(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 636 068 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
21.04.1999 Bulletin 1999/16

(21) Application number: **93905052.2**

(22) Date of filing: **12.02.1993**

(51) Int. Cl.[6]: **B43K 23/00**, B26B 21/52, A46B 5/02, C08J 9/00

(86) International application number:
PCT/US93/01316

(87) International publication number:
WO 93/15917 (19.08.1993 Gazette 1993/20)

(54) **FOAM GRIP**

SCHAUMSTOFFGRIFF

SURFACE DE PREHENSION EN MOUSSE

(84) Designated Contracting States:
DE ES FR GB IT

(30) Priority: **14.02.1992 US 836121**

(43) Date of publication of application:
01.02.1995 Bulletin 1995/05

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(56) References cited:

EP-A- 0 353 919	**WO-A-88/04995**
DE-A- 1 511 325	**DE-A- 2 162 132**
JP-A-54 031 316	**US-A- 4 008 350**
US-A- 4 098 506	**US-A- 4 158 087**
US-A- 4 283 808	**US-A- 4 476 276**
US-A- 4 725 627	**US-A- 4 932 800**

- **DATABASE WPI Section Ch, Week 8134, Derwent Publications Ltd., London, GB; Class A14, AN 81-61071D & JP-A-56 081 345 (OTSUKA KAGAKU YAKUHIN) 3 July 1981**
- **'CONCISE OXFORD DICTIONARY, PAGES 486, 487', FOWLER OXFORD PRESS, OXFORD**
- **'CHAMBERS SCIENCE AND TECHNOLOGY DICTIONARY, PAGES 954, 955', WALKER CHAMBERS CAMBRIDGE, CAMBRIDGE**

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Description

Background of the Invention

[0001] This invention relates to foam grips.

[0002] It is known in the art to provide articles which are to be gripped with the fingers with resilient or cushioned grips in order to improve the comfort of the user of the article. In particular, finger manipulated articles, such as writing instruments, have been provided with devices designed to provide a comfortable gripping area, as disclosed in, e.g., U.S. Patent No. 4,932,800. Conventional finger gripping devices typically provide a sleeve of resilient compressible material, extending about or covering a portion of the gripping area. This compressible material is intended to deform on application of gripping pressure, and at least partially conform to the shape of the fingers during manipulation of the article. After removal of gripping pressure, the compressible material returns to its original shape.

[0003] For additional information, see the following references: U.S Patent US-A-4 474 276 which discloses a sealing composition for preventing or inhibiting leaks; German Patent DE-A-1 511 325 which discloses the use of a sleeve on a writing instrument; U.S. Patent US-A-4 158 087 which discloses polyurethane foam compositions; U.S. Patent US-A-4 725 627 which discloses a hand-squeezable toy with dimensional memory; Japanese Patent J-A-56 081 345 which discloses a plastic foam with uniform and fine open cells; U.S. Patent US-A-4 098 506 a removable hand grip for use on a tennis racket and the like; U.S. Patent US-A-4 932 800 which discloses a compressible finger-gripping device for finger-manipulated articles; and British Patent GB-A-1 093 173 which discloses flexible polyurethane foams.

Summary of the Invention

[0004] In one aspect, the invention features a finger manipulated article having a handle with a gripping surface including a foam having a recovery rate of less than 10 cm per minute, preferably less than 5 cm per minute, more preferably less than 3 cm per minute.

[0005] In another aspect, the invention features a finger manipulated article having a handle with a gripping surface including a foam having a spring rate of between 250 and 20,000 grams per cm, preferably between 500 and 16,000 grams per cm.

[0006] In another aspect, the invention features a finger manipulated article having a handle with a gripping surface including a foam having a percent peak force of less than 95%, preferably of less than 85%.

