

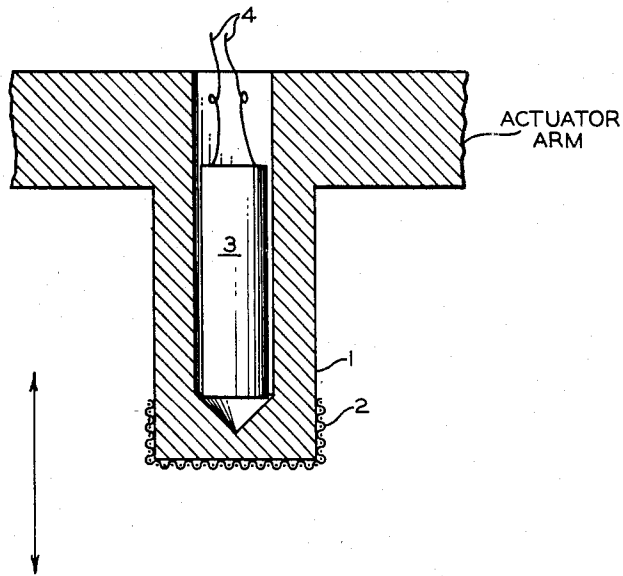
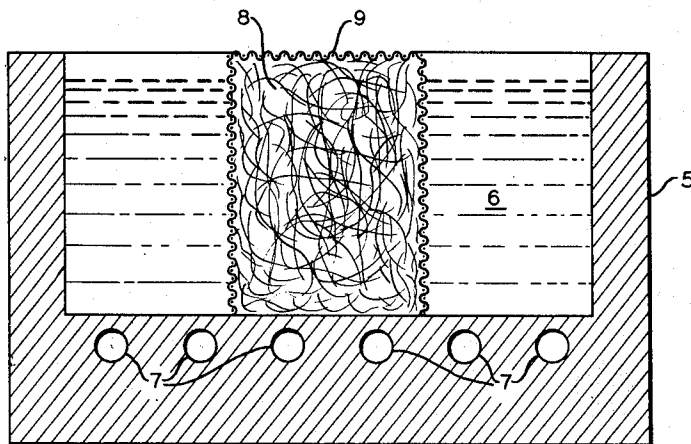
Aug. 18, 1964

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3,145,121

SELF-METERING LIQUID APPLICATOR

Filed Dec. 4, 1961



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1

3,145,121

SELF-METERING LIQUID APPLICATOR

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Filed Dec. 4, 1961, Ser. No. 156,622

3 Claims. (Cl. 118—202)

This invention relates to a liquid holding and dispensing device. One aspect of this invention relates to a device for dispensing a uniform self-metered amount of liquid on a surface.

In applying liquids to surfaces it is desirable to apply a uniform amount both for quality control and for economic reasons. In an attempt to meter the amount of liquid applied to surfaces, various types of apparatus have been used such as brushes, wicks, sprays, and the like. However, it has been found that such means of applying liquids to surfaces do not result in a uniform self-metered amount of liquid applied in all cases. It has also been found that the various types of apparatus are not suitable for applying such liquids as hot-melt adhesives, emulsion adhesives and the like.

We have invented an apparatus whereby a predetermined uniform amount of liquid can be applied to a surface.

It is an object of this invention to provide an apparatus for dispensing a uniform self-metered amount of liquid on a surface.

Other objects and several advantages will be apparent from an examination of the specification, drawing and claims.

Broadly speaking, this invention is an apparatus for applying a self-metered amount of liquid to a surface, comprising, in combination: a container for the liquid; a porous wick positioned in said container; a mesh cover in contact with said porous wick; an applicator tip covered with mesh; means for bringing said applicator tip into contact with said first mentioned mesh cover; and means for bringing said applicator tip into contact with said surface and withdrawing said applicator tip from said surface.

In order to more clearly describe the invention and provide a better understanding thereof reference is made to the accompanying drawing.

The drawing is a diagrammatic illustration in cross section of the apparatus which comprises an applicator for applying liquid adhesive to a surface and a reservoir for holding the liquid adhesive.

The apparatus comprises an actuator arm which moves up and down to alternately bring the applicator tip 1 in contact with the adhesive source and with the surface on which the adhesive is to be applied. The actuator arm is attached to means, not shown, that may be either manually operated or automatically operated to bring the applicator tip in contact with the adhesive source surface on which the adhesive is to be applied. The applicator tip has a wire mesh covering 2 that is heated by an electric heater 3 positioned inside said applicator. Electrical conduits 4 connect with an electrical power source not shown.

The apparatus also comprises a liquid reservoir 5 for holding the liquid adhesive 6. Heating coils 7 in the base of the reservoir keep the liquid adhesive at a predetermined temperature. Steel wool 8 is placed in the liquid adhesive reservoir in such a manner as to allow a portion of the steel wool to be submerged in the liquid adhesive. Wire mesh 9 is placed in contact with the steel wool extending across the top and downward around the steel wool into the liquid adhesive. The steel wool acts as a wick for allowing the liquid adhesive to rise above

2

the surface level in the reservoir. The surface tension properties of the liquid cause it to rise and form a thin film of liquid on the wire mesh above the steel wool.

