Dec. 31, 1946. L. H. ENGLUND 2,413,551

SPONGIFORM PLASTIC ABRASIVE PAD AND METHOD OF MAKING IT

Filed May 21, 1943

Fig. 1.

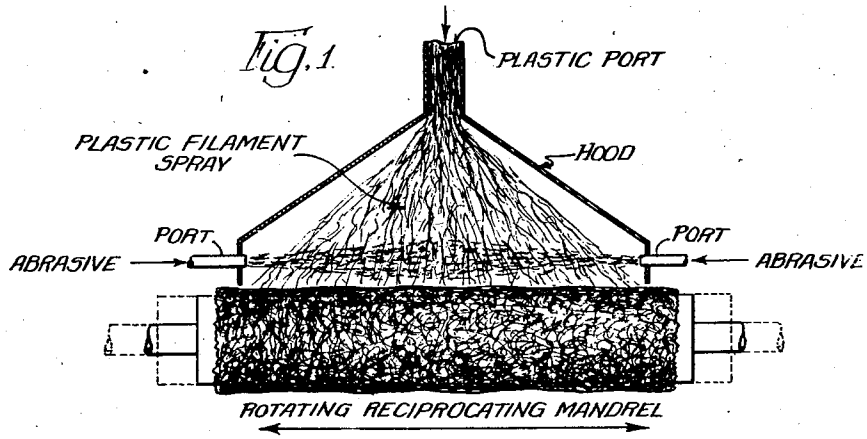


Fig. 2.

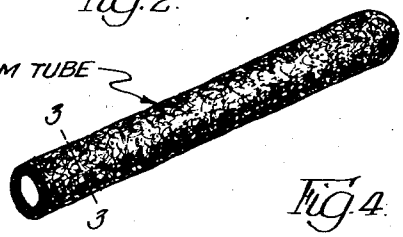


Fig. 3.

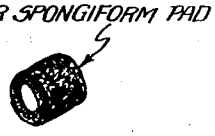


Fig. 4.

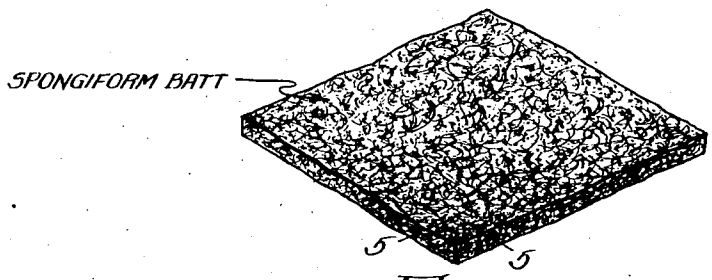
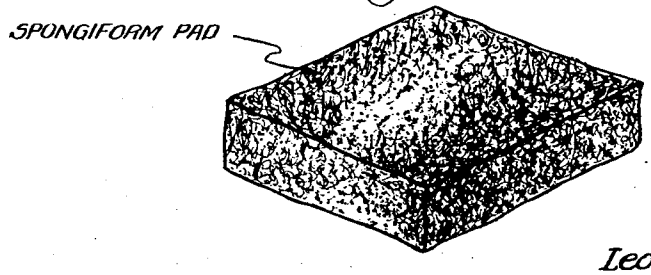


Fig. 5.



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UNITED STATES PATENT OFFICE

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SPONGIFORM PLASTIC ABRASIVE PAD AND METHOD OF MAKING IT

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Application May 21, 1943, Serial No. 487,848

10 Claims. (Cl. 51—185)

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This invention relates to improvements in the manufacture of plastic materials. More particularly, it pertains to plastic abrasive spongiform cleansing or scouring pads and a method for manufacturing the same.

A principal object of the invention is the provision of a plastic cleansing or scouring pad formed into a spongiform mass having a suitable abrasive substance embedded therein, and in which the threads or filaments constituting the mass are welded together to prevent disintegration of the pad during use.

