

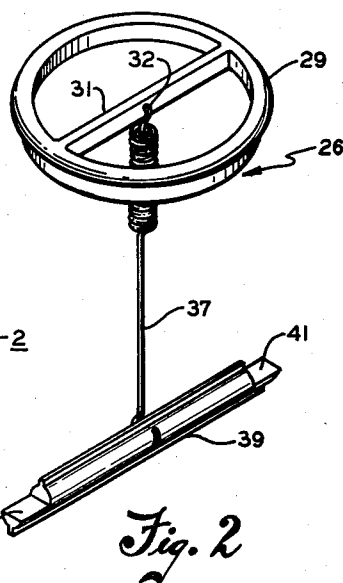
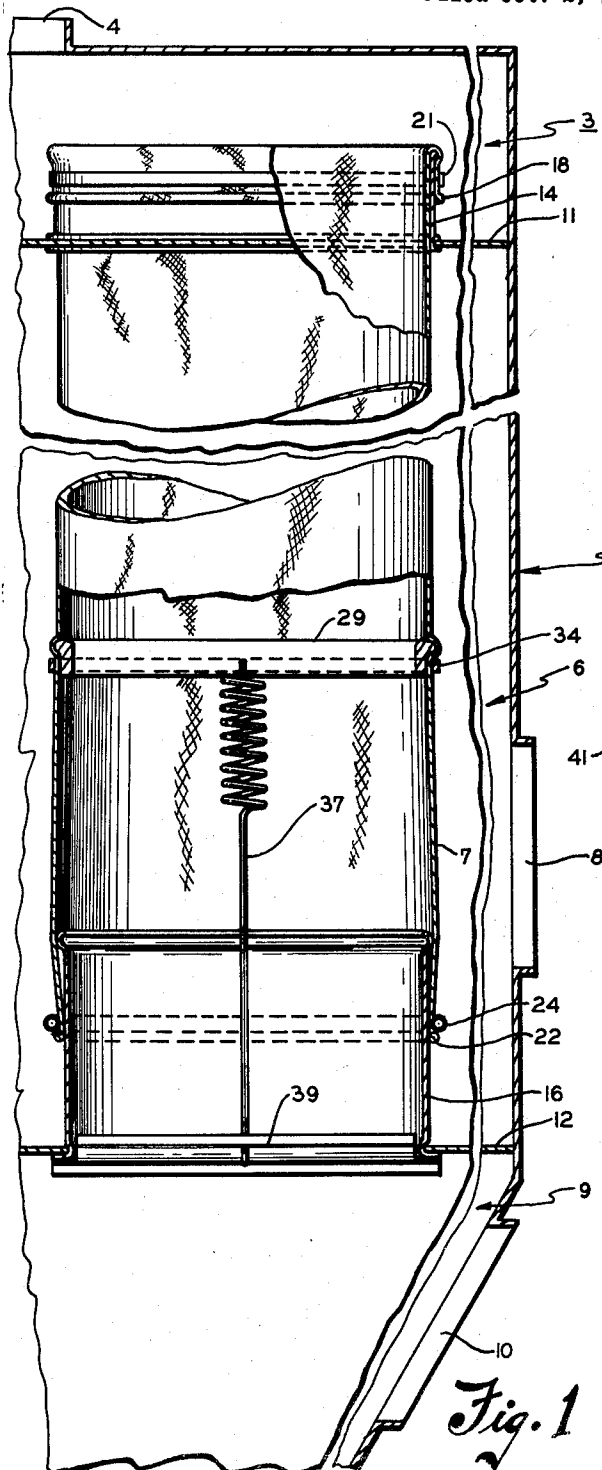
June 1, 1965

L. J. O'DELL

3,186,147

DUST COLLECTOR

Filed Oct. 2, 1961



INVENTOR.
LEONARD J. O'DELL

BY

Ralph B. Brick
ATTORNEY

1

3,186,147

DUST COLLECTOR

Leonard J. O'Dell, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky., a corporation of Delaware

Filed Oct. 2, 1961, Ser. No. 142,152

5 Claims. (Cl. 55—374)

The present invention relates to dust collector apparatus and more particularly to an improved gas pervious tube support arrangement for a tubular type dust collector.

In the past, gas cleaning tubes for tubular type dust collectors have been mounted between spaced supports in a housing with one end of such tube fastened directly to one of the spaced supports and the other end of such tube fastened to a spring member, which, in turn, has been fastened to the other of the spaced supports. Thus, the tubes have been held under resilient tension in the tube housing with little attention to or recognition of problems created by the varying loads placed upon the spring members during gas cleaning operation, the varying tensions placed upon the fabric areas of the tubes and, the varying rates of expansion between the tubes and the housing during high temperature gas cleaning operations.

The present invention recognizes these aforementioned problems and provides an improved tube support arrangement which reduces these problems to a minimum, if not avoiding them completely. More particularly, the present invention provides an improved arrangement for supporting gas cleaning tubes of tubular type dust collectors so that such tubes are under substantially uniform resilient tension throughout a major portion of the tube areas with minimum load on the tensioning spring members. The present invention further provides a tube support structure which accommodates for any expansion differences that might exist between the tubes and the housing therefor in the event of high temperature gas operations.

Various other features of the present invention will become obvious to one skilled in the art upon reading the disclosure set forth herein.

More particularly, the present invention provides a dust collector for collecting contaminant particles from a dirty gas stream comprising a housing having dirty gas stream inlet means and clean gas stream outlet means, a hopper section, a flexible gas pervious tube having opposed opened tube ends disposed within the housing between the gas inlet and gas outlet means to receive and collect contaminant particles from the dirty gas stream, spaced supports in the housing for the tube, the support extending across the housing in parallel relationship and including apertures communicating respectively with the dirty gas stream inlet means and the hopper section, and connecting means to connect the tube ends to the apertures of the spaced supports so that at least one of the ends of the tube is slidable relative the support to which it is connected, the connecting means including clamping means to clamp the tube around the periphery thereof at a position removed from the support for the slidably connected end, and spring means connected at one end to the clamping means, and at the other to the support for the slidably connected end to hold a major portion of the tube under yieldable tension to such support for the slidably connected end.

It is to be understood that although the present invention find particular applicability in the dust collection field where dust concentrations and dust particles sizes are comparatively large, the present invention also can be utilized where dust concentrations and particle sizes are considerably less; for example, in atmospheric air cleaning. It further is to be understood that various changes can be made by one skilled in the art in the arrangement, form and construction of the apparatus disclosed herein

2

without departing from the scope or spirit of the present invention.

Referring to the drawing which discloses one advantageous embodiment of the present invention:

FIGURE 1 is a partial, broken, elevational view of a tube dust collector housing disclosing one of the tubes disposed therein supported by the inventive support arrangement; and,

FIGURE 2 is a reduced perspective view of the resilient tensioning assembly structure of FIGURE 1.

As can be seen in FIGURE 1 of the drawing, tube housing 2 includes an upper dirty gas inlet section 3 having a dirty gas inlet 4, a tube section 6 having vertical tubes 7 disposed therein (only one tube being shown) and clean gas outlet 8, and a hopper section 9 with reverse flow outlet 10 in the lower portion of the housing.

Extending horizontally across housing 2 are spaced tube support members 11 and 12. Each tube support member is provided with a plurality of tube apertures, with apertures of one support member aligned with corresponding apertures of the other support member. Arranged to extend from aligned apertures in spaced supports 11, 12 are opposed thimbles 14 and 16, respectively, these thimbles being fastened to their support members by some suitable means such as sweating or welding. The opposed thimbles serve to support the opposite ends of a gas pervious fabric tube 7, in a manner described more fully hereinafter. It is to be understood that the gas pervious fabric tubes 7 can be made from any one of a number of known gas pervious materials and, advantageously, a suitable fiber glass fabric capable of withstanding high operating temperatures is used.

The upper end portion of each tube 7 is folded over the rounded edge of a thimble 14 so that end bead 18 of each tube embraces the outside surface of the thimble. To hold this tube end in fixed position to its thimble 14, a suitable draw band clamp 21 is applied along the end portion of the tube above bead 18. The lower end portion of each tube 7 is provided with an end bead 22, the lower end portion engaging a thimble 16 to be slidably positioned relatively thereto. A suitable resilient spring 24 surrounds such lower end portion of the tube to maintain it in position on its thimble 16 and yet permit slidable movement.

To hold the major portion of each tube 7 under yieldable tension, a resilient tensioning assembly 26 (FIGURE 2) is arranged to grip the tube adjacent the slidably connected end thereof and hold the major portion of the tube thereabove under yieldable tension to that support to which the tube end is slidably connected. This resilient tensioning assembly includes inner ring 29 disposed within the tube to conform with the internal surface thereof. Ring 29 can be made from any one of a number of suitable metals and advantageously is made from a suitable aluminum alloy which is light in weight and which is of sufficient structural strength to accommodate the stresses imparted thereto. As aforementioned the inner ring 29 conforms with the inner surface of tube 7, the ring having extending diametrically thereacross a bar 31 with an aperture 32 disposed therein intermediate the extremities of the bar. This aperture 32 is so positioned as to be in alignment with the longitudinal axis of the tube 7 when assembled therewith. When inner ring 29 is properly assembled in the tube 7, a draw band clamp 34 is mounted on the outer face of the tube to encircle the inner ring 29 and grip the tube 7 firmly therebetween. One end of tension spring 37 engages in aperture 32 of bar 31 of inner ring 29 so as to extend within and along the longitudinal axis of tube 7. The other end of tension spring 37 engages anchor bar 39 which extends across the lower aperture of support 12 and engages the support to hold tube 7 above ring 29 under tension. It is to be noted that an-

chor bar 39 is provided with recessed end shoulders 41 which grip support 12 under thimble 16. Further, it is to be understood that the dimensions of the resilient tensioning assembly will vary in accordance with the size of the tubes and in accordance with the results desired. For example, the amount of body section of a tube to be placed under tension can be determined by the length of the resilient spring member 37.

