Aug. 29, 1944. W. I. McCRUM 2,357,050

ATOMIZER HEAD

Filed Sept. 23, 1942

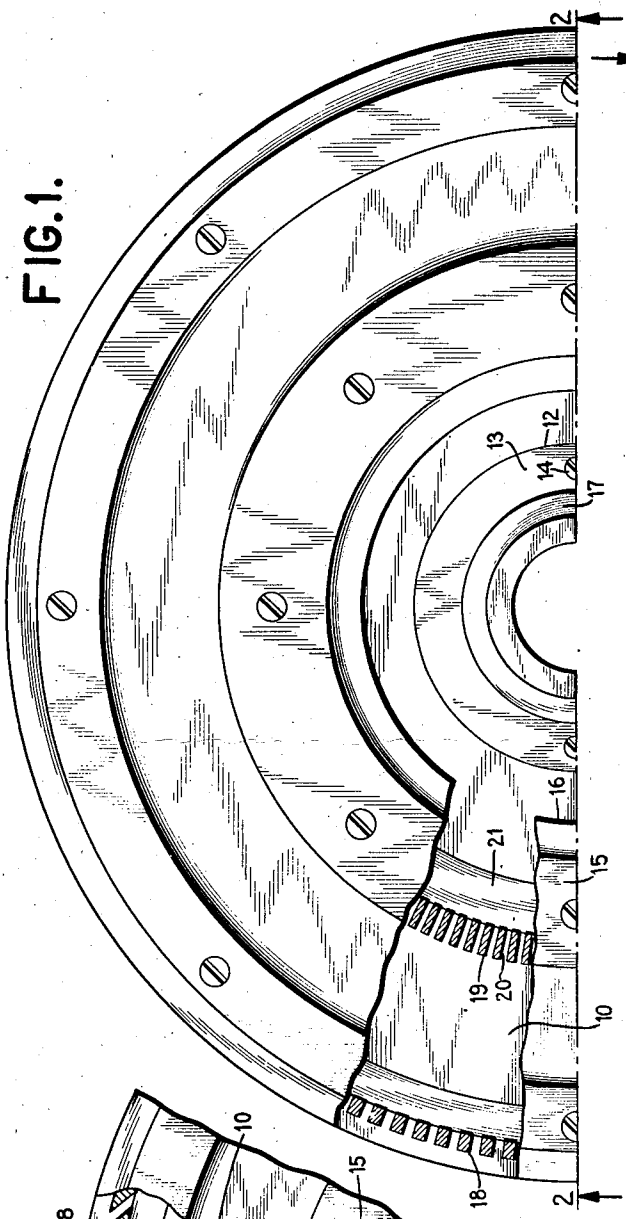


FIG. 1.

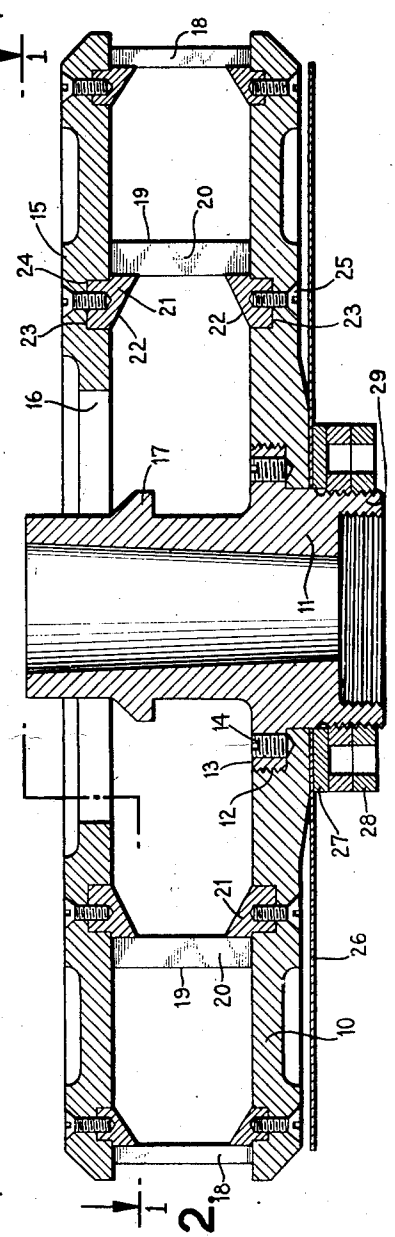


FIG. 2.

