A spray nozzle adapted to eject a radial spray around its entire periphery comprising a plastic nozzle element having an axial bore adapted to produce an axial jet and secured at its base in a metal supporting ring and a transverse deflector plate disposed in the path of the jet to deflect the same radially outwardly to form a 360° spray pattern. The deflector plate is formed by a plastic disc or liner shaped to the deflector surface and carried by a metal support element.

9 Claims, 8 Drawing Figures
PLASTIC LINED SPRAY NOZZLE

This invention relates to spray nozzles of the type adapted to produce a 360° radial spray pattern and has for an object to provide a nozzle of the above type having novel and improved characteristics.

The invention applies particularly to a nozzle of the type having an axial nozzle element with a bore to produce an axial jet and a transverse deflector plate disposed in the path of the jet and adapted to deflect the same into a radial spray extending around its entire periphery.

A further object is to provide such a nozzle with wear resisting surfaces which are suited for commercial manufacturing processes and which may be economically renewed or replaced.

A more specific object is to provide a nozzle of the above type in which the surfaces which contact the liquid are formed of plastic which is secured to metal support members.

A still further object is to provide a nozzle which is adapted for use with corrosive liquids or other materials which tend to attack or injure metal surfaces.

The nature of the invention will be better understood from the following description, taken in connection with the accompanying drawing in which a specific embodiment has been set forth for purposes of illustration.

In the drawing:

FIG. 1 is an axial section through a nozzle and deflector embodying the invention;

FIG. 2 is a detail section taken on the line 2-2 of FIG. 1 showing the means for securing the plastic nozzle element to a supporting ring;

FIG. 3 is a transverse section taken on the line 3-3 of FIG. 1 showing the plastic deflector liner and locking elements only;

FIG. 4 is an axial section similar to FIG. 1 showing a modified mechanical means for securing the plastic elements to the metal support members;

FIG. 5 is a detail section taken on the line 5-5 of FIG. 4 showing the locking grooves for securing the axial plastic nozzle element to its supporting ring;

FIG. 6 is a diametrical section through a deflector plate showing an alternative means for securing the plastic liner to the supporting disc;

FIG. 7 is a diametrical section similar to FIG. 6 showing a plastic deflector plate molded about a supporting sleeve; and

FIG. 8 is a similar section showing a further embodiment of the invention.

Referring to FIGS. 1 to 3 more in detail the spray nozzle is shown as comprising an axial plastic tubular element 10 having an axial bore 11 adapted to eject a jet of liquid and secured in a support ring 12 of metal or other rigid material having an external threaded portion 13 onto which a supply pipe 14 is threaded. The bore 11 may be tapered to a discharge opening 15 through which the jet of liquid passes.

The ring 12 is provided with a plurality of internal annular grooves 16, which may be undercut if desired, into which the plastic of the nozzle element 10 is molded to form tongues 17 for securing the plastic in place.

A deflector plate 20 is mounted in alignment with the bore 11 and in the path of the jet discharged therefrom and is shaped to deflect the liquid radially outwardly in a spray pattern extending around its entire periphery.

This plate 20 comprises a metal support disc 21 and a liner 22 of plastic disposed on its forward surface. This liner 22 is shown in the form of a disc having a flat rear surface 23 conforming to the forward surface 24 of the metal support disc 21 and coextensive with the periphery of the disc 21 so as to cover and shield the entire surface thereof. The forward surface 25 of the plastic liner 22 is shaped to deflect the liquid of the axial jet radially outwardly in a spray pattern extending around its entire periphery.

In the embodiment of FIG. 1 the support disc 21 is formed with a plurality of holes 27 which are countersunk at their rearward ends 28. The plastic liner 22 is molded into the holes 27 to form securing elements 29 which are shaped to conform to the holes 27 and to their countersunk portions 28 as shown in FIG. 1. Obviously the holes may have other contours adapted to lock the plastic liner in place. For example, the holes may be flared rearwardly or dovetailed if desired.

The deflector plate 20 may be supported in position by any suitable means such as a rod 30 which carries the metal support disc 21 and is mounted on a suitable bracket, not shown.

The nature of the plastic material is selected in accordance with the liquid with which it is to be used and the pressures to which it is to be subjected. Since the plastic is molded, the forward surface 25 of the deflector may be reproduced economically.

FIGS. 4 and 5 illustrate a modified form of spray nozzle similar to that of FIGS. 1 to 3 in which corresponding parts have been given the same reference numbers with the suffix "a." In this embodiment the plastic nozzle element 10a is mounted in the supporting ring 12a by an annular groove 16a and a series of axial interrupted grooves 32 for retaining the plastic therein against axial and rotational displacement. The support disc 21a carries a set of projecting threaded studs 33 around which the plastic of the liner 22a is molded, to secure the liner in place. The support disc 21a is shown as mounted on a rod 34 which extends axially through the bore in the nozzle element 10a and may be supported by any suitable means such as a spider, not shown, secured at the leading edge of the nozzle. Otherwise the structure and operation is similar to that first described.

FIG. 6 illustrates a further means for locking the plastic liner 22b to the supporting disc 21b. In this embodiment the supporting member 21b is formed with an undercut annular groove 35 in its supporting surface 24b and the plastic is molded into this groove. The plate 20b thus formed may be used in the structure shown in the previous figures.

In the embodiment of FIG. 7 the deflector plate 20c is composed entirely of plastic and is molded around a sleeve 40 having internal threads 41 and which is threaded onto the supporting rod 30c. The plastic plate is molded into the bore of the sleeve 40 to form locking plug 42 which secures the plastic in place on the sleeve. The forward face of the plastic plate is shaped to deflect the liquid into a peripheral spray as in the previously described embodiments.

The embodiment of FIG. 8 is similar to that of FIG. 7 except that the plastic plate 20d is molded directly onto the threaded end of the rod 30d or is provided with conforming inner threads 43 which are threaded onto the rod.
While several different means have been shown for securing the plastic elements onto the supporting members it is obvious that various types of locking means may be used and that the illustrations are representative only. In any case the plastic elements may be economically formed by molding and may be readily removed and replaced as required in subsequent operations.

What is claimed is:

1. A spray nozzle comprising a plastic element having a bore through which the spray liquid passes and having an inlet end and a discharge tip, a supporting ring of rigid material adapted to be attached to a coupling member and surrounding at least a portion of the outer surface of the plastic element, said plastic element and said supporting member having interlocked tongues and grooves for securing the plastic element in place, with the supporting ring having peripheral grooves into which said plastic is molded.

2. A spray nozzle as set forth in claim 1 in which said grooves are undercut for securing said plastic therein.

3. A spray nozzle as set forth in claim 1 in which said grooves extend axially.

4. A spray nozzle as set forth in claim 1 in which said grooves are annular in form.

5. A spray nozzle comprising an axial member having a bore through which spray liquid passes and having a discharge tip adapted to discharge a jet of liquid, and a fixed deflector plate disposed transversely in the path of said jet and having a forward surface shaped to deflect the liquid radially outwardly around its entire periphery to form a 360° spray pattern, said deflector plate comprising a rigid support disc having a plastic liner disposed over and secured to its forward surface as the deflecting surface thereof.

6. A spray nozzle as set forth in claim 5 in which said liner is mechanically interlocked with said support disc.

7. A spray nozzle as set forth in claim 6 in which said support disc is provided with recesses into which said liner is molded for securing the same.

8. A spray nozzle as set forth in claim 7 in which said recesses are undercut.

9. A spray nozzle as set forth in claim 5 in which said support disc carries projecting studs around which said plastic liner is molded.

* * * *