

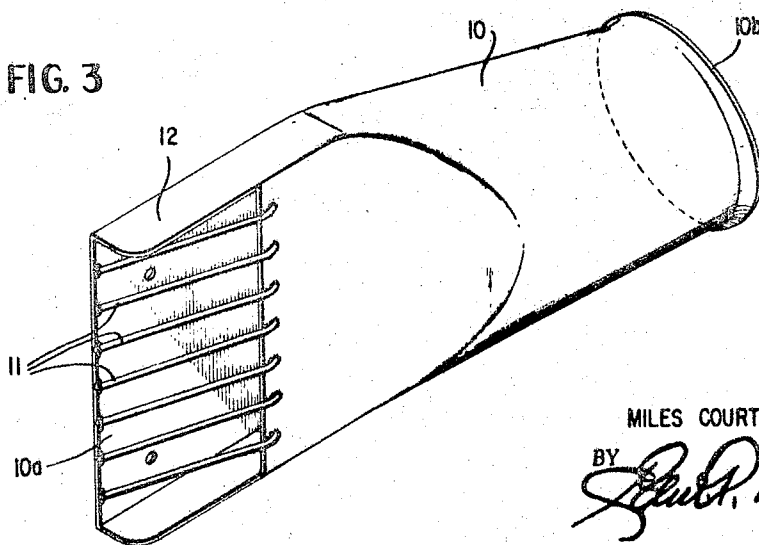
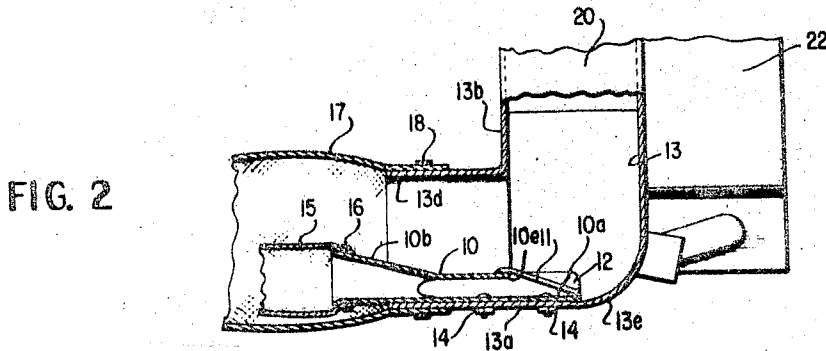
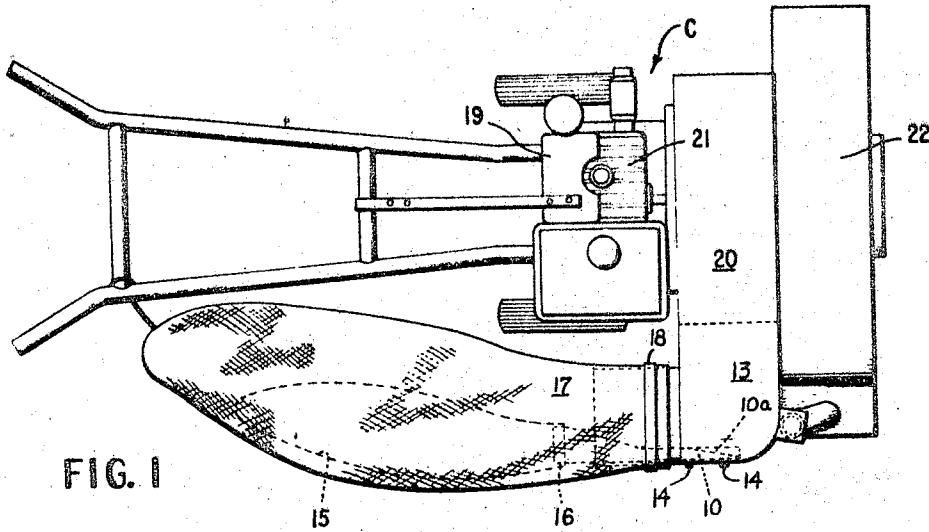
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TRASH SEPARATOR FOR SUCTION CLEANERS

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TRASH SEPARATOR FOR SUCTION CLEANERS

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The present invention relates to mobile industrial suction cleaners and pertains more particularly to means for separating larger particles of litter from smaller particles of dirt and dust entering the collecting means of such cleaners.

Heretofore, as far as I am aware, suction cleaners of the type employed for cleaning trucks, lorry trailers, freight cars, docks, floors of factories, platforms and the like have discharged all of their gleanings into a single container. If this container is equipped with air filtering means or with the usual filter-collection bags, the finer particles clog the filter quickly, which causes any increase of back-pressure on the suction means, thus reducing the efficiency of the cleaner and requiring dumping the contents of the container and cleaning the filter at frequent intervals.

The object of the present invention is, broadly, the provision of a separator means that may be positioned in the conduit between the suction means and the collecting container and which will separate the larger particles of litter from the smaller particles, including dirt and dust, and allows larger particles to be deposited in a collecting-container by a large volume of the impelling air-flow and the smaller particles to be deposited in another collecting-container, by a lesser volume of said air-flow, disposed within the container for the larger particles.

