the cylinder remote from the cone 50. A plurality of scrapers, generally indicated at 68, and illustrated in detail in Figure 5, are secured in circumferentially spaced relation upon an end of the tube 28 projecting within the cylinder 48. Each of these scrapers 68 include a short arm 70 which is secured by bolts or screws 72 inserted through apertures 74 in the arm 70 into the tube 28. This construction allows the rigid support of the scrapers within the cylinder so that longer arms 76 of the scrapers may extend longitudinally of the cylinder 48 and adjacent the wall thereof, into the space between the reduced portions 42 of the webs and the cylinder. It should be carefully noted that the arms 76 of the scrapers extend over the dust discharge apertures 66. Each scraper is provided with a sharpened edge 78 on the long arm 76, this construction having been found to aid materially in the prevention of undue dust collection within the cylinder. Of course, the housing 34 for the fan 32 will be provided with an outlet 80, and a considerable flow of air with dust removed therefrom will be exhausted from the outlet 80.

The operation of this invention will be clearly understood from a consideration of the foregoing description of the mechanical details thereof, taken in connection with the drawings and the above recited objects.

In recapitulation, it may be added that dust laden air is drawn in through the inlet tube 22, the heaviest dust particles being deflected downwardly by the shield deflector 26 for collection within the container 10. Air spills out from the various portions of the inlet tube 22 and is drawn into the apertures 52 of the separator 20. This dust laden air is deflected radially by the imperforate cone 60 and is propelled through the separator by the combined action of the propeller blades 46 and the fan 32, the propeller blades 46 being properly thought of as increasing the flow of dust laden air adjacent the wall of the cylinder 48. The action of the scrapers has already been fully described and a large percentage of the dust in the air is extracted

and discharged through the apertures 66. The main air flow, that is, the flow of air from which the dust has been largely removed, will be through the outlet 80.

Having described the invention, what is claimed as new is:

1. A rotary dust separator comprising a tube, a suction fan, a motor for the fan and including a shaft mounted coaxially of the tube, said fan being fixed to said shaft at one end of said tube, radially disposed webs rigidly secured to said shaft and extending longitudinally of the shaft, said webs having reduced portions and radially extended portions, a cylinder secured to said extended portions coaxially of said tube and having one end of the cylinder enclosing the other end of said tube, the other end of the cylinder being perforated, dust discharge openings in the wall of the cylinder adjacent said one end of the cylinder, said webs extending throughout a major portion of the cylinder, and scrapers fixed to the tube and extending between said reduced portions of the webs and said cylinder, said scrapers extending over the said dust discharge openings, said scrapers each having a short arm secured to said tube and a longer arm spaced radially outwardly from the short arm and having a sharpened longitudinal edge adjacent the inner surface of the cylinder.

2. A rotary dust separator comprising a tube, a suction fan, a motor for the fan and including a shaft mounted coaxially of the tube, said fan being fixed to said shaft at one end of said tube, radially disposed webs rigidly secured to said shaft and extending longitudinally of the shaft, said webs having reduced portions and radially extended portions, a cylinder secured to said extended portions coaxially of said tube and having one end of the cylinder enclosing the other end of said tube, the other end of the cylinder being perforated, dust discharge openings in the wall of the cylinder adjacent said one end of the cylinder, said webs extending throughout a major portion of the cylinder, and scrapers fixed to the tube and extending between said reduced portions of the webs and said cylinder, said webs having inclined terminal portions at said other end of the cylinder comprising propeller blades for dust-laden air.

3. A separator according to claim 2, and wherein said other end of the cylinder comprises a cone, and said propeller blades are disposed within the cone.

4. A separator according to claim 3, and including an imperforate cone secured to said shaft immediately inside said perforated cone.

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REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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1,789,871	Knight	Jan. 20, 1931
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