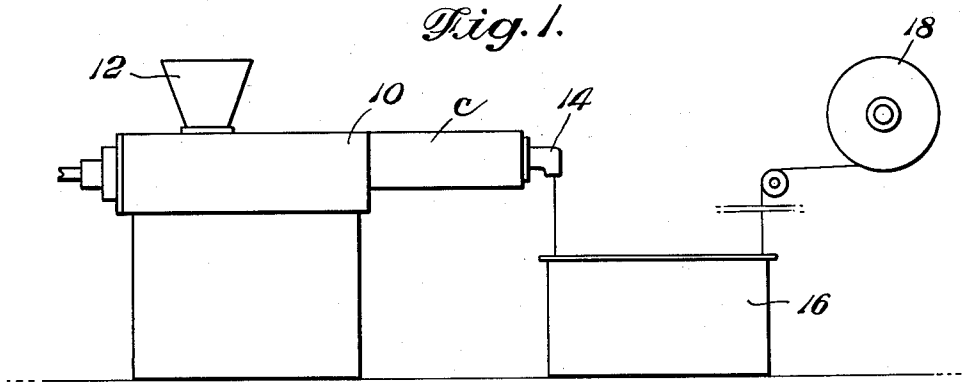
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Fig. 1.



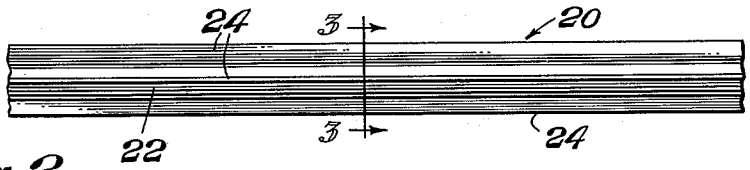


Fig. 2.

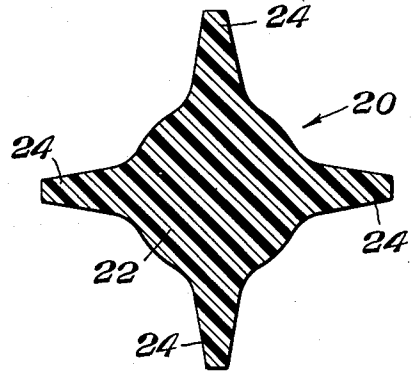


Fig. 3.

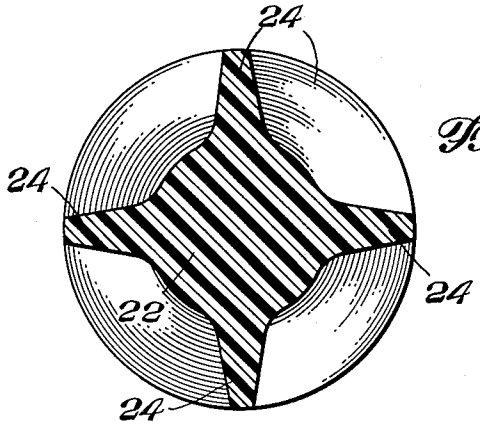


Fig. 5.

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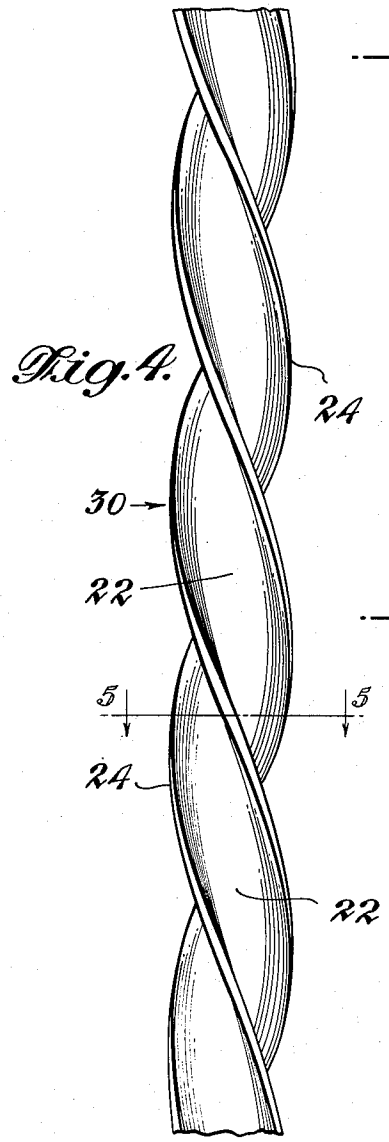


Fig. 4.

