

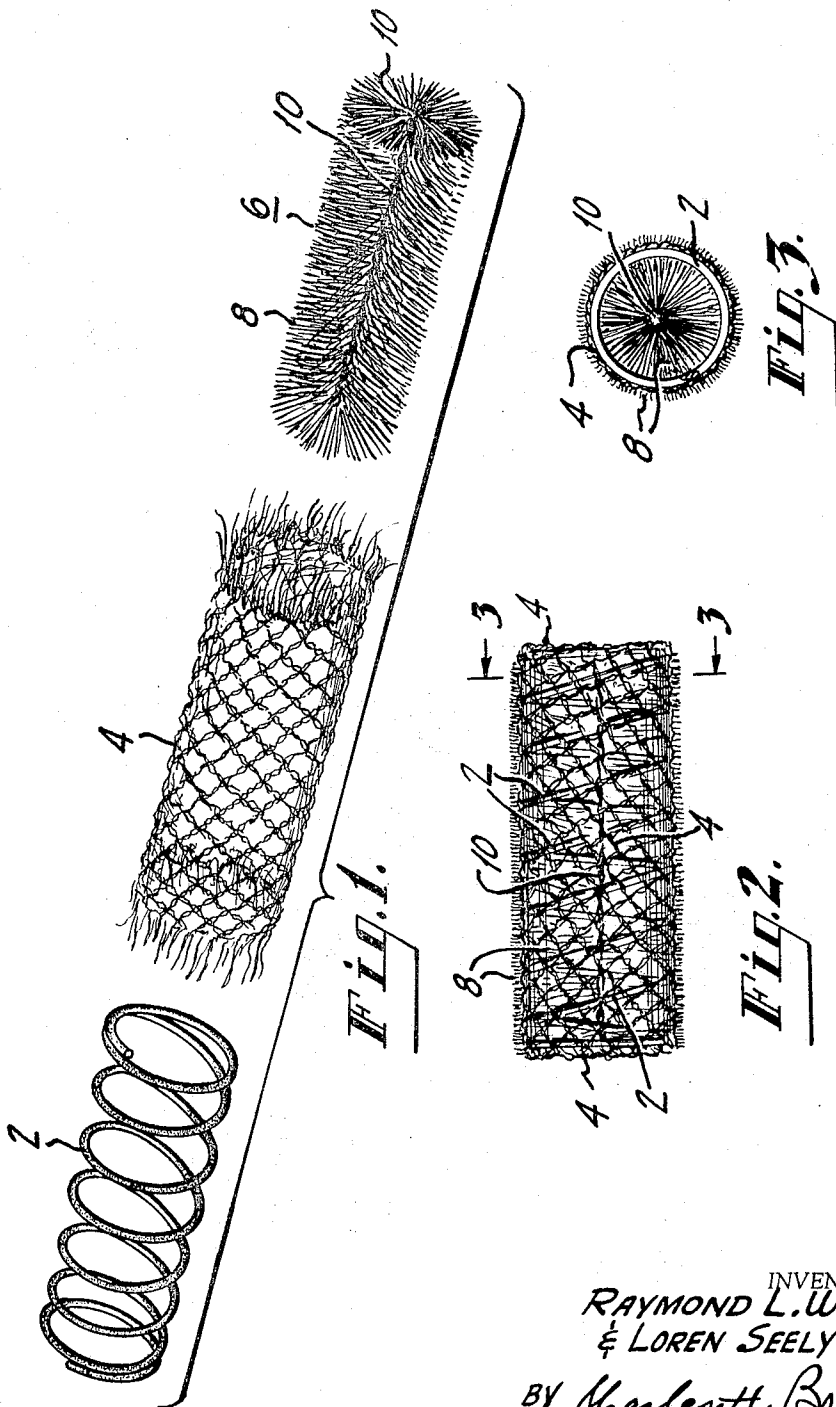
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BRUSH-TYPE HAIR CURLER HAVING SELF-STERILIZING BRISTLES

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**BRUSH-TYPE HAIR CURLER HAVING
SELF-STERILIZING BRISTLES**

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2 Claims. (Cl. 132-39)

This invention relates to a novel type of plastic filament such as may be used for making brushes, for example. More particularly, it relates to plastic filaments having incorporated therein an antibiotic or bactericidal agent in such form and concentration that the agent will continually exude to the surface of the filament over a relatively long period of time, thus keeping the filament sterile.

