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2,115,122

PERFORATE SHEET RESISTANT TO TEARING AND PACK THEREFROM

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Fig. 1

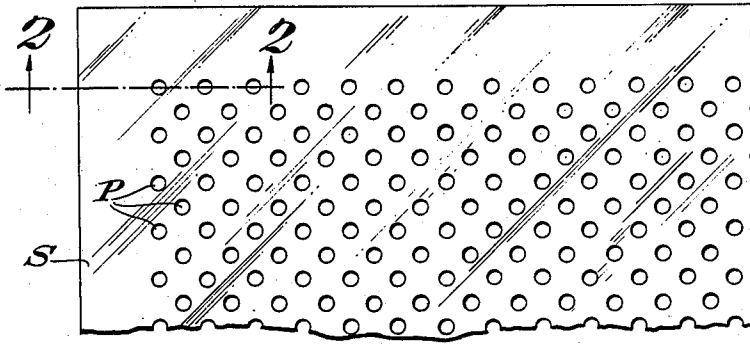


Fig. 3

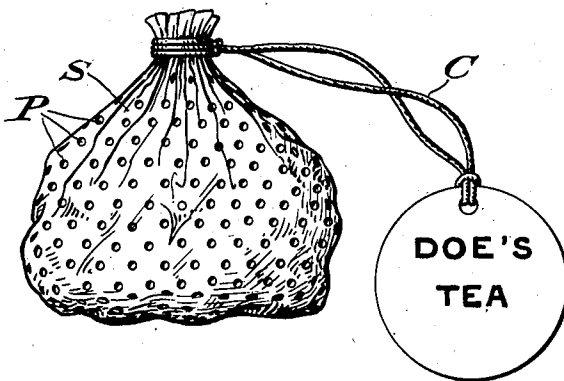


Fig. 4

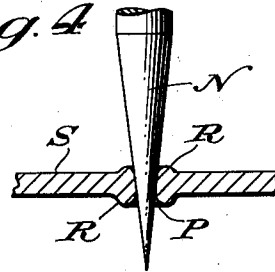
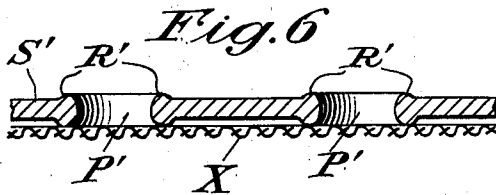
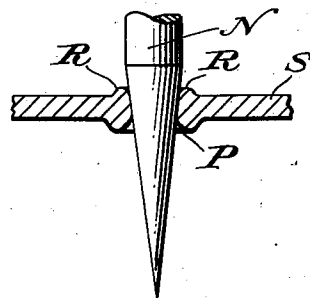


Fig. 5



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PERFORATE SHEET RESISTANT TO TEARING AND PACK THEREFROM

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2 Claims. (Cl. 99—77.1)

In the production of cellulosic or like thin transparent sheets, it has long been desired for various uses that such materials be provided in perforate form. While such sheets in general possess a reasonable strength when imperforate, they develop a serious tendency to tear between edges left by punching. Thus the problem of providing these thin transparent sheets with the desired areas of perforations and of integral strength sufficient for the various uses to which they are to be put has been baffling to those desiring to fabricate such materials.

Various suggestions have been made as to the use of such perforate sheets, but in these the desired characteristics of the sheet itself were lost sight of or abandoned. According to my concept my present basis of perforation without tearing lies in the establishment of a substantial resistance throughout the perforated areas by providing the holes or openings with marginal thermal modification of their edges so as to be disposed as autogenous rims or collets integral with the sheet and resistant to radial tears or runs.

As generally illustrative of my invention I show in the accompanying drawing views illustrative of simple structures in relation to such sheets. In the drawing:

Fig. 1 is a surface view of a fragment of transparent material having colleted punctures in accordance with my invention.

Fig. 2 is a section through such a sheet on the indicated line 2—2, of Fig. 1.

Fig. 3 represents a so-called tea bag or ball illustrative of my invention.

Fig. 4 indicates a colleted puncture as being formed for a small hole.

Fig. 5 a similar view illustrating the forming of a larger hole, and

Fig. 6 indicates a modified form of my material with partially obstructed aperture.