As the mesh-covered applicator head is brought in contact with the mesh-covered steel wool in the liquid reservoir a thin film of adhesive forms on the mesh covered applicator head as a result of the surface tension properties of the liquid. The film covered mesh on the applicator head is then brought in contact with the surface on which the liquid adhesive is to be applied and the applicator head is withdrawn leaving a self-metered amount of adhesive on the surface.

When applying adhesives to such surfaces as polyethylene, it is often desirable to use a hot-melt adhesive. The apparatus has been equipped with heaters to maintain a predetermined temperature as would be necessary in the application of hot-melt adhesives.

It is understood that the drawing illustrates only one particular embodiment of the invention and is not included to limit the scope of the invention. While the foregoing discussion has been directed toward the application of liquid adhesives on surfaces, it is understood that any liquid having the proper surface tension properties can be applied using the apparatus of this invention.

Various components of the illustrated apparatus can be substituted by other components that accomplish the same result. For example, the steel wool wick assembly can be replaced by cotton fiber, glass fiber, plastic shavings, porous ceramic plugs, sponges and the like. The wire mesh cover over the wick assembly and over the applicator head can be replaced by a mesh made from any material that will not absorb the liquid to be applied so long as the material is wettable by the liquid to be applied. Since the operability of the present invention resides in the surface tension characteristics of the liquid toward the mesh coverings over the wick assembly and the applicator head, it is imperative that the mesh coverings are wettable by the liquid. For example, when applying water using the apparatus of this invention, an oily mesh covering would not be wettable and very little water would adhere to either of the mesh coverings. Likewise, the wick assembly should be constructed of a material that is wettable by the liquid to be applied. Suitable materials for the mesh coverings are wire mesh, glass mesh, plastic mesh and the like.

As mentioned before, the liquid to be applied forms a thin film on the mesh covering over the wick assembly due to its surface tension properties. The film is of uniform thickness, and when the mesh covered applicator head is brought in contact with the first mentioned mesh covering, a thin film of liquid of uniform thickness forms on it also. When the film covered applicator head is brought in contact with the surface on which the liquid is to be applied, a portion of the thin liquid film is deposited on the surface after the applicator head is removed. The deposited liquid is uniform in amount for each application to similar surfaces. Thus the apparatus of the present invention provides a means of applying a self-metered amount of liquid to surfaces.

By changing the size of the mesh covering on the wick assembly and/or the applicator head, the amount of liquid applied can be controlled. For example, a covering of small mesh size would cause a greater amount of liquid to be applied to the surface while a large mesh size would cause less liquid to be applied to the surface. A variation of temperature of the adhesive and applicator head also causes a change in the amount of liquid applied. Higher temperatures generally decrease the surface tension of the liquid, causing more wetting of the mesh and a larger amount of liquid applied.

The apparatus of the present invention has been utilized in applying hot-melt adhesives to polyethylene film. It

has been found that the hot-melt adhesive is applied in uniform amounts giving good results in such an application.

As many possible embodiments can be made of this invention without departing from the scope thereof, it is to be understood that all matter herein set forth is to be interpreted as illustrative and not as unduly limiting the invention.

We claim:

1. A liquid application system comprising a container for said liquid, a wick in said container of sufficient height to extend from a point within the liquid to a point above the level of liquid therein, mesh surrounding the top and sides of said wick, an applicator, an applicator tip on said applicator, mesh covering said applicator tip, said applicator tip having said mesh thereon adapted to contact said mesh on the top of said wick, the mesh on said wick and said applicator tip being wettable by the liquid but which does not absorb the liquid, and means to move said applicator tip to and from contact with said mesh surrounding said wick.

2. The system of claim 1 wherein the mesh size is sufficient to apply the desired amount of liquid to said surface, said amount of liquid being inversely proportional to said mesh size.

3. Apparatus for applying liquid to a surface comprising a container for said liquid, said container having a base and upstanding side walls, heating means in the base of said container to maintain the liquid at a predetermined temperature, a wick of steel wool in said container

of sufficient height to extend from the bottom of said container to a point above the level of liquid therein, wire mesh surrounding the top and sides of said wick, an applicator, an applicator tip on said applicator, wire mesh covering said applicator tip, said applicator tip having said wire mesh thereon adapted to contact said wire mesh on the top of said wick, the wire mesh on said wick and said applicator tip being wettable by the liquid but which does not absorb the liquid, heating means in said applicator adapted to maintain said applicator tip at a predetermined temperature, the mesh size of the wire mesh being sufficient to apply the desired amount of liquid, said amount of liquid being inversely proportional to said mesh size, and means to move said applicator tip to and from contact with said mesh surrounding said wick.

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