Brushes and other plastic articles, especially those coming in contact with the human person, quickly become contaminated with various types of bacteria and fungi. These may not only impart unpleasant odors to the articles but may also become a health hazard. This is particularly true where the articles are in constant use in public establishments such as barber shops and beauty parlors but is also true where the articles are only in home use.

Where the problem is more acute, as in barber shops or beauty parlors, constant sterilization is a necessity. This is usually accomplished by keeping the articles in sterilization chambers between successive uses and usually necessitates maintaining several sets of articles on hand so that the articles may be kept under sterile conditions for a long enough time to be effective against the bacteria or fungi that have accumulated. Even with these precautions, sterilization is often ineffective and there is usually no good way for the user to determine whether the sterilization treatment is effective or not.

One object of the present invention is to provide an improved plastic filament that is self-sterilizing.

Another object of the invention is to provide a plastic filament that may be used to manufacture brush bristles so that the brush does not need to be treated with any external sterilizing agent to render it safe for use.

Another object of the invention is to provide a plastic filament that remains in a satisfactory sterile condition over an extended period of time even when it is in frequent contact with people.

A further object of the invention is to provide a brush that does not need to be kept in a sterilizer between uses on different people.

Briefly, the above and other objects are accomplished by providing a filament that comprises any one of a number of different plastics, or synthetic resins, having incorporated therein a small percentage of one of the sulfa compounds which are well known bactericides and anti-fungal agents. The bactericidal agent is not completely dissolved in the plastic but is partially present as a separate phase. That is, the agent is present in such form that it is not completely compatible with the plastic. The agent thus slowly and constantly exudes to the surface of the plastic where it is instantly available to kill any bacteria or fungi that may attempt to lodge there.

Specific examples of the invention will now be described with reference to the accompanying drawing of which:

FIGURE 1 is an exploded perspective view of a three-part hair curler including a brush made of bristles that incorporate the present invention,

FIGURE 2 is a view of the curler of FIGURE 1 in assembled form, and

FIGURE 3 is a section taken along the line 3-3 of FIGURE 2.

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It will be understood, however, that the specific example of a hair curler is intended to be illustrative only.

Referring now to FIGURE 1, there is shown a hair curler such as is commonly used in a beauty parlor or in the home for winding strands of hair thereon and, if desired, treating the hair with a waving lotion so that after the hair is unwound after a period of time, a wave is imparted to the hair. The curler consists of a spiral metal spring 2 over the outside of which is slipped a plastic mesh 4. Within the spring portion 2 is a brush 6 of generally cylindrical shape, made of plastic bristles 8 held together by a twisted wire core 10. FIGURE 2 shows the curler with the parts assembled.

When the curler is in contact with hair it picks up bacteria and fungi which are always associated with human hair. The brush bristles are particularly difficult to sterilize by ordinary means since sterilization must be done so as not to damage the plastic. And when the curler is used in the home, proper sterilization equipment is almost never available.

In accordance with the present invention, the brush bristles may be made in such form that they are self-sterilizing. Thus, the bristles may be made as in accordance with the following specific example.

Example

A composition was made up by thoroughly mixing powdered polystyrene and powdered sulfanilamide so that the mixture contained 97% by weight of the former and 3% by weight of the latter. This mixture was put into a 20:1 screw type extruder and filaments were extruded at a temperature of about 325° F. The polystyrene was melted in the extrusion process. The extruded filaments had a diameter of 0.008". The extruded filaments were immediately quenched in air at ordinary room temperature or in water.