[0007] In another aspect, the invention features a finger manipulated article having a handle with a gripping surface including a polyurethane foam that was made from a mixture including a latex or a filler, or both. The mixture also includes a polyurethane foam precursor, which can be, e.g., a foamable polyurethane prepolymer or the combination of a polyisocyanate and polyol that when mixed together react to provide a polyurethane foam.

[0008] In another aspect, the invention features a method of manufacturing a finger manipulated article having a foam gripping surface. The method includes mixing the chemical precursor (e.g., polyol and isocyanate, or polyurethane prepolymer) used to form the foam, and a latex or a filler, or both, to induce foaming; molding the foam to a desired shape; and applying the foam to the gripping surface of the article. The mixing, molding, and applying steps (or any two of the three steps) may occur simultaneously, for example, by conventional insert molding.

[0009] The foam preferably extends circumferential around the gripping surface of the article. Alternatively, the foam can be disposed on a portion of the surface in the form of a discontinuous surface (e.g., strips, dots), or can be disposed within, e.g., a hollow razor handle that has openings in its surface through which the foam extends. In the latter alternative, the fingers of the user will contact the foam extending through the holes. The foam alternatively can be the major component of the handle of the finger-manipulated device.

[0010] "Finger-manipulated article", as used herein, means an article having a handle that can be easily maneuvered by the fingers of a user's hand. Typically, the handle of such an article will have a maximum diameter of less than 3.5 cm. Examples of finger manipulated articles include writing instruments like pens and pencils; razors; and toothbrushes.

[0011] "Foam", as used herein, is a cellular polymer consisting of two phases, a fluid (liquid or gas) and a solid. The fluid phase in a cellular polymer is distributed in voids or pockets called cells. These cells can be interconnected to form an open-cell foam, or the cells can be discrete and independent of other cells to form a closed cell foam.

[0012] The foams of the invention have sufficient rigidity that they can be used in a thin layer on a handle without the underlying handle causing discomfort for the user. Further, the foam has slow recovery, such that it is easily deformed by the user, does not exert significant force against the user's fingers, and returns slowly to its original shape when compressive force is removed. These properties provide comfort to the user of the article, and reduces user fatigue, particularly on writing instruments.

[0013] Another aspect of the invention is the preferred foams themselves, which can be used in other applications (e.g., on hand grips for tennis rackets).

[0014] Other features and advantages of the invention will be apparent from the description of the preferred embodiment thereof, and from the claims.

Description of the Preferred Embodiments

[0015] The figure is a perspective view of a pen having a preferred gripping surface.

[0016] Referring to the figure, the writing end of pen 10 has a cylindrical body 12 that includes a foam gripping surface 14 extending around the circumference of the instrument in the finger gripping area. The foam layer is less than 1.5 cm thick (more preferably 0.05-0.5 cm thick).

[0017] The preferred foam is a polyurethane. Some of the significant properties of the foam are spring rate, recovery rate, and percent peak force. These properties are measured as described subsequently, in the Examples. The preferred foam may be any cured polyurethane prepolymer having a spring rate of from 250 to 20,000 grams/cm, a recovery rate of less than 5 cm per minute, and a percent peak force of less than 95%.

[0018] Suitable polyurethane foams include those prepared from compositions having two components: a foamable, curable polyurethane prepolymer, and an aqueous phase containing a latex and a surfactant. One of the two phases (or both) also includes a filler. Either phase can also include a conventional catalyst (or other reaction rate modifier) to either speed up or slow down the reaction.

[0019] The preferred foamable polyurethane prepolymers are polyisocyanate capped polyoxyethylene polyols, for example the TREPOL® prepolymers described in U.S. Pat. No. 4,828,542, which is owned by Twin Rivers Engineering of Boothbay, Maine and is hereby incorporated by reference. Other preferred polymers are sold by W.R. Grace & Co. and include HYPOL® FHP 2000 and Hydrogel®, which are derived from toluene diisocyanate, and the FHP 4000 series, which are derived from methylene diisocyanate.

[0020] Preferred latexes include styrene-butadienes, polystyrenes, nitriles, acrylics, polyvinyl acetates, and polyvinyl chlorides. Acrylic latexes generally are produced as copolymer of methyl or ethyl methacrylate and an other monomer like styrene and vinyl acetate. The preferred latexes are stable aqueous dispersion of a polymeric substance having a particle size in the range of about 500 Å to 50,000 Å (0.05 μm to 5 μm). Particularly preferred latexes are those having low resilience properties, e.g. UCAR 154, UCAR 123, and UCAR 163 (all commercially available from Union Carbide) and Hycar Acrylic 2671 and Nitrile 1562, available from BF Goodrich. The latex provides the composition with reduced resiliency. Preferably, the starting mixture used to produce the foam should include between 15% and 80% of the latex by weight, where the latex includes 30% to 60% solids by weight.

[0021] Any inert filler may be used. Preferred fillers include barium sulfate, calcium carbonate, diatomaceous earth, carbon black, silica, clay, TiO_2, fibers, and other inorganic compounds. The filler helps provide the foam with good mechanical properties, including rigidity, density, and other viscoelastic properties. Preferably, the final foam includes up to 30% of filler by weight. Too little filler in the composition may provide a foam that is not rigid enough, resulting in discomfort to the user because the fingers may feel the body of the pen through the grip. Too much filler results in a foam that may be too viscous to process. Sufficient filler is added to the composition to provide a composition density of from 0.32 to 1.5 g/cm^3.

[0022] The amounts of the polyurethane prepolymer (and thus the polyurethane resin in the cured foam), latex and filler can be varied in order to provide a desired balance of properties. The properties of the composition will also be affected by the specific polyurethane prepolymer, latex, and filler selected. The percentage of open cells and the degree of openness of cells in a flexible foam are related to resiliency.

[0023] The surfactant can be e.g., Pluronic-62, Brij 72, and DC 190. Other suitable surfactants are described in U.S. Pat. No. 4,158,087, which is hereby incorporated by reference. The surfactants help to control the cell size and surface properties of the foam. They also make the latex more compatible with the resin during mixing.

[0024] The composition may also comprise other conventional additives, e.g., colorants, catalysts, and foaming agents.

Examples

[0025]

1. A series of foam grips were prepared from an aqueous phase that included 16 parts (by weight) of diatomaceous earth filler, 34 parts water, and 50 parts Geon HYCAR 2671 latex available from B.F. Goodrich, and a prepolymer phase that included the TREPOL prepolymer described in U.S. Patent No. 4,828,542. The two phases were mixed at a weight ratio of 2:1 until the mix was uniform, causing the composition to foam as carbon dioxide gas is generated. The reacting foam mixtures were molded in a single cavity mold, to form a foam grip having approximately a 0.9 cm outer diameter, a thickness of 0.22 cm, and a length of 4.2 cm. The mechanical properties spring-rate, percent peak force, and recovery rate for the grips, were measured (as described below); the results are presented in

the Table.

2. A foam grip having approximately a 1.0 cm diameter, a thickness of 0.22 cm, and a length of 4.2 cm was prepared by injecting a reacting foam mixture into a single-cavity mold into which a pen barrel assembly was inserted. The foam mixture was obtained by mixing an aqueous phase (35 parts by weight of UCAR 154 acrylic latex emulsion available from Union Carbide, and 5 parts of 3% water emulsion of Brij 72 surfactant available from ICI America) and a prepolymer phase comprised of 25 parts Hydrogel polyurethane prepolymer obtained from W.R. Grace Company, 10 parts $CaCO_3$ filler, and 0.05 parts carbon black pigment. The mechanical properties of the resulting slow recovery foam grip on a finished pen barrel are presented in the Table.

