May 31, 1938. W. S. BOWEN 2,118,803

CONCENTRATOR

Filed Jan. 25, 1937

Fig. 1

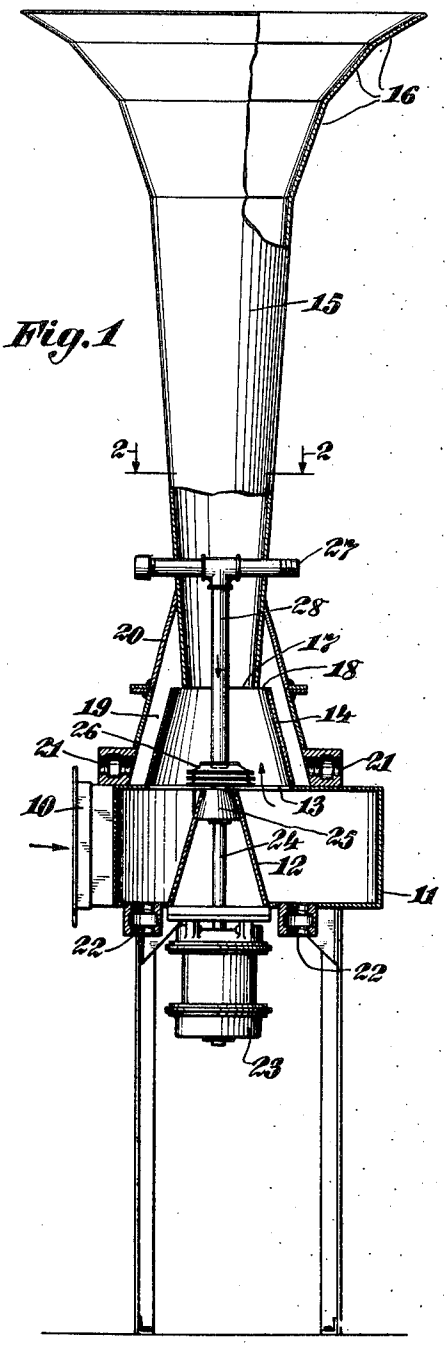
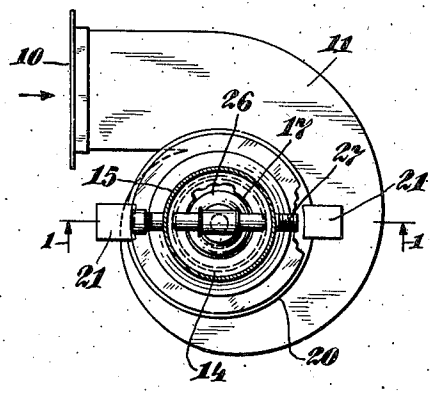


Fig. 2



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CONCENTRATOR

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10 Claims. (Cl. 159—4)

The present invention relates to concentrators and embodies, more specifically, an improved concentrating mechanism by means of which a fluid stream may be effectively treated with a medium in order that desired characteristics may be imparted thereto.

An object of the invention, accordingly, is to provide an improved form of concentrator by means of which a desired body may be effectively treated with a treating medium.

A further object of the invention is to provide a mechanism of the above character wherein a desired body may be effectively concentrated by a treating medium in such fashion as to effectively concentrate the medium without occasioning loss thereof.

Further objects and advantages of the invention will be apparent as it is described in further detail in connection with the accompanying drawing, wherein

Figure 1 is a view in elevation, showing one form of mechanism constructed in accordance with the present invention, this view being cut away and in section to show the interior portion thereof. The section of Figure 1 is taken on line 1—1 of Figure 2.

Figure 2 is a view in section taken on line 2—2 of Figure 1 and looking in the direction of the arrows.

With reference to the above drawing, air or other treating medium is introduced at 10 into a scroll 11, by means of which a whirl is imparted to the air. At the central portion of the scroll, a cone 12 is provided for directing the air upwardly through the outlet 13 of the scroll. Outlet 13 has mounted about the edge thereof a cone 14 which constitutes the converging inlet portion of a Venturi tube, the outlet portion of which is shown at 15.

The elements 14 and 15 will be seen to form a venturi, the construction of which is well known in the art and the characteristics of which are such that the velocity of the medium flowing therethrough increases as the section of the venturi decreases until the minimum Venturi section is reached. From the point where expansion begins to take place in the outlet or expanding element of the Venturi mechanism, the velocity decreases and is eventually restored to the velocity at which the fluid entered the mechanism. In applicant's Patent No. 2,082,242, dated June 1, 1937, for "Dust collector", there is described a dust collecting mechanism in which the principle of the venturi is utilized. The elements of such mechanism will thus be seen to be present in the Venturi structure including the elements 14 and 15 of the present drawing.

From the Venturi expanding or outlet tube 15, the medium is carried off or dissipated by further expansion members as indicated by the reference character 16. The minimum section or throat 17 of the Venturi mechanism is the inlet to the expanding cone 15, while the outlet of the converging cone 14 of the Venturi inlet portion is of greater diameter than the throat 17, whereby an annular slot 18 is formed therebetween.

