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AEROSOL SPRAY HEAD
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Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

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This invention relates to spray heads for liquids and has for its primary object to produce a spray head which may be economically produced from a minimum number of easily assembled parts.

Also, it is an object to provide such a spray head which performs an improved atomizing of the sprayed fluids.

In accordance with the invention the spray head need comprise but two parts, namely, a casing having a bore therethrough terminating in a discharge orifice and an insert which is preferably press fitted into the bore through the open end thereof and which, when assembled in the casing, functions jointly with the casing to define the several interconnected chambers and passageways for delivering the fluid to and through the discharge orifice with a swirling motion. The said two parts are adapted for economical mass production by injection moulding of plastics as well as by other methods and from other materials.

In accordance with one important feature of the invention, the fluid supply passage enters the said bore transversely so that the fluid is partially atomized by impingement against the insert even before it is swirled around and ejected through the discharge orifice, thereby increasing the efficiency of the device.

A further important feature consists in utilizing the insert for cooperation with the casing to define an annular fluid directing chamber disposed to receive fluid entering from the supply passage and to distribute it through a plurality of passages communicating through said bore with the discharge orifice.

The construction of the spray head is such that it is unnecessary to provide any enclosed passageways or bores through the insert, the several enclosed passages within the spray head being formed by exterior slots and surfaces on the insert cooperating with the interior surface of the casing.

In accordance with one form of the invention, the insert is provided with a plurality of fine grooves which not only act to better break up the stream of liquid impinging thereagainst in the distribution chamber, but also cooperate with the casing to define a plurality of axially directed passages of smaller cross-sectional area than the discharge orifice. These passages carry the fluid toward the discharge orifice and at the same time filter out solid impurities or the like which might tend to clog the orifice.

A further refinement of this same feature consists in forming the filtering slots of a width no greater than that of the discharge orifice so that particles of solid matter of a size large enough to clog the discharge orifice will be arrested in filtering slots.

In the accompanying drawings:

Figure 1 is a vertical cross section through the valve casing of the invention.

Figure 2 is a similar view, partly in section, showing the manner in which the preferred types of insert of the invention is assembled in said casing;

Figure 3 is an end elevation of the insert as viewed from the left in Figure 2;
supply passages 25 which communicate at their outer ends with an annular collector chamber 26 (Fig. 2) defined by a circular groove at the base of conical face 23.

One or more axially extending grooves 27 in the cylindrical surface of distributing and swirling member 21, coax with the surrounding face of bore 11 to define passageways for conveying pressurized fluid from the distribution chamber 22 to collector chamber 26. From chamber 26 the fluid will pass through tangential swirl passages 25 into swirl chamber 24, where its tangential impetus will cause it to form a rapidly whirling vortex of fluid within the chamber 24 before being discharged as a fine spray or fog through the discharge orifice 12.

In the preferred embodiment of the invention, there are provided a relatively large number of the axial grooves 27 each of a cross-sectional area which is no greater than that of the discharge orifice 12. Thus the passages 27 defined by these grooves within the distribution chamber 22 will filter out particles of solids to prevent their clogging the orifice 12. Such particles will be retained in the relative large distribution chamber 22. Also the width of the passages 26 will preferably be no greater than the diameter of the orifice 12, so that solid particles of a size which might otherwise clog the orifice 12 are prevented from entering and clogging the intake ends of passages 27.

In the embodiment of the invention illustrated in Figures 5 and 6 the construction and arrangement of the casing 10 is identical to that of the preferred embodiment, and its several parts are accordingly designated by similar reference characters. The insert member is of generally similar construction to that of the preferred embodiment, and includes a plug section 20' and a fluid distributing and swirling section 21'. However, the arrangement of grooves or passages on said section 21' has been modified to eliminate the filtering passages 27 and collector chamber 26. In place thereof there are provided one or more axial grooves 27', of relatively larger cross section than the grooves 27 of the preferred embodiment. The number of grooves 27' corresponds with the number of the tangential grooves or passages 25', and each such groove 27' communicates directly with the outer end of its associated passage 25'. Also the conical tip 28 of the preferred embodiment is omitted.

Obviously, the casing and insert of both embodiments are adapted for economical production from usual plastic materials and for assembly by press fitting one into the other.

It will be apparent that other arrangements or modifications of the passages and chambers jointly defined by the casing and insert of the invention may be made; also that the proportions of such passages and of the orifice 12 may be varied to achieve varying spray patterns and particle sizes and to cope with a wide range of viscosities and filtering requirements of the sprayed fluid, all without departing from the present invention.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A spray head comprising a casing of integral construction formed with an opening therethrough defined at one end by a discharge orifice, and open at the other end, a plug frictionally fixed in and sealing said open end, a fluid distributing and swirling member integral with and projecting axially from said plug toward said orifice, said member being spaced from the walls of said opening adjacent said plug to define an annular distributing chamber adjoining said plug and being snugly received in said opening between the distributing chamber and said orifice, said member being formed with interconnected axial and tangential grooves co-acting with said casing to define passages extending from the said distributing chamber to said orifice.

2. The combination of claim 1 wherein said grooves are of a cross-sectional area no greater than that of the discharge orifice to filter out solid particles of a size which might clog the orifice.

3. A spray head comprising a casing of integral construction formed with a two-diameter bore, and having a discharge orifice communicating axially with the smaller diameter portion of said bore, the larger diameter portion of the bore opening through said casing at its end remote from said orifice, an insert in said bore comprising a generally cylindrical fluid distributing and swirling member snugly received in said smaller diameter bore portion and projecting axially into said larger diameter bore portion, a cylindrical plug integrally fixed to said member in axially spaced relation to said smaller diameter bore portion, said plug being frictionally fixed in and sealing the open end of said larger diameter bore portion and with the projecting portion of said member defining an annular fluid distribution chamber, said member being formed with grooves extending through said smaller diameter portion and co-acting with said casing to define passages establishing communication between said distribution chamber and the orifice, said casing being formed with a fluid supply passage opening into said distribution chamber transversely to the axis of said bore, whereby incoming fluid will be partially atomized by impingement against said grooved member.

4. A spray head comprising a casing of integral construction formed with a cylindrical bore blind at one end and opening through the casing at its other end, said casing having a discharge orifice therein communicating axially with the blind end of said bore, and an inlet communicating with said bore intermediate its ends, a plug frictionally fixed in and sealing the open end of said bore, a fluid distributing and swirling member integral with said plug extending axially into and snugly received in the blind end of said bore adjacent said orifice, said member being formed with a groove cooperating with the wall of said bore to define a passage establishing communication between said inlet and said orifice.

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