3. Foam grips (having the same dimensions as those prepared in example 2) were insert-molded on pen barrel assemblies by injecting a reacting polyurethane foam mixture into a single cavity mold as in Example 2. The mixtures were identical to Example 2, with the exception of the prepolymer phase which was comprised of 25 part HYPOL FHP 2000 polyurethane prepolymer (W.R. Grace Company) instead of the Hydrogel resin. The mechanical properties for the resulting foam grips are presented in the Table.

Table 1

Mechanical Properties for Molded Grip Components			
Example #	Spring Rate g/cm	Percent Peak Force	Recovery Rate cm/min
1	1,480	74	0.21
2	1,301	79	0.53
3	427	79	0.35

Test Procedures:

Spring Rate

[0026] The spring rate of the grip is measured on a standard Instron (e.g., Model 1122) compression tester. When the foam portion of the gripping surface is disposed on the outside of a rigid body (e.g., as shown in the figure), the procedure involves fixedly positioning the grip in alignment with a probe which consists of a cylindrical aluminum rod having a radius of 0.8 cm; the end of the rod has a curvature with a tip radius of 0.6 cm and a chamber radius of 0.2 cm. The probe is arranged for reciprocal movement through a vertical distance after the bottom surface of the probe contacts the grip. The probe is moved downward at 0.13 cm/min to a distance corresponding to approximately 70% of the thickness of the grip before returning to its original position. During this process, the force of compression versus distance of compression is recorded on an X-Y graph. The spring rate value corresponds to the slope of the force/compression distance curve at a compression distance of 0.025 cm.

[0027] When the foam portion of the gripping surface is not disposed on the outside of a rigid body, the beginning of the test procedure is modified slightly. A 0.2 cm thick piece of the foam is cut from the foam portion, and attached to the outside of a rigid body having an outer circumference of approximately the same size of any common pen. The remainder of the procedure remains the same.

Percent Peak Force

[0028] Peak force is the maximum force of compression resulting from the spring rate measurement. The instron probe is held at the point of maximum grip compression (for the spring rate measurement) for sixty seconds. The force at this time, divided by the peak force, expressed as a percentage, is the percent peak force.

Recovery Rate

[0029] The recovery rate is measured concurrently with the spring rate measurement. The probe is held at the point of maximum grip compression for sixty seconds, and is then lifted instantly to a position which is below the original probe-grip contact position by approximately 20% of the thickness of the foam. The time for the grip to recover to reach the probe is recorded by the Instron. The recovery rate is defined as the time for the grip to recover to reach the probe divided by the grip recovery distance.

[0030] Other embodiments are within the claims. For example a foam gripping surface may also be utilized on other finger manipulated articles, besides pens and pencils, such as razors (typically having an elongate handle with a cutting

edge at one end), toothbrushes (typically having an elongate handle with an array of bristles disposed at one end), and other similar personal care items. The surfactant, like the filler, can be included in either the prepolymer or aqueous phase. Although in the preferred embodiment the polyurethane foam precursor is a foamable polyurethane prepolymer, alternatively the foam may be produced from the reaction of a polyol (polyester-type or polyether-type) with an isocyanate (such as TDI (toluene diisocyanate), MDI (methylene bis (4-phenyl isocyanate), or H-MDI (dicyclohexylmethane-4,4'-diisocyanate)). Foams produced from isocyanates and polyols generally require a catalyst, surfactant and a blowing agent.

Claims

1. A finger manipulated article (10) having a handle that can be easily maneuvered by the fingers, said handle having a body (12) and a gripping surface comprising a foam layer on an outer surface of the body (12), said foam characterized by having a density from 0.32 to 1.5 g/cm^3 and being deformable by the fingers of the user of the article.