As the substance passes into the contracting cone 14 and its velocity increases, the violence of the whirl to which it has been subjected by the scroll 11 is increased, causing the heavy particles to be thrown outwardly against the inner surface of the cone 14 in order that they may pass out through the annular slot 18 and be received within a liquid discharge chamber 19 formed by a conical housing member 20. The lower portion of the housing is provided with one or more outlets 21 through which the liquid may be withdrawn while the scroll 11 is provided with one or more outlets 22 by means of which drainage may be effected.

Centrally of the mechanism, there is provided a motor or other driving means 23 having a driving shaft 24 which is housed at 25 within the cone 12. The upper end of the shaft 24 is provided with an atomizing head 26 which is positioned within the inlet portion of the venturi and adjacent the entering section thereof. Liquid is introduced into the mechanism by means of a pipe 27 connected with a feed pipe 28 which discharges the liquid into the atomizing head 26. This head throws a heavy sheet of liquid radially outwardly and directs the same across the air stream entering the Venturi section 14. This assures a substantially complete saturation of the air leaving the venturi and consequently, an effective concentration of the liquid. The liquid is, of course, thrown outwardly against the inner surface of the converging Venturi portion 14 and escapes through the annular slot 18 in order that it may be recovered and discharged through the outlets 21.

While the invention has been described with specific reference to the construction shown in the accompanying drawing, it is not to be limited save as defined by the appended claims.

I claim:

1. Concentrating mechanism comprising a Venturi separating mechanism through which a unidirectional progression of fluid takes place, said mechanism having an entrance and a throat formed with a separating slot, means to direct a substance to be concentrated across the entrance of the separating mechanism, and means to direct a concentrating medium through the substance and into the spearating mechanism with a whirling motion.

2. Concentrating mechanism comprising a Venturi separating mechanism through which a unidirectional progression of fluid takes place,

said mechanism having an entrance and a throat formed with a separating slot, means to direct a substance to be concentrated across the entrance of the separating mechanism, means at the entrance of the mechanism to impart a whirl to median flowing therethrough, and means to direct a concentrating medium into the last named means.

3. Concentrating mechanism comprising a Venturi separating mechanism through which a unidirectional progression of fluid takes place, said mechanism having an entrance and a throat formed with a separating slot, means to direct a substance to be concentrated across the entrance of the separating mechanism, a collecting chamber about the separating slot, and means to direct a concentrating medium through the substance and into the separating mechanism with a whirling motion.

4. Concentrating mechanism comprising a Venturi separating mechanism through which a unidirectional progression of fluid takes place, said mechanism having an entrance and a throat formed with a separating slot, a rotatable head at the entrance of the mechanism to direct a substance to be concentrated across the entrance of the separating mechanism, and means to direct a concentrating medium through the substance and into the separating mechanism with a whirling motion.

5. Concentrating mechanism comprising a vertically disposed Venturi separating mechanism through which a unidirectional progression of fluid takes place upwardly, said mechanism having an entrance at the lower end thereof and a throat formed with a separating slot above the entrance, means to direct a substance to be concentrated across the entrance, and means to direct a concentrating medium through the substance and into the separating mechanism with a whirling motion.

6. Concentrating mechanism comprising a vertically disposed Venturi separating mechanism through which a unidirectional progression of fluid takes place upwardly, said mechanism having an entrance at the lower end thereof and a throat formed with a separating slot above the entrance, a rotatable spray head to direct a substance to be concentrated across the entrance, and means to direct a concentrating medium through the substance and into the separating mechanism with a whirling motion.

7. Concentrating mechanism comprising a vertically disposed Venturi separating mechanism through which a unidirectional progression of fluid takes place upwardly, said mechanism having an entrance at the lower end thereof and a throat formed with a separating slot above the entrance, a rotatable spray head to direct a substance to be concentrated across the entrance, a feed pipe to discharge substance downwardly upon the spray head, and means to direct a concentrating medium through the substance and into the separating mechanism with a whirling motion.

8. Concentrating mechanism comprising a vertically disposed Venturi seperating mechanism through which a unidirectional progression of fluid takes place upwardly, said mechanism having an entrance at the lower end thereof and a throat formed with a separating slot above the entrance, a rotatable spray head to direct a substance to be concentrated across the entrance, a feed pipe to discharge substance downwardly upon the spray head, a scroll communicating with the entrance of the venturi and adapted to impart a whirl to a concentrating medium directed therethrough, a central cone in the scroll axially of the venturi, and a drive shaft journaled in the cone, said spray head being secured to the drive shaft to be driven thereby.

9. Concentrating mechanism comprising a vertically disposed Venturi separating mechanism through which a unidirectional progression of fluid takes place upwardly, said mechanism having an entrance at the lower end thereof and a throat formed with a separating slot above the entrance, a rotatable spray head to direct a substance to be concentrated across the entrance, a feed pipe to discharge substance downwardly upon the spray head, a scroll communicating with the entrance of the venturi and adapted to impart a whirl to a concentrating medium directed therethrough, a collecting chamber about the separating slot, a central cone in the scroll axially of the venturi, and a drive shaft journaled in the cone, said spray head being secured to the drive shaft to be driven thereby.

10. Concentrating mechanism comprising a Venturi separating mechanism through which a unidirectional progression of fluid takes place, said mechanism having an entrance and a throat portion, means at the throat portion to effect a separating action, means to direct a concentrating medium having a whirling motion into the separating mechanism, and means to direct a substance to be concentrated into the path of the concentrating medium at a zone adjacent the said entrance.

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