The effectiveness of these filaments in killing bacteria and fungi usually associated with human hair, was tested as follows. A standard lactose broth was made up by dissolving 13 g. of dehydrated lactose broth culture media in 1000 ml. distilled water. The broth was sterilized by heating for 15 minutes on a boiling water bath. The test tubes, tongs and watch glasses used in this test were also similarly sterilized.

A culture of bacteria and fungi found in human hair was prepared by addition of the bacteria and fungi to the broth described above and the culture was permitted to stand at ordinary room temperature for 24 hours. A number of short lengths of filament, containing sulfanilamide, made as described above, were then dipped into the aged culture, allowed to stand 30 minutes in air and placed in a sterile broth solution. These were permitted to stand at ordinary room temperature for another 48 hours. For purposes of comparison, another set of polystyrene filaments, without added sulfanilamide, was first dipped in the 24 hour culture containing bacteria and fungi, allowed to stand 30 minutes in air and, then was placed in a different container of sterile broth and these filaments were also permitted to stand for 48 hours at ordinary room temperature.

At the end of 48 hours both sets of filaments were compared. The control filaments and culture media were completely saturated with colonies of bacteria including surface colonies. The filaments and culture media containing the sulfanilamide had no surface colonies of bacteria, and the culture media likewise was free of bacteria and fungi.

It will be recognized that the above test is much more severe than would be imposed by actual conditions of use in the home or even in a barber shop or beauty parlor.

Filaments have been extruded using other proportions of polystyrene and sulfanilamide and the preferred range

has been found to be 98% polystyrene-2% sulfanilamide to 95% polystyrene-5% sulfanilamide. Using less than about 2% sulfanilamide, the sterilizing effect was undesirably weak and using too high a percentage of sulfanilamide resulted in incomplete mixing of the two ingredients, and weakened the filaments to an undesirable degree.

The temperature used to extrude the filaments depends upon the particular grade of polystyrene selected. It may range from about 325° F. to about 500° F.

Plastics other than polystyrene may also be used. Examples of other suitable plastics are the fiber forming polyamides (nylons) and the linear fiber-forming polyesters.

Bactericidal agents other than sulfanilamide may also be used. Examples of other suitable agents are sulfathiazole and sulfadiazine.

The diameter of the extruded filaments is not particularly critical. In making brushes, for example, any bristle diameter from extremely fine to coarse may be used, such as from .008" to .017" diameter.

From among the many types of bactericidal agents that may be used and the wide variety of plastics with which these may be mixed, it is mainly essential that the combination be such that the two different ingredients remain as separate and distinct phases yet partially dissolved and homogenous in the extruded product so that the bactericidal agent can continue to exude to the surface over an extended period of time. The bactericide must also be somewhat soluble in water as moisture is essential in the exudation and bactericidal activity.

It is also necessary that the bactericidal agent be completely stable at the temperature at which the filament is extruded.

Although the invention has been described with particular reference to the manufacture of a plastic filament for use as the bristle of a brush, it should be understood that the plastic filament of the invention may be used as a thread to form the plastic mesh of the hair curler or for

other uses where it is desired to maintain a filament or a thread sterile.

What is claimed is:

1. A hair curler comprising a wire spring, a plastic mesh body supported by and surrounding said spring, and a brush disposed within said spring and having bristles the ends of which extend through said mesh, said brush being made of self-sterilizing bristles comprising a filamentary synthetic resinous material having incorporated therein a small percentage of a powdered bactericidal agent which is partially incompatible with said synthetic resinous material.

2. A hair curler comprising a plastic mesh body, a brush disposed within said mesh body and having bristles the ends of which extend through said mesh body, said brush being made of self-sterilizing bristles comprising a filamentary synthetic resinous material having incorporated therein a small percentage of a powdered bactericidal agent which is partially incompatible with said synthetic resinous material.

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