2. The article of claim 1, which is a pen, a razor, or a toothbrush.

3. The article of claim 1 or 2, wherein said foam has one or more of the following features:

   (a) has a recovery rate of less than 5 and less than 3 cm per minute;
   (b) comprises a polyurethane resin;
   (c) is produced from a mixture comprising a foamable polyurethane resin and a latex and the latex is selected from the group consisting of styrene-butadienes, polystyrenes, nitriles, acrylics, polyvinyl acetates, and polyvinyl chlorides;
   (d) further comprising a filler and said filler is selected from the group consisting of diatomaceous earth, carbon black, silica, fibers, and inorganic compounds;
   (e) has an average thickness of less than 1.5 cm;
   (f) has a spring rate of between 250 and 20,000 grams/cm; and
   (g) has a percent peak force of less than 95%.

4. The finger manipulated article of claim 1 or 2, wherein said foam has a percent peak force of less than 95%.

5. The article of claim 4, wherein said article is a pen, and said foam has one or more of the following features:

   (a) has a recovery rate of less than 5 cm per minute;
   (b) is made from a mixture comprising a foamable polyurethane resin and a latex;
   (c) further comprises a filler; and
   (d) has a spring rate of between 250 and 20,000 grams per cm.

6. The finger manipulated article of claim 1 or 2, wherein said foam has a spring rate of between 250 and 20,000 grams per cm.

7. The article of claim 6, wherein said article is a writing instrument and said foam has one or more of the following features:

   (a) a recovery rate of less than 10 cm per minute;l
   (b) a percent peak force of less than 95%;
   (c) is produced from a foamable polyurethane resin;
   (d) is produced from a mixture including a foamable polyurethane resin and a latex; or
   (e) further comprises a filler.

8. The finger manipulated article of claim 1 or 2, wherein said foam is produced from a mixture comprising a polyurethane resin and a latex.

9. The article of claim 8, having one or more of the following features:

   (a) said latex is selected from the group consisting of styrene-butadienes, polystyrenes, nitriles, acrylics, polyvinyl acetates, and polyvinyl chlorides;
   (b) said foam further comprises a filler;

(c) said article is a pen; and

(d) said foam has a thickness of less than 1.5 cm.

10. The finger manipulated article or claim 1 or 2, wherein said foam includes a filler.

11. The article of claim 10, wherein said filler consists of diatomaceous earth, carbon black, silica, fibers, and/or inorganic compounds.

12. A method for manufacturing a finger-manipulated article according to claim 1 comprising:

(a) mixing a polyurethane foam precursor, a latex, or a filler, of both, to cause foaming to occur, whereby the occured foam has a density from 0.32 to 1.5 g/cm^3;
(b) molding the foam to a desired shape; and
(c) applying the molded foam to the body of said article.

13. The method of claim 12, wherein:

(a) a latex is mixed with said polyurethane foam precursor;
(b) said latex is selected from the group consisting of styrene-butadienes, polystyrenes, nitrites, acrylics, polyvinyl acetates, and polyvinyl chlorides;
(c) a filler is mixed with said polyurethane foam precursor;
(d) said filler is selected from the group consisting of diatomaceous earth, carbon black, silica, fibers, and inorganic compounds;
(e) said precursor comprises a polyol and an isocyanate;
(g) said article is a writing instrument;
(h) all three steps are performed simultaneously; or
(i) said steps are performed by insert molding.

14. A method of producing the foam of claim 1 comprising mixing a latex, a filler, and a polyurethane foam precursor, said mixing causing foaming to provide said foam.

Patentansprüche

1. Fingermanipulierter Artikel (10) mit einem Griff, der sich mit den Fingern leicht manövrieren läßt, welcher Griff ein Hauptstück (12) aufweist und eine Greifoberfläche, umfassend eine Schaumstoffschicht auf einer äußeren Oberfläche des Hauptstückes (12), welcher Schaumstoff dadurch gekennzeichnet ist, daß er eine Dichte von 0,32 ... 1,5 g/cm^3 hat und mit den Fingern des Benutzers des Artikels deformierbar ist.

