

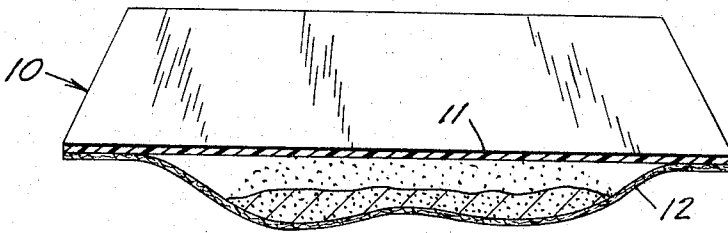
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3,334,374

APPLICATOR PAD

Filed Dec. 28, 1964



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3,334,374

APPLICATOR PAD

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4 Claims. (Cl. 15—539)

This application relates to applicator pads for applying a liquid agent to an object or surface, the pads being dry in storage but containing within them a readily released supply of the liquid agent. Common examples of the jobs which the pads comprising this invention are adapted to simplify are removing stains or soils from clothing; cleaning or polishing metal or other surfaces or applying protective coatings over them; lubricating small articles; polishing shoes; removing fingernail polish; etc.

The novel applicator pads shorten and simplify these jobs. In place of buckets and mops, bottles and cloths, and similar customary combinations, only a single item that may be kept in one place is required. No preliminary steps prior to application of the liquid are needed and the correct measure of liquid is quickly applied in the desired location. Further, the pads are tidy, dry, and may be conveniently stored in an orderly manner. There is no chance for spilling or dripping during performance of the job. Another advantage of the applicator pads of the invention is that they may be stored indefinitely without deterioration or reaction of the liquid agent.

In general, an applicator pad of the invention includes a flexible, compressible, sealed receptacle containing pressure-rupturable capsules filled with the desired liquid agent. A convenient form of receptacle is a thin, flat pouch having front and back walls united at their peripheral edges. At least one area of the walls forming permeable web readily conformable to the surface to which liquid is to be applied. When the receptacle is compressed as by being pressed against the object to be treated, the capsules are crushed and the liquid agent released. The released agent penetrates the permeable portion of the receptacle and covers or soaks into the object against which the pad is pressed.

An exemplary applicator pad of the invention is shown in section in the drawing. The flat, thin, flexible pouch 10 pictured there comprises a liquid-impermeable back wall 11, typically a polymeric film, and a liquid-permeable front wall 12, typically a nonwoven fabric of fibers of a material such as a reconstituted cellulosic or cotton linters bonded with an organic resin. Metal foils, paper sheets, and various woven fabrics might also be used, and the liquid-permeable wall might be a perforated sheet when used with capsules of large enough size. In many cases an absorbent material is desirably used as the front, permeable wall. In the illustrated pouch, the walls 11 and 12 are attached around their edges by heat sealing, though they might also be attached with adhesive or tape, or by sewing, etc.

The liquid-impermeable back wall 11 keeps the user's hand dry and directs all the liquid applied through the permeable wall, but in some uses the whole pouch material might be liquid-permeable. A rather thin front wall 12 is desirable for the most immediate and complete application of the liquid contents. The porosity and thickness may be varied depending on the particular application, thicker webs being desirable, for example, where more rubbing or buffing may be used. Abrasives can also be incorporated within either the porous or impermeable web where desired.

The thin, flat character of the pouch 10 assures distribution of the capsules in a thin layer over the surface of application. Thus, the released liquid from the capsules is

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more quickly and completely available since it need not soak around other capsules or crushed capsule shells. Other receptacles, preferably having such a thin compartment, may also be used, such as thin boxes with a permeable base and flexible or depressible top, hollowed out sponges or pads, etc.

Pressure-rupturable capsules, comprising thin, self-supporting, polymeric shells around particles of the desired liquid agent, are placed within the pouch before it is finally sealed. The capsules may be formed with a wide variety of aqueous or organic liquid fills by many processes known to the art, as for example as described in the Green Patent No. 2,800,457, issued July 23, 1957, or in Raley Patent No. 2,766,478, issued Oct. 16, 1956, or by other known techniques. Tough, useful capsules having good storage and handling characteristics have been found to be those having aminoplast polymer shell walls around finely divided particles of the liquid agent. Such capsules may be made by the procedure described in the copending application of Gale W. Matson, U.S. Ser. No. 175,394, filed Feb. 26, 1962, and now abandoned.

The manufactured capsules are dry, and in small microscopic sizes (microcapsules) may have the appearance of a fine powder; in larger sizes the capsules are visually observable as such to the unaided eye. The aminoplast shelled capsules may be stored indefinitely without deterioration, evaporation or reaction of their liquid contents. Typically they are impervious to moisture.

Under moderate pressure the capsules burst, discharging their liquid fill. In using the pads, the liquid agent may be freed by such methods as squeezing the pad between the fingers preliminary to application or pressing the pad against the object to which the liquid is to be applied. As the pad is pressed or rubbed against the object, the released liquid penetrates the porous facing member 12 and soaks into the object or is distributed over its surface.