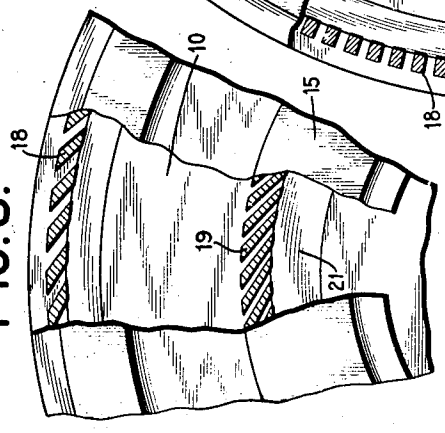


FIG. 3.

INVENTOR.
WALTER I. McCRUM
BY Hoguet, Neary & Campbell,
his ATTORNEYS.

Patented Aug. 29, 1944

2,357,050

UNITED STATES PATENT OFFICE

2,357,050

ATOMIZER HEAD

Walter Isaac McCrum, Belmar, N. J., assignor to Bowen Research Corporation, Garwood, N. J., a corporation of New Jersey

Application September 23, 1942, Serial No. 459,357

8 Claims. (Cl. 299—63)

The present invention relates to devices for dispersing fluids, and embodies more specifically, an improved spray or atomizer head by means of which fluids may be effectively atomized and wherein the spray head is of such a structure that it is highly serviceable in distributing the liquid to be atomized and also in being of such a construction that the device may be easily manufactured and assembled, and also repaired.

An object of the invention is to provide an atomizer head wherein the atomizing vanes or plates are formed so that they may be easily assembled or removed from the head without disturbing the balance or the spray characteristics of the mechanism.

A further object of the invention is to provide a device of the above character wherein the vane or plate structure is such that it may be made by simple machining operations and yet be accurately formed and easily balanced as well as readily inserted or removed from the mechanism.

A further object of the invention is to provide an atomizer head wherein means are provided for preventing objectionable abrasion or wear on the bottom of the head.

The foregoing and other objects are attained by providing an atomizer head having top and bottom members that are provided with one or more vane elements, the vane elements being annular in formation and unitary in construction and adapted to be secured in position between the top and bottom plates.

The details of the foregoing mechanism, as well as of the invention, will appear as it is described in greater detail in connection with the accompanying drawing wherein

Figure 1 is a partial plane view showing an atomizer head formed in accordance with the present invention. The plane in which the sectional portion of Figure 1 is illustrated is shown by the line 1—1 in Figure 2;

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

Figure 3 is a partial plane view partly broken away and in section such as that of Figure 1 showing a modified vane formation.

Referring to the above drawing, the atomizer head is shown as being provided with a bottom plate 10 which may be threaded upon a tapering sleeve fitting 11, the fitting 11 being of such form as to enable the head to be secured to a drive shaft in any usual fashion. The bottom plate 10 is shown as being threaded at 12 to a flange 13 formed on the fitting 11, set screws 14 being provided to secure the plate to the fitting in a desired position.

An annular top plate 15 is provided to overlie the bottom plate 10 and is formed with a central aperture 16 through which material may be fed into the atomizer head. To facilitate the distribution of the material into the head, a flange 17 is provided on the fitting 11, the flange 17 serving to deflect the material outwardly towards the vanes of the atomizer head.

In order that effective atomization may be accomplished, the head is provided with one or more series of vanes. In the form shown herein the head is illustrated as being provided with outer series of vanes 18 and an inner series of vanes 19. The radial dimension of the vanes may vary as desired and, in order to accomplish effective atomization and to provide a structure that is easy to manufacture and to assemble and disassemble, the vanes are formed in an integral structure. That is, each series of vanes, if there is more than one series, is formed as an integral annulus.

This will be seen from examination of Figures 1 and 2 in which the inner series of vanes 19 is formed from an annular ring 20 having a cylindrical outer surface and having flanges 21 on the opposite faces of the ring. The flanges are preferably spaced radially inward from the outer cylindrical surface of the ring so that the ring is generally U-shaped in cross-section. The inner surfaces of the flanges are tapered as at 22 to serve as guiding surfaces to deflect the liquid toward the center of the vanes. The flanges 21 are formed with upwardly and downwardly extending annular flanges 23 that are adapted to be received within cooperating annular grooves 24 formed in the top and bottom plates 15 and 10, respectively. Screws 25 are provided to secure the top and bottom plates to the flanges 23 as illustrated in Figure 2.