2. Artikel nach Anspruch 1, der ein Schreibinstrument, ein Rasierapparat oder eine Zahnbürste ist.

3. Artikel nach Anspruch 1 oder 2, bei welchem der Schaumstoff ein oder mehrere der folgenden Merkmale hat:

(a) eine Rückstellgeschwindigkeit von weniger als 5 cm pro Minute und bevorzugt weniger als 3 cm pro Minute;
(b) er umfaßt ein Polyurethanharz;
(c) er wird aus einer Mischung erzeugt, umfassend ein verschäumbares Polyurethanharz und einen Latex, wobei der Latex ausgewählt wird aus der Gruppe, bestehend aus Styrol/Butadienen, Polystyrolen, Nitrilen, Acrylharzen, Polyvinylacetaten und Polyvinylchloriden;
(d) ferner aufweisend einen Füllstoff, welcher Füllstoff ausgewählt wird aus der Gruppe, bestehend aus Kieselgur, Ruß, Siliciumdioxid, Fasern und anorganischen Verbindungen;
(e) eine mittlere Dicke von weniger als 1,5 cm;
(f) eine Federkonstante zwischen 250 und 20.000 gf/cm; sowie
(g) eine relative Kompressionskraft von weniger als 95 %.

4. Artikel nach Anspruch 1 oder 2, bei welchem der Schaumstoff eine relative Kompressionskraft von weniger als 95 %.

5. Artikel nach Anspruch 4, welcher Artikel ein Schreibinstrument ist und bei welchem der Schaumstoff ein oder mehrere der folgenden Merkmale hat:

(a) eine Rückstellgeschwindigkeit von weniger als 5 cm pro Minute;
(b) er wird aus einer Mischung erzeugt, umfassend ein verschäumbares Polyurethanharz und einen Latex;
(c) ferner aufweisend einen Füllstoff sowie
(d) eine Federkonstante zwischen 250 und 20.000 g/cm.

6. Fingermanipulierter Artikel nach Anspruch 1 oder 2, bei welchem der Schaumstoff eine Federkonstante zwischen 250 und 20.000 gf/cm hat.

7. Artikel nach Anspruch 6, wobei der Artikel ein Schreibinstrument ist und der Schaumstoff ein oder mehrere der folgenden Merkmale hat:

(a) eine Rückstellgeschwindigkeit von weniger als 10 cm pro Minute;
(b) eine relative Kompressionskraft von weniger als 95 %,
(c) er wird aus einem verschäumbarem Polyurethanharz erzeugt,
(d) er wird aus einer Mischung erzeugt, umfassend ein verschäumbares Polyurethanharz und einen Latex, oder
(e) ferner umfassend einen Füllstoff.

8. Fingermanipulierter Artikel nach Anspruch 1 oder 2, bei welchem der Schaumstoff erzeugt wird aus einer Mischung, umfassend ein Polyurethanharz und einen Latex.

9. Artikel nach Anspruch 8 mit einem oder mehreren der folgenden Merkmale:

(a) der Latex wird ausgewählt aus der Gruppe, bestehend aus Styrol/Butadienen, Polystyrolen, Nitrilen, Acrylharzen, Polyvinylacetaten und Polyvinylchloriden;
(b) der Schaumstoff umfaßt ferner einen Füllstoff;
(c) der Artikel ist ein Schreibinstrument; sowie
(d) der Schaumstoff hat eine Dicke von Weniger als 1,5 cm.

10. Fingermanipulierter Artikel nach Anspruch 1 oder 2, bei welchem der Schaumstoff einen Füllstoff einschließt.

11. Artikel nach Anspruch 10, bei welchem der Füllstoff aus Kieselgur, Ruß, Siliciumdioxid, Fasern und/oder anorganischen Verbindungen besteht.

12. Verfahren zum Herstellen eines fingermanipulierten Artikels nach Anspruch 1, umfassend:

(a) Mischen eines Polyurethan-Schaumstoffprekursors, eines Latex oder eines Füllstoffes oder beider, um eine Schaumbildung herbeizuführen, wobei der entstandene Schaumstoff eine Dichte von 0,32 ... 1,5 g/cm^3 hat;
(b) Formgeben des Schaumstoffes zu einer angestrebten Gestalt;
(c) Aufbringen des geformten Schaumstoffes auf das Hauptstück des Artikels.

13. Verfahren nach Anspruch 12, bei welchem Verfahren:

(a) ein Latex gemischt wird mit dem Polyurethan-Schaumstoffprekursor;
(b) der Latex ausgewählt wird aus der Gruppe, bestehend aus Styrol/Butadienen, Polystyrolen, Nitrilen, Acrylharzen, Polyvinylaceteaten und Polyvinylchloriden;
(c) der Füllstoff mit dem Polyurethan-Schaumstoffprekursor gemischt wird;
(d) der Füllstoff ausgewählt wird aus der Gruppe, bestehend aus Kieselgur, Ruß, Siliciumdioxid, Fasern und/oder anorganischen Verbindungen;
(e) der Prekursor ein Polyol und ein Isocyanat umfaßt;
(g) der Artikel ein Instrument zum Schreiben ist;
(h) alle drei Schritte gleichzeitig ausgeführt werden, oder
(i) diese Schritte mit Hilfe der Insert-Technik ausgeführt werden

14. Verfahren zum Herstellen des Schaumstoffes nach Anspruch 1, umfassend das Mischen eines Latex, eines Füllstoffes und eines Polyurethan-Schaumstoffprekursors, wobei das Mischen die Schaumbildung zur Schaffung des Schaumstoffes bewirkt.

Revendications

1. Article (10) manipulé par les doigts ayant une poignée qui peut être facilement manoeuvrée par les doigts, la poignée ayant un corps (12) et une surface de saisie qui possède une couche de mousse sur une surface externe du corps (12), la mousse étant caractérisée par une masse volumique comprise entre 0,32 et 1,5 g/cm^3 et étant déformable sous l'action des doigts de l'utilisateur de l'article.

2. Article selon la revendication 1, qui est un crayon, un rasoir ou une brosse à dents.

3. Article selon la revendication 1 ou 2, dans lequel la mousse a une ou plusieurs des propriétés suivantes :

   (a) elle a une vitesse de récupération inférieure à 5 cm/min et de préférence à 3 cm/min,
   (b) elle comprend une résine de polyuréthane,
   (c) elle est produite à partir d'un mélange comprenant une résine de polyuréthane pouvant former une mousse et un latex, et le latex est choisi dans le groupe formé par un butadiène-styrène, un polystyrène, un nitrile, une résine acrylique, un acétate de polyvinyle et un chlorure de polyvinyle,
   (d) elle comporte en outre une charge, la charge étant choisie dans le groupe qui comprend la terre à diatomées, le noir de carbone, la silice, des fibres et des composés minéraux,
   (e) elle a une épaisseur moyenne inférieure à 1,5 cm,
   (f) elle a une raideur comprise entre 250 et 20 000 g/cm, et
   (g) elle a une force de crête en pourcentage inférieure à 95 %.

4. Article manipulé par les doigts selon la revendication 1 ou 2, dans lequel la mousse a une force de crête en pourcentage inférieure à 95 %.

5. Article selon la revendication 4, dans lequel l'article est un crayon, et la mousse a une ou plusieurs des propriétés suivantes :

   (a) elle a une vitesse de récupération inférieure à 5 cm/min,
   (b) elle est formée d'un mélange contenant une résine de polyuréthane capable de former une mousse et un latex,
   (c) elle comporte en outre une charge, et
   (d) elle a une raideur comprise entre 250 et 20 000 g/cm.

6. Article manipulé par les doigts selon la revendication 1 ou 2, dans lequel la mousse a une raideur comprise entre 250 et 20 000 g/cm.