According to my invention thin sheets of material S, such as commercial "Cellophane", "Kodapak" "Pliofilm" or like materials of cellulosic or synthetic character may be provided with perforated areas without any serious loss of strength or other desirable characteristics, such as transparency and flexibility.

For example, I may take thin sheets S of such materials above described, and render them perforate as by definite controlled punctures P. These I preferably form by heated needle point or stylus N. Such points N are preferably tapered slightly as indicated in Figs. 4 and 5, and may be arranged in rows or patterns as for producing designs or other dispositions of the per-

forations through the sheet or so much thereof as is desired to have perforated. For some purposes the punctures through the material may be effected by rupture as by static electrical discharge from suitably arranged terminals spaced and disposed to give the desired pattern.

Referring to these characteristic perforations or punctures P, it will be noted that they appear with rims R of slightly rounded edge or cross sectional figure as indicated in Fig. 2, due to its softening or partial fusion or local adaptation of the material by reason of its somewhat thermoplastic character. These edges so formed and indicated at R constitute what may be termed autogenous collets or grommets about the openings. Due to their substantial homogeneity with the intervening areas of the main sheet S, their relative flexibility is not lost and yet they are found to be radially resistant to cracking or tearing. Being autogenous they act under stress and strain in substantial accord with the adjacent areas of the sheet S.

My invention is variously applicable in the art for the fabrication from sheets of articles of manufacture. As wrappers or in container packs, these articles possess all of their original characteristics according to their source and nature. The transparency and lustre of such sheets is not diminished and as they are made permeable by the system of perforations, they can be used for both air ventilated and liquid permeable packs or containers.

As illustrative of many such uses my sheets may be indicated as perfectly adapted for packs or container wraps for tea, coffee, bath salts or other liquid infusions, or may be filled with an evaporative content, as artificial camphors or gums for moth deterrent purposes or like air circulative dispensation. Some of these, like lavender and naphthalene crystals need rather smaller perforations as for example by puncture thrust of the hot tapered needle N which is not carried as deeply vertically through the material, so that it may be of less radial diameter than when carried further through.

Where desired, a light deposit of fibre or lint or gauze X may be lodged across the actual aperture mouth by attachment to the rim or edge while the material is softened and adhesive. Such fibres only partly obstruct the actual holes or vents P, while offering a slight resistance to the escape of material contained within the sheet when used as a pack, for example, for a finely divided content.

While I have referred to certain well known

commercial materials as directly of interest in the consideration of my invention, it will be understood that such reference is intended as illustrative and not by way of limitation. Any material of this class having the general desired qualifications for the use intended may be so prepared. Generally classed, these materials may be esters, ethers, or hydrated cellulosic material or rubber or like compounds.

From such may be obtained thin sheets or films of flexible character and being readily rendered thermo-plastic. They are as a class highly flexible in thin sheets and usually of a desirable transparency and lustre. Such materials can be made tasteless and odorless and so are well adapted for even delicate infusion purposes such as tea balls (as suggested in Fig. 3) where the taste and flavor of the tea are of high importance to be obtained without other extraneous flavors or odors. In that figure (Fig. 3) a square or other shaped piece is dinked from a sheet such as S, filled with tea leaves and tied with the conventional cord C having an identification tag. The perforations give free and ready access to the tea or other material to be infused or dissolved. Where the content is distributed by evaporation, the perforations form free vents and the flexibility in such cases assists in air penetration and egress, especially as such a pack is moved and flexed.

As the utility of my invention will be at once

apparent to any one skilled in the art, I do not need to elaborate further upon its attained status. Various materials of the indicated nature are and doubtless will be used alone, or, as suggested, with supplemental addition. My method may be considerably varied as indicated, and within the scope of the appended claims, modifications as to material, form or method are to be understood as included.

What I therefore claim and desire to secure by Letters Patent is:—

1. In a pack for infusion or diffusion purposes, including a body of material to be distributed, and an enclosing envelopment including a thin sheet of transparent material of the class plasticizable by heat, said sheet having an area containing a plurality of perforations formed with fused margins disposed as integral autogenous rims, whereby tearing of the sheet between perforations is resisted.

2. A pack for infusion or diffusion purposes including a body of material and an enclosing envelope consisting of a flexible sheet of transparent material of the class plasticizable by heat, said sheet having an area containing a plurality of perforations formed with fused margins disposed as integral autogenous rims resistant to ruptures between the perforations, said sheet being drawn around the body of material and secured about it to hold the content.

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