Another object of the invention is to prolong the life of the air-filtering trash collecting bags and to increase the efficiency of the suction cleaner.

The above and other objects of the invention are attained by the preferred form of the separation means, as at present devised, in the arrangement hereinafter described and shown in the accompanying drawing.

In the drawing:

FIGURE 1 is a top plan view of a mobile industrial suction cleaner equipped with the separator means of the present invention;

FIGURE 2 is a fragmentary enlarged sectional view taken through the discharge duct of the suction cleaner, shown in FIGURE 1, and illustrating the construction and location of the separator; and

FIGURE 3 is an enlarged perspective view of a separator.

Referring in detail to the drawings, in which like characters refer to similar and like parts throughout its several views, a screening separator 10 is disposed in the discharge leg portion 13d of a conduit 13 leading from and conveying a flow of air, under pressure, discharging from a suction cleaner C and entraining the trash therewith, the separator 10 being so positioned in said conduit 13 as to screen trash or litter of a large particle size (such as paper, paper-cups, wrappers, folders, pamphlets, small boxes, cigarettes and cigar butts, small stick-like objects, twigs, leaves, chips from machines, packing-waste, pieces of textile and plastic cloth, straw, food-scrap, shredded materials, excelsior, and like litter) from said air flow and convey it to a collecting-container means 17, while permitting trash of smaller particle size (such as dirt, dust, lint, threads, ashes, powdered cement, gypsum, carbon-black, sawdust, seeds, sand, and the like), to pass therethrough to another collecting-container means 15.

In applying such a separator to a suction cleaner of the type shown in my United States Patent No. 2,971,210, the separator 10 preferably takes the form of a straight tubular member open at both ends, its intake end portion

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being substantially rectangular in cross-section (i.e., longer in one direction than in the other) and its discharge end portion being substantially circular in cross-section. The extremity of the intake end is cut or formed obliquely to its axis to provide a wide lateral inlet opening 10a, as shown in FIGURE 3, the edges of which extend substantially diagonally of the axis of the tubular member. A screening means extends across the opening 10a and may comprise the parallel spaced bars 11 spanning and welded to the forward and rear edges of the opening 10a. The spacing of the bars 11 (or the mesh of other screening that may be employed) will determine the particle size of the gleanings that will pass into the tubular separator 10. The side edges of the inlet opening 10a of the separator 10 may be turned, as at 12, to provide flanges.

The separator 10 is dimensioned so that it can be disposed axially into the discharge end of an elbow-type conduit 13 with its intake end innermost and to occupy about one-fourth or less of the interior area of the discharge end of said conduit. The elbow conduit 13 is preferably rectangular in cross-section, but has an intake leg 13b and a discharge outlet 13d connected by intermediate arcuate side walls, the outer wall 13e of which being of a greater radii than the inner arcuate side wall. The separator 10 is positioned, with its intake end 10a innermost, in the discharge leg 13d against and along the inner face of the outer wall 13a which is a rear extension of the outer arcuate wall 13e. As shown in FIGURE 2, the intake end of the separator 10 projects into the elbow portion of the conduit 13 for a distance and is positioned so that the rear edge 10e of its opening 10a aligns approximately with the inner wall of the intake leg 13b of said elbow conduit so that the said oblique opening 10a is laterally directed and faces the air entering the intake leg 13b, while its circular discharge end 10b extends beyond the discharge leg 13d of the conduit 13, as indicated in FIGURE 2. The separator 10 may be held in this position, as shown, by any suitable means, such as by bolts 14, extending through the contacting portions of its wall and the wall 13a of the conduit 13, or may be welded thereto or otherwise secured in position. When bolts 14 or the like are employed they, together with the openings therefor, serve to locate and position the separator properly in the conduit.

The rear or discharge end 10b of said tubular separator 10 has the neck of a collecting filter-bag 15 telescoped thereover and held in position thereon by clamp bands or the like 16. The collecting filter-bag 15 is disposed preferably, within a larger collecting filter-bag 17, the open end of which telescopes over the discharge end of the leg 13d of the conduit 13 and is secured thereon by a clamp band 18.

The suction cleaner C, shown in FIGURE 1 by way of example only, and more particularly defined in my afore said Letters Patent, comprises a manually guided wheeled carriage 19, upon which is mounted a suction fan contained in a casing 20 and a motor 21 operatively connected to the fan. A flared and downwardly directed nozzle-cowl 22 is carried in the front face of the fan casing 20 and communicates with said casing. The discharge from said casing 20 is through the elbow conduit 13 which has its intake leg 13b connected with the casing 20 and has its discharge leg 13d connected to the collection bag 1 in the manner above described.