For good results the capsules should have an average diameter in the range of 200–1000 μ . Capsules more than 1000 μ in diameter are less desired because to make them handleable in manufacturing and processing they must have rather thick, strong shells that hinder easy rupture of them in an applicator pad. At sizes smaller than 200 μ , the capsules become rather difficult to rupture by hand pressure. Further, with small capsules the shells comprise too large a proportion, and the usable liquid too small a proportion, of the pouch contents. Since the capsule shell acts as an adsorbent, small capsules with their accompanying large surface area of shell upon rupture may also be disadvantageous as causing too great an adsorption of liquid released from the capsules. Preferably the capsules are in a range of about 300–600 μ in diameter.

The liquid fill normally comprises about 50 to 99 or more weight percent of the capsules. Capsules are included in the pouch 10 in an amount principally determined by the amount of liquid that is normally needed or desirable in a single application of the pad. As previously noted however, the amount of capsules should be such as not to become such a thick layer in the pouch that the pouch becomes unwieldy. For capsules between 200 and 600 μ , a pouch having an impermeable back wall should be less than about $\frac{3}{8}$ " and preferably less than about $\frac{1}{8}$ " in thickness.

For certain cleaning applications such as dry cleaning, the broken capsule shells may be of advantage if they adsorb the loosened soil from the clothing fabric. Additional adsorbents, such as clay, may be added to the pouch to increase adsorption.

Dry cleaning solvents, mineral spirits, detergents, abrasive liquids, lubricants, polishes, tarnish preventing agents, and pesticides are included among the variety of oils, solvents, and reactive chemicals that may be use-

fully employed as liquid fills in the capsules of the pads of this invention. The particular agent of a class chosen will depend on the needs of the particular application. For example, for dry cleaning purposes a liquid fill of the capsules should be chosen that has a broad spectrum solvency of oils, chemical inertness toward clothing fabrics, low vapor toxicity, and an appropriate evaporation rate so that the agent remains liquid during the time of application but evaporates sufficiently fast to permit a quick use of the material cleaned. Typical dry cleaning fluids include perchloroethylene and trichloroethylene.

In one specific embodiment of the invention a pouch as illustrated in FIGURE 1 was prepared by heat sealing the peripheral edges of a sheet of polyethylene film and an overlaid permeable nonwoven fabric of 1½ denier, ¾" viscose rayon staple fibers bonded with a polyvinyl alcohol resin. The interior area of the pouch was rectangular, about 1⅞" by 1⅞". About 1.2 grams of capsules having a urea-formaldehyde shell and a fill of perchloroethylene were placed in the pouch prior to final sealing. The capsules had diameters between about 300 and 600μ and comprised between about 82 and 88 percent by weight perchloroethylene. When the pouch was rubbed against fabric material with sufficient force to crush the capsules therein, with the permeable side against the fabric, food and other stains were removed by the cleaning medium. The same results were obtained when the pouch was used to clean stains from rugs, drapes, upholstery, floors, walls, and other areas.

I claim:

1. A dry applicator pad containing a supply of liquid agent that may be readily released in controlled amounts by pressure on the pad during use and which is adapted for neat and convenient handling and storage, said pad comprising a thin flat flexible compressible sealed pouch having front and back walls united at their peripheral edges and containing many individual loose dry pressure-rupturable capsules less than 1000 microns in diameter,

each comprising a polymeric thin shell filled with said liquid agent, at least one wall of the pouch including a conformable liquid-permeable fibrous web whereby when the pouch is rubbed in contact with a surface of application, liquid agent is freed from capsules by the rubbing pressure and applied.

2. The applicator pad of claim 1 in which the capsules are between about 300 and 600 microns in diameter and have an aminoplast polymeric shell.

3. The applicator pad of claim 1 in which the liquid agent is a dry-cleaning agent for clothing.

4. A dry applicator pad containing a supply of liquid agent that may be readily released in controlled amounts by pressure on the pad during use and which is adapted for neat and convenient handling and storage, said pad comprising a thin flat flexible compressible sealed pouch formed by overlaid sheets of heat-sealable material sealed together at their peripheral edges and containing many individual loose dry pressure-rupturable capsules between about 300 and 600 microns in diameter, each comprising an aminoplast polymeric shell filled in an amount of 82 percent or more by weight with said liquid agent, one sheet being a liquid-impermeable polymeric film and the other a conformable liquid-permeable fibrous material whereby when the pouch is rubbed in contact with a surface of application, liquid agent is freed from the capsules by the rubbing pressure and applied.

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**UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION**

Patent No. 3,334,374

August 8, 1967

Nathaniel L. Watkins, Jr.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 36, after "forming" insert -- the receptable should comprise a rather thin, liquid- --; column 2, line 60, after "between" insert -- about --.

Signed and sealed this 15th day of October 1968.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents