Jan. 14, 1936. S. COOPER 2,027,810

PERFORATED CELLOPHANE AND THE LIKE, AND METHOD OF MAKING THE SAME

Filed Oct. 30, 1933

Fig. 1.

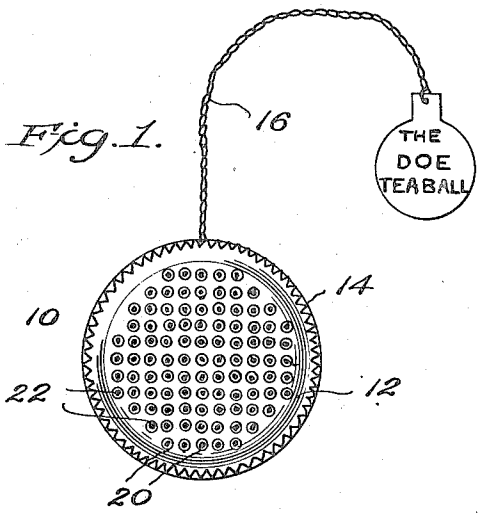


Fig. 3.

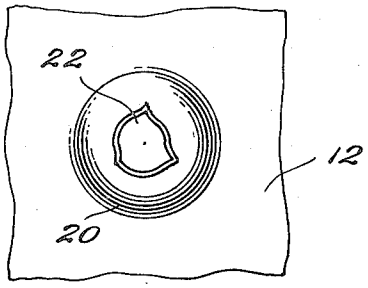


Fig. 2.

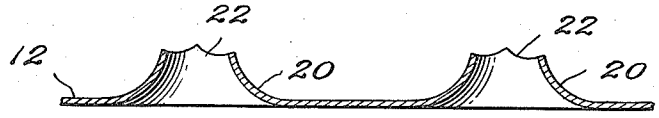


Fig. 4.

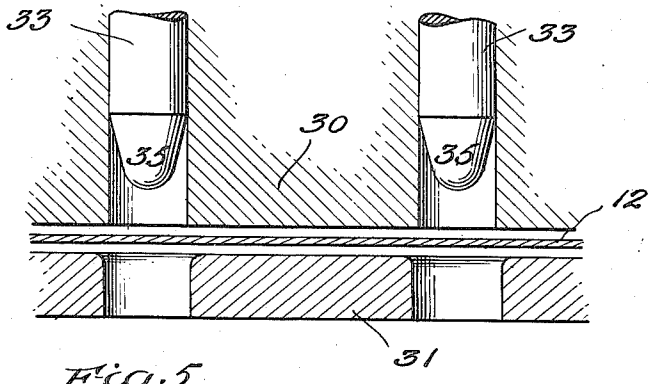
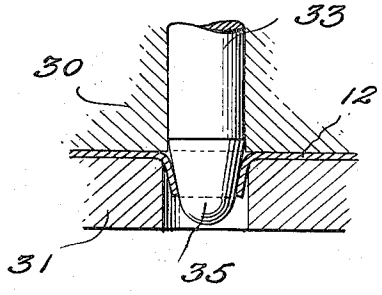


Fig. 5.



INVENTOR.
SIMON COOPER,
BY
Gustave R. Thompson
ATTORNEY

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PERFORATED CELLOPHANE AND THE LIKE, AND METHOD OF MAKING THE SAME

Simon Cooper, Brooklyn, N. Y., assignor to Cooper Tea Packet Company, Brooklyn, N. Y., a corporation of New York

Application October 30, 1933, Serial No. 695,943

5 Claims. (Cl. 164—125)

This invention relates to a method of forming perforated "Cellophane" and the like, and to the perforated product, which latter is capable of various uses, and particularly as the material for forming bags for tea, which bags are immersed for brewing tea. The word "Cellophane" is understood to be a trademark used in connection with a widely used sheet-material, which is understood to be a sheet formed by evaporating liquid films of cellulose-esters dissolved in suitable solvents.

Tea bags have heretofore been made of perforated "Cellophane". It has been found that tea-bags made of perforated "Cellophane" frequently burst when dangled or jiggled in hot water in the act of infusing the water with the extract from the tea-leaves contained in the bag. "Cellophane" has the peculiarity of being tough when there are no slits or incisions in it, but of tearing with exceptional ease when it has a slit or incision at which a tear may initiate. Examination of perforated "Cellophane" under a microscope has revealed tiny fissures running into the "Cellophane" from the edges of the perforations, and this discovery applied to the knowledge of the way in which tea-bags are used, explains the ease with which tea-bags made of "Cellophane" burst when manipulated in hot-water in the brewing of tea. A mass of tea-leaves acquires considerable weight from absorption of water, and this weight acting on the "Cellophane", weakened by the fissures running into it from the edges of the perforations, causes the "Cellophane" to tear, and the tea-leaves thereby escape into the cup or vessel in which the tea is being brewed.

The present invention provides perforated sheets of "Cellophane" and the like. Such material in the form of a tea-bag envelope, for example, will withstand forces tending to tear or burst the same to a much greater extent than the perforated "Cellophane" heretofore made and used in making tea-bags.

Figures illustrating a mode of procedure in forming the perforated sheets of "Cellophane" and the like used in making the tea-bags, are illustrated in the accompanying drawing. The drawing also illustrates the material and a tea-bag formed of said material.

In said drawing Fig. 1 is a face view of a completed tea-bag. The size of the perforations is however exaggerated.

Figs. 2 and 3 are respectively, a sectional view and a plan view of the perforated sheet made according to the present invention, the dimensions being greatly exaggerated.

Figs. 4 and 5 are vertical sectional views illustrative of a mode of procedure for forming the perforated material.

Referring to said drawing, numeral 10 designates an envelope which may be formed of perforated sheets 12 of "Cellophane", and containing within the envelope dried tea leaves. The envelope containing the tea-leaves is used in brewing the drink "tea" by steeping the tea-leaves contained in the tea ball, in hot water.

The two sheets of perforated "Cellophane" 12 may be held together at their edges by a seam 14, of thread. The envelope may have a cord or string 16 attached thereto for dangling it in hot-water.

As hereinbefore set forth, perforated "Cellophane" heretofore used for tea-bags does not give complete satisfaction owing to more or less frequent bursting of the perforated "Cellophane" envelope, particularly in the manipulation or dangling of the tea-ball in hot-water in the act of brewing the tea.

The principle contributing cause to the bursting of the perforated "Cellophane" material appears to be the fissures incident to, and running into the material from, the perforations which are made in the "Cellophane" material. The perforations being in the flat material, the strains incident to the use of the material, are borne by the material which is weakened by the fissures running inward from the perforations.

According to the present invention the perforations are formed, not in the flat material, but in bosses projecting from the flat material. Referring to Figs. 2 and 3, bosses 20 are shown as projecting from the sheet of "Cellophane" 12, and the perforations 22 are formed in the bosses 12. The perforations 22 are in the apex portions of the bosses 20. The strains against the material 12 are therefore borne by those portions of the material into which fissures from the perforations have not entered. Consequently the perforated "Cellophane" is much better able to withstand strains, when made according to the present invention, than in the case where the material is weakened by fissures which run into the part of the material which bears the strains incident to use. Fissures running into the embossed portion 20 from the perforation 22 in the apex do not weaken the material in the same way that fissures do which enter the flat portion of the sheet 12.

According to the process part of my invention

perforated "Cellophane" is made by taking sheets of "Cellophane" and the like, and providing or arranging the perforations in bosses raised from the sheet, in such manner that weakness in the material adjacent the perforations, and incident to the perforating, are confined to the bosses and not created in the sheet itself. The perforation may be carried out as a part of the operation of embossing the "Cellophane". Referring to Figs. 4 and 5, a sheet of "Cellophane" 12 may be interposed between dies 30, 31. One of the dies, as 30 may be provided with a series of punches 33. These punches 33 are forced against the "Cellophane" 12 while held between the dies, and the punches 33 being provided with blunt ends 35, the first action of the punches is to emboss the "Cellophane", and, as the movement of the punches continues, the ends of the punches burst through the apex of the boss. The piercing movement of the punches is stopped when the "Cellophane" is punctured, thus resulting in a perforation or aperture somewhat less than the cross sectional area of the punch.

The embossing and perforation of the "Cellophane" may be carried out by other modes and procedures than that herein specifically illustrated and described, and the perforated "Cellophane" material made according to the present invention may be used for other purposes than for the envelopes of tea-bags, and in fact may be used wherever the perforated "Cellophane" having enlarged resistance to tearing is desired. I consider as like "Cellophane", very thin material which is amorphous, or substantially so, such as thin parchmented paper.

What is claimed is:

1. A perforated thin sheet of "Cellophane" and like amorphous material usable as a wrapper and in which tears readily start from perforations therein, the finished sheet having permanent bosses thereon and the perforations being in the bosses, the sheet in use being thereby made resistant to tearing under pressure applied thereto.

2. A perforated thin sheet of "Cellophane" and like amorphous material usable as a wrapper and in which tears readily start from perforations therein, the finished sheet having permanent bosses thereon and the perforations being in the apex portions of the bosses, the sheet in use being thereby made resistant to tearing under pressure applied thereto.

3. A method of making perforated thin sheets of "Cellophane" and like amorphous material usable as a wrapper and in which tears readily start from perforations therein, comprising forming the perforations in permanent bosses on the sheet, weaknesses in the material adjacent the perforations and incident to the perforating being confined to the bosses and not created in the sheet itself, the sheet in use being thereby made resistance to tearing under pressure applied thereto.

4. A method of making perforated thin sheets of "Cellophane" and like amorphous material usable as a wrapper and in which tears readily start from perforations therein, comprising forming the perforations in the apex portion of permanent bosses on the sheet, weaknesses in the material adjacent the perforations and incident to the perforating being confined to the bosses and not created in the sheet itself, the sheet in use being thereby made resistant to tearing under pressure applied thereto.

5. A method of making perforated thin sheets of "Cellophane" and like amorphous material usable as a wrapper and in which tears readily start from perforations therein, comprising forming permanent bosses on the sheet and forming the perforations in the bosses, weaknesses in the material adjacent the perforations and incident to the perforating being confined to the bosses and not created in the sheet itself, the sheet in use being thereby made resistant to tearing under pressure applied thereto.

SIMON COOPER.