From the above, it will be clear that the oblique screened intake opening 10a of the separator 10 is positioned to be aligned with the line of flow of the gleanings entrained in the propelled air passing from the intake leg 13b of the conduit 13; and that, since the small particles, especially dirt and dust, travel predominately along the greater arc 13e and outer wall 13a of the discharge leg of the elbow conduit 13, they will pass through

the screen 11 and into the tubular separator 10 and, finally, into the collecting filter-bag 15 while being entrained in a smaller volume of the propelled air; whereas the litter of larger size (which will not pass through the screen 11), will slide off the screen and continue into the larger collecting filter-bag 17 with the much greater volume of entraining propelled air. For an example, in practice, I have employed a 90-degree elbow conduit 13, as shown, 6 inches by 6 inches in cross-section, with a separator 10 having a throat at its oblique intake opening 10a of 1 inch by 6 inches. This arrangement is most satisfactory and permits $\frac{1}{4}$ of the volume of air to go into the inner bag 15 with the finer particles, while the larger particles travel with the greater volume of air into the larger outer bag 17. Since the larger particles, such as large pieces of litter scrap and various other debris, have little, if any, dirt and dust entrained with them, this arrangement eliminates the necessity of filtering all the air through both bags and only the small air volume, entraining the dirt and dust, is filtered through both bags thereby giving double protection against emission of the collected dirt and dust back into the environmental atmosphere.

I have found that the above described separation results in fewer "bag blankouts" (i.e., clogging of the pores of the bags before they are filled), in the prolonged use of the cleaner before having to change bags or to clean them, in the prolonged useful life of the bags, and in greater efficiency of the suction cleaner by reducing back pressure on the air propelling means or fan 20. My experience, in commercial and industrial cleaning with any suction cleaner before the use of the separator of this invention (i.e., with all the litter and fines going into one bag, is that the bag will clog in about three to five minutes and must be emptied and cleaned; whereas, with the use of the separator 10 and the inner and outer air-filtering bags 15 and 17, the cleaning operation can proceed continuously without clogging or back-pressure which destroys the suction, until the bags are above three-quarters filled, thus resulting in a definite advance in commercial and industrial cleaning.

Having thus described my invention and the manner of performing the same, it is to be understood that changes and modifications may be made in the device without departing from the spirit of the invention and that the invention is only to be limited by the scope of the appended claims.

That which is claimed, as new and to be secured by Letters Patent, is:

1. In an air suction cleaner of the type defined having an air impeller communicating with a suction nozzle for creating an air suction at said nozzle and propelling said air and its entrained gleanings through a discharge conduit of elbow-form having one end in communication with said impeller and the other end being a discharge outlet; the improvement comprising a gleanings separator means positioned within and extending longitudinally and inwardly of and along the outer side wall of the discharge outlet end portion of said conduit to form a tubular non-foraminous passage open at both of its ends and of a cross-section area less than one-half of the cross-sectional area of said conduit, the innermost end of said tubular passage being formed and arranged to confront the flow of said propelled air and its entrained gleanings passing into the said discharge conduit; a screening means across

the innermost end of said tubular passage to separate the larger gleanings from gleanings of small particle size; two air pervious filtering collection bags each having an opening therein, one of said bags being disposed loosely within the other bag, the innermost bag being of much less proportions than the outermost bag, and means detachably connecting the opening of the inner bag to and in communication with the outer end of the tubular separator means, and means detachably connecting the opening of the outer bag to and in communication with the discharge end of said discharge conduit—all as and for the purposes described.

2. The subject matter of claim 1 wherein the discharge conduit is rectangular in cross-section and wherein said separator is a tubular member having at least its innermost end portion rectangular in cross-section and of a narrower dimension in one transverse direction than in its other transverse direction and its discharge end being cylindrical and projecting beyond the discharge outlet of said conduit, the wider cross-sectional dimension of said tubular member being substantially coextensive with the outer adjacent wall of said conduit, which extends from the greater arc of its elbow-portion.

3. A trash separator for use with an air suction cleaner of the type defined having an air impeller provided with an arcuate elbow-form discharge conduit having an intake leg, a discharge leg and an intermediate arcuate portion for conveying the propelled air from the impeller, together with the entrained gleanings, which have been sucked-up by said cleaner, to an air-filtering bag connected to and in communication with said discharge leg; said separator comprising a substantially straight elongated non-foraminous tubular member having an inlet opening at one end oblique to the axis of said tubular member and a discharge opening at its other end, said separator having a cross-section wider in one direction than in a direction at right-angle to said first direction and being of a cross-sectional area of about one-fourth or less of the cross-sections area of said discharge leg and adapted to be inserted longitudinally into and longitudinally of said discharge leg, a screening means across said inlet opening of said tubular member, means for positioning and detachably securing said separator in said discharge leg with its inlet opening facing the air flow entering the intake leg of said conduit and with its wider cross-sectional dimension contiguous to the wall of the discharge leg extending from the greater arc of its elbow-portion, and an air-filtering bag of smaller proportions than said first mentioned air-filtering bag and detachably connected to and in communication with the discharge end of said separator and adapted to be disposed loosely within said first-mentioned air-filtering bag.

References Cited by the Examiner

UNITED STATES PATENTS

216,061	6/1879	Shaw	209—250 XR
328,057	10/1885	Paine	15—353 XR
759,151	5/1904	Benefield	209—250
1,835,511	12/1931	Means	209—250
2,014,118	9/1935	Smellie	55—368 XR
2,032,579	3/1936	Johnson	209—259
2,971,210	2/1961	Thompson	15—346

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