The vanes are formed by machining through the cylindrical outer surface in the base of the U-shaped portion of the ring 20 between the flanges 21, and as will appear in Figure 1, these machining operations involving merely a straight machine cut in a direction parallel to the axis of the ring. In this fashion, the indexing of the ring 20 may be accomplished effectively and the cutting of the vanes is accomplished by the simplest of machining operations.

The outer series of vanes 18 may be formed in a manner similar to the formation of the vanes of series 19 and the shape and size may be varied as desired. For example, in the form shown in

the drawing, the outer vanes 18 are spaced somewhat further apart than the inner vanes 19 and are of a smaller radial dimension than the vanes 19.

Beneath the bottom plate 10 a flexible plate 26 is provided, the plate being secured in position by means of a washer 27 and lock nuts 28 which are threaded onto a downwardly extending extremity 29 of the fitting 11. The plate 26 deflects dried abrasive material from contact against the bottom of the plate 10 and thus prevents excessive wear which otherwise would be caused because of the circulation of the dried and abrasive particles in the drying chamber when the atomizer head is used in spray drying operations.

It will be quite apparent that the vanes 18 and 19 may be formed so that they have either a forward or backward lead. For example, in Figure 3, the vanes are shown with a backward lead, considering the direction of rotation of the atomizer head as being clockwise in the drawing. This vane arrangement may be varied by variation of the machining operations by means of which the vanes are formed. While the invention has been described with specific reference to the accompanying drawing, it is not to be limited save as defined in the appended claims.

I claim:

1. An atomizer head comprising top and bottom plates, means to mount one of the plates on a rotatable element, a unitary annular member having vanes formed therein, interengaging means on the plates and member to position said member in substantially co-axial relationship to said plates, and means for detachably securing said plates and said member in assembled position.

2. An atomizer head comprising top and bottom plates, means to mount the plates on a rotatable element, an annular member formed with vanes, flanges at the opposite extremity of the annular member, and means to secure the flanges to the plates.

3. An atomizer head comprising top and bottom plates, means to mount the plates on a rotatable element, an annular member formed with vanes, flanges at the opposite extremity of the annular member, said flanges having inner surfaces inclined toward the vanes, and means to secure the flanges to the plates.

4. An atomizer head comprising top and bottom plates spaced apart to form a chamber, an annular member located between said plates and formed with slots therethrough extending parallel to the axis of the head providing a plurality of vanes, interengaging means on said plates and said annular member for positioning said member in substantially co-axial relationship to said plates, means for securing said member to said plates, and means for securing said head to a rotatable element.

5. An atomizer head comprising a pair of plates spaced apart to form a chamber, an annular member of generally U-shaped cross section and provided with slots extending through the base of the U-shaped portion thereof to form a plurality of vanes, interengaging means on the sides of said member and on said plates for positioning said member in substantially co-axial relationship to said plates, means for securing said member in place between said plates, and means for securing said head to a rotatable element.

6. An atomizer head comprising a pair of plates spaced apart to form a chamber, an annular member located in said chamber and formed with flanges on the opposite faces thereof, said member having slots formed therein between the flanges to provide a plurality of vanes, said plates having annular grooves therein receiving the flanges on the member, means for securing said member to the plates and means for securing said head to a rotatable element.

7. An atomizer head embodying an annular member of generally U-shaped cross section having slots extending through the base of the U-shaped portion to form a plurality of vanes therein, the inner surfaces of said member inwardly of and adjacent to said vanes being inclined inwardly to direct fluid toward the vanes and the outer surfaces of said member having outwardly projecting annular flanges thereon concentric with said base of said member.

8. An atomizer head comprising a fitting adapted to be secured to a rotatable element, a pair of plates spaced apart to form a chamber and extending outward at right angles to the axis of rotation of the fitting, a ring of material concentric with said axis of rotation, said ring being of generally U-shaped cross section and formed with slots in the base of the U-shaped portion thereof to provide a plurality of vanes therein, the inner face of said ring adjacent the slots being formed with surfaces inclined toward the slots to direct fluid toward the central portion of said slots, and means for securing the ring to the plates.

WALTER ISAAC McCRUM.