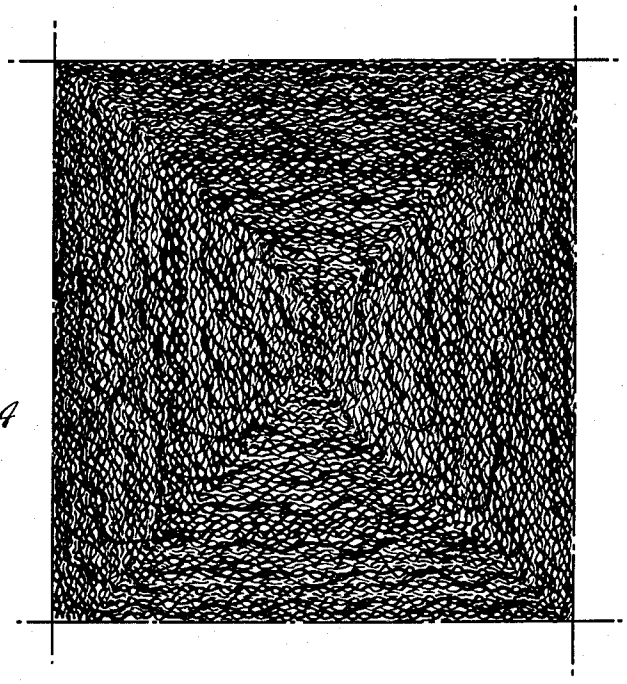


Fig. 6.

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SCOURING PAD AND FILAMENT

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Application November 5, 1952, Serial No. 318,884

4 Claims. (Cl. 28—78)

The present invention relates to artificial filaments and pads and textiles made therefrom, and more particularly relates to hot melt extruded synthetic monofilaments of polyedged form, and pads and textiles made therefrom.

Prior to the instant invention, the manufacture of artificial monofilaments has been carried out primarily by the solvent spinning process. The solvent spinning process produces a monofilament by spinning a suitable material in solution through an orifice and into a precipitating or coagulating bath. Monofilaments produced by the solvent-precipitating spinning process have been found satisfactory for certain uses, such as artificial silk and fabrics, various types of bristles and some forms of artificial hair. However, these heretofore known artificial filaments are sometimes found undesirable as when the use of sharp edges are critical, such as, for example, in a scouring pad. It is known that the hot melt extrusion process has been employed for the extrusion of various other types of articles, but heretofore this process has never been utilized in the production of a monofilament having a polyedged cross-section of the character and in the manner hereinafter set forth.

It is an object of the present invention to provide an extruded artificial monofilament that is formed with a plurality of sharply defined edges.

A further object of the present invention is to provide an extruded artificial monofilament that is twisted to simulate a plurality of filaments.

A still further object of the present invention is to provide a scouring pad that is fabricated from the artificial filament embodied in the present invention.

A still further object of the present invention is to provide a fabric that is fabricated from the artificial filament embodied in the present invention.

Other objects and the nature and advantages of the instant invention will be apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a diagrammatic illustration of the apparatus utilized in the process employed in the manufacture of the polyedged monofilament embodied in the present invention;

Fig. 2 is an elevational magnified view of a polyedged monofilament embodied in the present invention having an outer diameter of approximately .012 to .015 inch;

Fig. 3 is a section taken along the line 3—3 of Fig. 2;

Fig. 4 is an elevational magnified view of a twisted polyedged monofilament having an outer diameter of approximately .012 to .015 inch;

Fig. 5 is a section taken along the line 5—5 of Fig. 4; and

Fig. 6 is a view in elevation of a scouring pad in accordance with the invention.

The artificial monofilament embodied in the present invention is formed from a thermoplastic material, such as ethyl-cellulose, cellulose nitrate, cellulose acetate, cellulose acetate butyrate or the vinyl compounds. The preferred material employed in the process described

herein is a copolymer of vinyl-vinylidene chloride which is more commonly known in the field as saran. The physical properties of saran are particularly adaptable for use in the end products to which the present invention is applied, one of which is a scouring pad such as utilized for cleansing purposes. Saran is highly abrasion resistant, non-corrosive, inert, sanitary, non-toxic, tough, strong, and non-hygroscopic and can be extruded into any desired shape or form by the hot melt extrusion process.

Referring now to the drawings, and particularly Fig. 1, the apparatus employed in the process of producing the monofilament embodied in the present invention is illustrated therein and includes an extruder **10**, a hopper **12** and a die **14**. Pigmented, stabilized, and plasticized thermoplastic material, preferably a copolymer of vinyl-vinylidene chloride, is introduced into the hopper **12**. The extruder **10**, which includes a rotating screw, forces the material through a heated cylinder C and through the die **14**, from which is extruded a monofilament. The monofilament is cooled in a bath **16** and then may be oriented on apparatus (not shown) before it is wound on a package **18**.

Referring now to Figs. 2 and 3, one form of the monofilament embodied in the present invention is illustrated therein and is indicated generally at **20**. The monofilament **20** comprises a longitudinally extending body portion **22** which has integrally formed therewith a plurality of fins **24**. The fins **24** also extend longitudinally and, as shown in Fig. 3, extend outwardly from the body portion **22** to form fluted sections therewith. Four fins are illustrated in the drawings, but any number of fins may be formed with the body portion **22** in accordance with the end product to be fabricated.

By forming the polyedged monofilament **20** by the hot melt extrusion process employing the apparatus illustrated in Fig. 1, each of the fins **24** is sharply defined and thereby forms with adjacent fins and the body portion **22** a construction that can be utilized for a variety of purposes. If a scouring pad, such as used in dishwashing, is fabricated from the polyedged monofilament **20**, it is apparent that the sharp edges formed by the fins **24** are ideal in performing the difficult cleansing task ordinarily associated with a scouring pad. It is contemplated that the polyedged monofilament illustrated in Figs. 2 and 3 can be employed for a variety of other purposes, whenever it is feasible to employ a single strand filament. This would include some fabrics and coverings, such as, for example, the covering for the audio portion of a television receiver. The covering of loud speakers with fabrics is more or less conventional and in some cases this covering is used for decorative purposes and in other cases functions as a screen for protecting the apparatus which may be delicate. It is usually required that the fabric be maintained with little or no attention, that is to say, it must be easy to clean, decorative, strong, porous and have the appearance of strength and quality. Metal fabrics may not be desirable because they may affect the audio qualities or characteristics of the sound producing apparatus and they also may appear to be harsh in appearance. Textile fabrics may be desirable for their audio characteristics but when they are made of natural fibers, they are difficult to clean. Textile fabrics, unless made at relatively great expense, may appear to be flat with little texture and decoration. Synthetic filaments may also appear to be flat with little texture. Monofilaments would naturally be relatively flat. By the utilization, however, of a fluted or polyedged monofilament in accordance with the present invention, a highly decorative textured fabric can readily be fabricated which will include the required audio characteristics. A particularly highly textured fabric for this purpose can be made of the twisted polyedged monofilament such as is illustrated in

Fig. 4. It is significant that this highly textured fabric can be made simply of a monofilament and be of the simplest weave so that its production can be rapid and economical. The appearance of this simply woven but unique fabric will be that of a three-dimensional construction simulating many filaments. It is furthermore contemplated to construct the polyedged monofilament in a more rigid formation, whereby other articles, such as artificial bristles, can be manufactured.

Referring now to Figs. 4 and 5, the variation of the polyedged monofilament mentioned above is illustrated and comprises a twisted set monofilament indicated generally at **30**. The twisted monofilament **30** is formed with substantially the identical cross-section as the monofilament **20** illustrated in Figs. 2 and 3 but is twisted and set, giving the effect of a plurality of filaments and thereby adding body to the general construction of the monofilament. It is apparent that the twisted polyedged monofilament **30** is adaptable for use in the fabrication of a scouring pad, such as is illustrated, for example, in Figure 6, and also for use in a variety of other articles and fabrics.

The monofilaments described hereinabove have included those formed with fluted cross-sections; however, it is also contemplated to form a polyedged monofilament having a square cross-section or a cross-section having straight edges.

It is apparent that the monofilaments produced by the hot melt extrusion process described hereinabove have formed thereon the sharp edges that are necessary in the fabrication of an article such as a scouring pad. The hot melt extrusion process is particularly applicable for producing the sharply defined edges and can be adapted to produce a monofilament having any number of edges as required.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit of the invention and, therefore, the invention is not limited to what is shown in the drawings and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. A filament formed from a thermoplastic material comprising a body portion and at least three continuously and longitudinally extending fins integrally joined to said body portion, each of said fins including at least two sharp edges defining abrasive means.

2. A filament formed from a thermoplastic material comprising a body portion and at least three continuously and longitudinally extending fins integrally joined to said body portion, said fins including at least two sharp edges defining abrasive means, and said filament being twisted to simulate a plurality of filaments wound together.

3. A filament as set forth in claim 2, wherein said thermoplastic material is formed from a copolymer of vinyl and vinylidene chlorides.

4. A scouring pad comprising a mass of thermoplastic fibers, each of said fibers having a body portion and at least three longitudinally and continuously extending fins formed integral with said body portion, said fins being defined by edges formed with sharp corners suitable for abrasive purposes wherein each of said fibers is twisted to simulate a plurality of filaments wound together.

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