Aug. 30, 1949. C. R. HOADLEY 2,480,243

EXPANDABLE SPINNER

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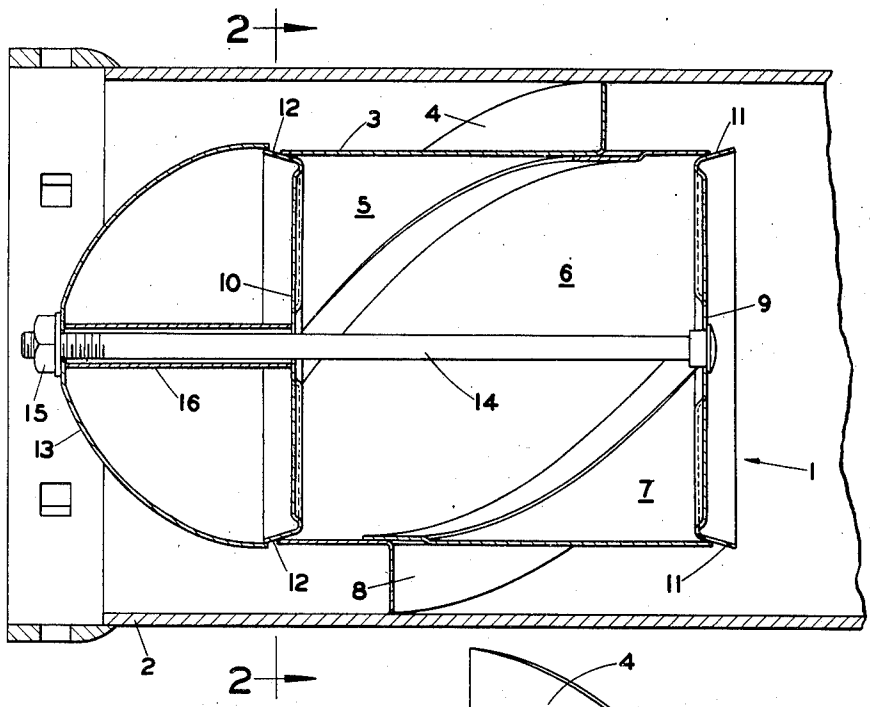


FIG.1

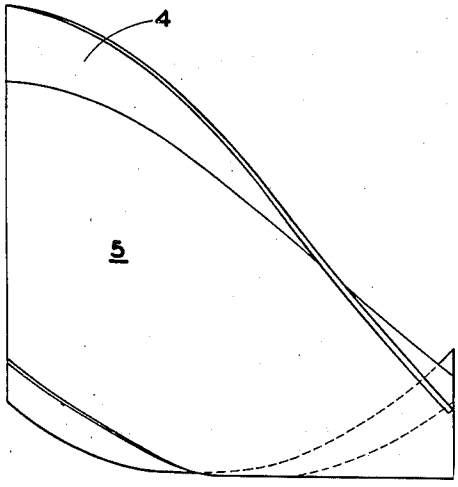


FIG.3

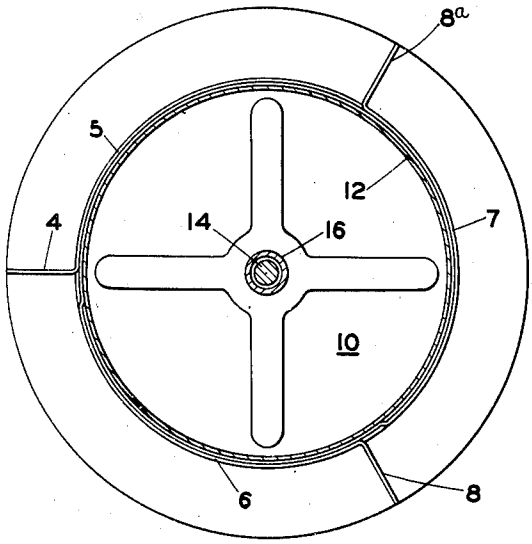


FIG.2

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EXPANDIBLE SPINNER

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9 Claims. (Cl. 183—80)

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This invention relates to a centrifugal type of dust collector or other centrifugal separator in general and more particularly to spinner units therefor.

An object of this invention is to provide a spinner unit for a centrifugal type dust collector or other centrifugal separator which may be expanded to fit in a tube of slightly greater diameter than the spinner.

Another object of this invention is to provide a spinner unit for a centrifugal type dust collector or other centrifugal separator which is comprised of two or more spirally cut cylinder sections interlocking so that they can be expanded by the application of radial pressure thereto.

Another object of this invention is to provide an expandable spinner unit which is simply constructed, efficient to operate and inexpensive to manufacture.

Other objects of this invention will be apparent from the specification and claims set forth hereinafter.

This invention consists of the new and improved construction and combination of parts to be more fully described hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawing to be taken as part of this specification there is clearly and fully illustrated the preferred embodiment of this invention in which drawing—

Fig. 1 is a longitudinal section of the spinner unit installed in a separator tube,

Fig. 2 is a transverse section taken along the line of 2—2 of Fig. 1,

Fig. 3 shows a portion of one of the spirally cut sections forming the cylindrical portion of the spinner unit.

Referring to the drawing by characters of reference, the numeral 1 refers to a spinner unit positioned in a dust collector or other centrifugal type separator tube 2. The spinner unit 1 is comprised of a cylinder 3 having turned up flange portions or spiral vanes 4. The cylinder 3 and vanes 4 are comprised of two or more spirally cut cylindrical sections having one spiral edge turned up thereby to form a spiral vane as an integral part thereof.

For the purposes of illustration, the invention is shown as formed from three spiral sections. It is obvious, however, that any reasonable number of sections could be used subject only to the limits of size and practicability of construction.

In the invention shown, there are three spiral sections 5, 6, and 7 having edge portions 4, 8, and 8^a bent to form spiral vanes as an integral part thereof. The edge of the spiral section opposite the vanes is bent to form a grooved or landed portion to interlock with the other spiral sections thereby facilitating the assembly of the spinner as a unit.

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At the two open ends of the cylinder 3 are disc members 9 and 10 having turned up flange edge portions 11 and 12 at a bevel or angle. The minimum diameter of the beveled flange edge portions 11 and 12 is less than the inside diameter of the cylinder 3 and the maximum diameter of the beveled flange portion is more than the diameter of the cylinder 3 so that the compression of the discs 9 and 10 towards each other would effect a radial pressure on the cylinder 3 thereby causing it to expand.

A rounded cap or other cover member 13 covers the end of the spinner facing the flow of fluid. A bolt or other clamping means 14 extends from the disc 9 through the disc 10 and the cover member 13 and has a nut or other adjusting means 15 at its end to apply pressure to the discs 9 and 10. Between the cover plate 13 and the disc 10 and surrounding the bolt 14 is a sleeve member 16 whereby pressure from the adjustment of the nut 15 may be transmitted to the disc 10 without causing compression of the cover member 13 thereupon.

In manufacture most of the essential elements of this invention would be fabricated from sheet metal. The disc members 9 and 10 and the cover plate 13 would probably be stamped to their relative shapes. The spiral sections 5, 6 and 7 would probably be cut from sheet metal and each turned up to form a flange or vane and subsequently stamped or rolled to shape.

The term "elements" of the cylinder as used in the claims refers to the mathematical straight line elements which define a cylindrical surface.

In operation this invention functions as follows:

The spinner unit 1 is of the type that is used for imparting a spiral or centrifugal motion to air of other fluid for the purpose of separating solid or liquid particles therefrom. The invention has the distinct advantage of eliminating the necessity that the spinner be machined or otherwise fabricated to very close tolerances for insertion in the collector tube.

As the spinner 1 is put into a tube 2 which is slightly larger in diameter than the diameter across the vanes, the nut 15 is tightened creating a pressure on the disc members 9 and 10 tending to force them together. Compression of the disc

members 9 and 10 toward each other will cause a radial pressure to be exerted against the interior of the cylinder 3 due to the beveled flange portions 11 and 12. Thus by merely tightening the nut 15 the spinner unit may be expanded to fit tubes which are slightly larger than the diameter across the vanes. The cover plate 13 facing the flow of air or other fluid tends to effect a more even distribution of the air or fluid passing thereover thereby reducing turbulence.

What is claimed and is desired to be secured by Letters Patent of the United States is:

1. In a device of the character described, a spinner for imparting a spiral motion to a fluid passing thereover; said spinner comprising a cylinder having spiral vanes affixed externally thereto, said cylinder being of such a construction as to be adjustable in diameter within predetermined limits, said vanes being affixed externally to said cylinder in such a manner as to be adjustable therewith, and means to expand the diameter of said cylinder and of said vanes within said predetermined limits to a predetermined value, said expansion of said cylinder and vanes maintaining the same surface contour defined by said vanes prior to expansion but with an increased diameter.

2. In a device of the character described, a spinner for imparting a spiral motion to a fluid passing thereover; said spinner comprising a cylinder having spiral vanes affixed externally thereto, said cylinder being formed of two or more sections cut along the line of said spiral vanes and joined so that an adjustment may be made of its diameter within predetermined limits, said vanes being affixed externally to said spirally cut sections so that an adjustment of the diameter of said vanes will be coincident with an adjustment of the diameter of said cylinder, and means to expand the diameter of said cylinder and of said vanes within said predetermined limits to a predetermined value, said expansion of said cylinder and vanes maintaining the same surface contour defined by said vanes prior to expansion but with an increased diameter.

3. In a device of the character described, a spinner for imparting a spiral motion to a fluid passing thereover; said spinner comprising a cylinder having spiral vanes affixed thereto, said cylinder being formed of two or more sections cut along the lines of said spiral vanes and joined so that an adjustment may be made of its diameter within predetermined limits, said vanes being affixed to said spirally cut sections so that an adjustment of the diameter of said vanes will be coincident with an adjustment of the diameter of said cylinder, a disc with a beveled flange edge portion positioned in one end of said cylinder, a similar disc positioned in the other end of said cylinder, a bolt connecting said discs having an adjusting nut thereon whereby said discs may be compressed toward each other, and the minimum diameter of said flange bevel being less than the diameter of said cylinder and the maximum diameter of said flange bevel being more than the diameter of said cylinder so that compression of said discs toward each other will cause an expansion of the diameter of said cylinder and said vanes within the limits of the differential of diameter of said flange bevel.

4. In a device of the character described, a spinner for imparting a spiral motion to a fluid passing thereover; said spinner comprising a cylinder having spiral vanes affixed thereto, said cylinder being formed of two or more sections cut along the lines of said spiral vanes and joined so that an adjustment may be made of its diameter within predetermined limits, said vanes being affixed to said spirally cut sections so that an adjustment of the diameter of said vanes will be coincident with an adjustment of the diameter of said cylinder, a disc with a beveled flange edge portion positioned in one end of said cylinder, a similar disc positioned in the other end of said cylinder, a bolt connecting said discs having an adjusting nut thereon whereby said discs may be compressed toward each other, and the minimum diameter of said flange bevel being less than the diameter of said cylinder and the maximum diameter of said flange bevel being more than the diameter of said cylinder so that compression of said discs toward each other will cause an expansion of the diameter of said cylinder and said vanes within the limits of the differential of diameter of said flange bevel, and a rounded end member covering the end of said cylinder facing fluid flow for even distribution of fluid.

5. In a device of the character described, a spinner unit to be positioned in a tube of a centrifugal type dust collector, said spinner functioning to impart a spiral motion to dust laden air passing thereover, said spinner comprising a cylinder formed of two or more spirally cut sections having one edge turned up to form a spiral vane, said sections interlocking spirally so that the application of radial pressure will cause the diameter of said cylinder and said spiral vane portions to increase within predetermined limits, a disc with a beveled flange dege portion positioned in one end of said cylinder, a similar disc positioned in the other end of said cylinder, the angle and extent of said beveled flange portions being such that compression of the discs toward each other will result in the expansion of said cylinder and vanes, a rounded end member covering the end of said cylinder facing air flow for even distribution of air thereover, a clamping means interconnecting said discs and said rounded end member having an adjusting nut for compression of said discs, a sleeve surrounding a portion of said clamping means to prevent compression of said rounded end member upon the disc nearest it, and the compression of said discs functioning to expand the diameter of said cylinder and vanes thereby to effect a close fit in a tube slightly larger in diameter than the diameter of said vanes.

6. In a device of the character described, a spinner for imparting a spiral motion to a fluid passing thereover; said spinner comprising a cylinder having a plurality of direction changing vanes extending externally from and extending longitudinally of the cylinder and at an angle to the individual elements defining the surface thereof, said cylinder being formed of a plurality of sections each of a size and shape as to contain on the surface thereof at least one of said vanes regardless of the longitudinal and angular extent of such vane, and means to adjust the relation of said sections to each other to expand the diameter of said cylinder and said vanes within predetermined limits, said expansion of said cylinder and vanes maintaining the same surface contour defined by said vanes prior to expansion but with an increased diameter.

7. In a device of the character described, a spinner for imparting a spiral motion to a fluid passing thereover; said spinner comprising a

cylinder having a plurality of direction changing vanes extending longitudinally of the cylinder and at an angle to the individual elements defining the surface thereof, said cylinder being formed of a plurality of sections each of a size and shape as to contain on the surface thereof at least one of said vanes regardless of the longitudinal and angular extent of such vane, a disc with a beveled flange edge portion positioned in one end of said cylinder, a similar disc positioned in the other end of said cylinder, a bolt connecting said discs having an adjusting nut thereon whereby said discs may be compressed toward each other, and the minimum diameter of said flange bevel being less than the diameter of said cylinder and the maximum diameter of said flange bevel being more than the diameter of said cylinder so that compression of said discs toward each other will cause an expansion of the diameter of said cylinder and said vanes within the limits of the differential of diameter of said flange bevel.

8. In a device of the character described, a spinner for imparting a spiral motion to a fluid passing thereover; said spinner comprising a cylinder having a plurality of direction changing vanes extending longitudinally of the cylinder and at an angle to the individual elements defining the surface thereof, said cylinder being formed of a plurality of sections each of a size and shape as to contain on the surface thereof at least one of said vanes regardless of the longitudinal and angular extent of such vane, a disc with a beveled flange edge portion positioned in one end of said cylinder, a similar disc positioned in the other end of said cylinder, the angle and extent of said beveled flange portions being such that compression of the discs toward each other will result in the expansion of said cylinder and vanes, a rounded end member covering the end of said cylinder facing air flow for even distribution of air thereover, a clamping means interconnecting said discs and said rounded end member having an adjusting nut for compression of said discs, a sleeve surrounding a portion of said clamping means to prevent compression of said rounded end member upon the disc nearest it, and the compression of said discs functioning to expand the diameter of said cylinder and vanes thereby to effect a close fit in a tube slightly larger in diameter than the diameter of said vanes.

9. In a device of the character described, a spinner for imparting a spiral motion to a fluid passing thereover; said spinner comprising a thin-walled hollow core member of generally circular cross-section and closed at one end, said core member having a plurality of direction changing vanes extending externally therefrom, said vanes extending longitudinally of and at an angle to the longitudinal axis of said core member and having their outer edges defining a predetermined contour, said core member being formed of a plurality of sections each of a size and shape as to contain on the surface thereof at least one of said vanes regardless of the longitudinal and angular extent of such vane, and means to flex said sections radially and longitudinally to adjust their relative positions to expand the diameter of said core member and said vanes, said adjustment maintaining the outer edges of said vanes at the same contour but increasing their diameter.

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