With the arranged above described, a tube 7 can be readily assembled and disassembled between opposed thimbles on the spaced supports by merely adjusting the clamping rings 21 and 34 and the resilient tensioning assembly 26. Since the lower end of such tube is slidably mounted relative thimble 16, differences in expansion between the tube and the housing can be accommodated during high temperature operations without substantially effecting the action of yieldable tensioning assembly 26 on the major portion of tube 7.

The invention claimed is:

1. A dust collector for collecting contaminant particles from a dirty gas stream comprising: a housing having dirty gas stream inlet means and clean gas stream outlet means, hopper means, a flexible gas pervious tube having opposed opened tube ends disposed within said housing between said gas inlet and gas outlet means to receive and collect contaminant particles from the dirty gas stream, spaced supports in said housing for said tube, said supports extending across said housing in parallel relationship and including apertures communicating respectively with said dirty gas stream inlet means and said hopper means, and connecting means to connect said tube ends to said apertures of said spaced supports with at least one of said ends of said tube slidable relative the support to which it is connected, said connecting means including clamping means to clamp said tube around the periphery thereof at a position removed from said support for said slidably connected end, and spring means connected at one end to said clamping means and at the other to said support for said slidably connected end to hold said tube under yieldable tension to said support for said slidably connected end.

2. The apparatus of claim 1, wherein said tube is vertically disposed within said housing between said spaced supports and said spring means is fastened to the lower of said spaced supports.

3. A dust collector for collecting contaminant particles from a dirty gas stream comprising: a housing having dirty gas stream inlet means and clean gas stream outlet means, hopper means, a flexible gas pervious tube having opposed opened tube ends disposed within said housing between said gas inlet and gas outlet means to collect contaminant particles from the dirty gas stream, spaced supports in said housing for said tube, said supports extending across said housing in parallel relationship and including apertures communicating respectively with said dirty gas stream inlet means and said hopper means, and connecting means to communicably connect said tube ends to said apertures of said spaced supports with at least one of said ends slidable relative the support to which it is connected, said connecting means including an inner ring disposed within said tube in spaced relation from said slidably mounted end; to conform with the internal sur-

face of said tube, a clamping member embracing said tube and said inner ring and clamping said tube therebetween at a position removed from said support for said slidably connected end, a tension spring having one end fastened to said inner ring, and an anchor bar to hold the other end of said tension spring, said anchor bar extending across the aperture of the support for said slidably connected tube end to grip said support and hold the tube portion above said inner ring under tension.

4. A dust collector for collecting contaminant particles from a dirty gas stream comprising: a housing having dirty gas stream inlet means and clean gas stream outlet means, hopper means, a flexible gas pervious tube having opposed opened tube ends disposed within said housing between said gas inlet and gas outlet means to receive and collect contaminant particles from a dirty gas stream, spaced supports in said housing to support said tube, said supports extending across said housing in parallel relationship and including apertures communicating respectively with said dirty gas stream inlet means and said hopper means, and having thimbles surrounding said apertures and extending therefrom to receive opposite ends of said tube, first clamping means to fasten one end portion of said tube to a thimble of one of said spaced supports, a retainer spring holding the opposite end portion of said tube in sliding engagement with an opposite thimble, and second clamping means to clamp said tube around the periphery thereof at a position removed from said support for said slidably connected end, and spring means connected at one end to said second clamping means and at the other to said support for said slidably connected end to hold said tube above said second clamping means under yieldable tension to said support for said slidably connected end.

5. The apparatus of claim 4, said second clamping means including an inner ring disposed within said tube to conform with the internal surface thereof and a clamping outer ring embracing said tube and said inner ring to clamp said tube therebetween and said spring means including, a tension spring extending within and along the longitudinal axis of said tube and having one end fastened to said inner ring, and an anchor bar to receive the other end of said tension spring, said anchor bar extending across the aperture of the support for said slidably connecting end of said tube to grip said support and hold said tube under tension.

References Cited by the Examiner

UNITED STATES PATENTS

462,351	11/91	Fowler	55—189
515,767	3/95	Harmon	55—374
1,693,312	11/28	Moore.	
2,222,077	11/40	Kahn	55—370
2,335,315	11/43	Seymour.	
2,758,669	8/56	Brace	55—373
2,871,978	2/59	Webster et al.	55—341
2,976,953	3/61	Haas et al.	55—379 X

REUBEN FRIEDMAN, *Primary Examiner.*

GEORGE D. MITCHELL, *Examiner.*