7. Article selon la revendication 6, dans lequel l'article est un instrument d'écriture et la mousse a une ou plusieurs des propriétés suivantes :

   (a) une vitesse de récupération inférieure à 10 cm/min,
   (b) une force de crête en pourcentage inférieure à 95 %,
   (c) elle est produite à partir d'une résine de polyuréthane capable de former une mousse,
   (d) elle est produite à partir d'un mélange comprenant un latex et une résine de polyuréthane qui peut former une mousse, ou
   (e) elle comporte en outre une charge.

8. Article manipulé par les doigts selon la revendication 1 ou 2, dans lequel la mousse est produite à partir d'un mélange contenant une résine de polyuréthane et un latex.

9. Article selon la revendication 8, ayant une ou plusieurs des propriétés suivantes :

   (a) le latex est choisi dans le groupe formé par un butadiène-styrène, un polystyrène, un nitrile, une résine acrylique, un acétate de polyvinyle et un chlorure de polyvinyle,
   (b) la mousse contient en outre une charge,
   (c) l'article est un crayon, et
   (d) la mousse a une épaisseur inférieure à 1,5 cm.

10. Article manipulé par les doigts selon la revendication 1 ou 2, dans lequel la mousse contient une charge.

11. Article selon la revendication 10, dans lequel la charge est formée de terre à diatomées, de noir de carbone, de silice, de fibres et/ou de composés minéraux.

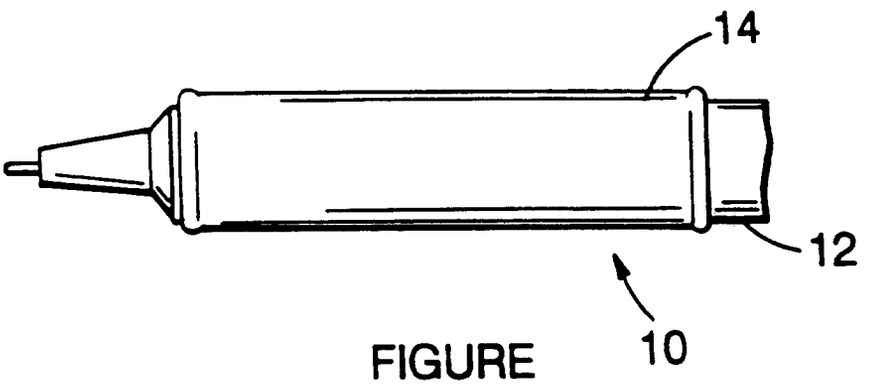
12. Procédé de fabrication d'un article manipulé par les doigts, selon la revendication 1, comprenant :

(a) un mélange d'un précurseur de mousse de polyuréthane, d'un latex ou d'une charge ou des deux afin qu'une mousse se forme, la mousse formée ayant une masse volumique comprise entre 0,32 et 1,5 g/cm^3,
(b) le moulage de la mousse à la configuration voulue, et
(c) l'application de la mousse moulée sur le corps de l'article.

13. Procédé selon la revendication 12, dans lequel :

(a) un latex est mélangé au précurseur de mousse de polyuréthane,
(b) le latex est choisi dans le groupe qui comprend un butadiène-styrène, un polystyrène, un nitrile, une résine acrylique, un acétate de polyvinyle et un chlorure de polyvinyle,
(c) une charge est mélangée au précurseur de mousse de polyuréthane,
(d) la charge est choisie dans le groupe constitué par la terre à diatomées, le noir de carbone, la silice, les fibres et les composés minéraux,
(e) le précurseur comprend un polyol et un isocyanate,
(g) l'article est un instrument d'écriture,
(h) les trois étapes sont exécutées simultanément ou
(i) les étapes sont réalisées par moulage d'un insert.

14. Procédé de production de la mousse selon la revendication 1, comprenant le mélange d'un latex, d'une charge et d'un précurseur de mousse de polyuréthane, le mélange provoquant la formation de la mousse.



FIGURE