More specifically, an object of the invention is the provision of a cleansing or scouring pad in which a plurality of substantially continuous filaments of a plasticized plastic material from a molten plastic mass is sprayed or cast upon an actuated member while simultaneously depositing and impregnating the various filaments with an abrasive coating prior to cooling or setting of the plastic to obtain a welded fibrous abrasive and spongiform mass.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the several steps and the relation of one or more of such steps with respect to each of the others, and the article possessing the features, properties, and the relation of elements, which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a side elevational view, partly in section, and diagrammatically illustrating one preferred form of apparatus for practicing the present invention;

Fig. 2 is a perspective view of a finished tubular fibrous mass of material slipped from a reciprocating mandrel such as shown in Fig. 1;

Fig. 3 is a tubular spongiform pad cut off along the line 3—3 in Fig. 2;

Fig. 4 is a perspective view illustrating a spongiform batt cast in this particular form, or taken from a spongiform tube which has longitudinally been slit; and

Fig. 5 is an enlarged section of an abrasive plastic spongiform pad cut from a spongiform batt as indicated along the lines 5—5 of Fig. 4.

Referring more particularly to Fig. 1 of the drawing it will be seen that molten plastic material of a suitable nature is introduced into an opening or port in the top of a hood which, as diagrammatically illustrated, is in the form of an inverted funnel. The plastic material can be sprayed, cast, or otherwise introduced in the form of a continuous filament spray. This can be done in any suitable manner, utilizing, for example, an air blast whereby there is imparted to the numerous filaments a wavering or quivering motion, the object of which will more fully appear hereinafter.

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As the filaments are precipitated downwardly they are gathered upon a reciprocating member. The particular gathering member shown in the drawing is a rotating mandrel but it is within the contemplation of the invention that such a member can be made in the form of a square or rectangular slab of a non-rotating but reciprocating type merely. As the mandrel rotates and simultaneously reciprocates along its longitudinal axis, the plurality of continuous filaments are gathered and built up on the mandrel. This step is continued until a desirable thickness of material has been obtained. In reciprocating the mandrel, an irregularly shaped and intricate pattern is obtained which emphasizes and supplements the wavering or quivering pattern spray of the filaments being deposited and thus a spongiform mass is created. At suitable points around the hood, but preferably at a level just above the point where the filaments are being deposited upon the mandrel, there is introduced by means of suitable pipes or ports an abrasive material such as pumice stone, fuller's earth, or any other suitable abrasive or powdered or finely comminuted material.

Since the filaments are still in a plastic state for a short time after they are deposited, the abrasive material will not only coat each individual thread but become impregnated therein. After a suitable thickness of the spongiform fibrous mass has been built up upon the reciprocating member, the various overlapping and adjacent threads at their points of contact will have begun to set or cool and become welded together. Thereafter the material can be slipped off the roll in the form of a tube, as indicated in Fig. 2, and suitable thicknesses thereof cut in the form of tubular spongiform pads as illustrated in Fig. 3.

Referring more particularly to Fig. 4, there is illustrated a spongiform batt which can be provided by slitting a tube, as illustrated in Fig. 2, or by casting filaments upon a reciprocating slab as already indicated. From such a spongiform batt a plurality of spongiform pads for ultimate

use can be cut in rectangularly shaped pads which are ideally suitable for household scouring and cleansing purposes because of their abrasive characteristics.

It should be understood that it is within the contemplation of the present invention to use any plasticized plastic material in fluid form. While preferably a molten plastic is intended, it may also be in solvent form. Either a thermoplastic resin or thermosetting resin may be used. Urea-formaldehyde resins, phenol-formaldehyde resins, melamine-formaldehyde resins, cellulose esters and also polyvinyl resins will make suitable pads.

Since it is desirable to have a spongiform mass which has resiliency, there is preferably introduced into the plastic any suitable type of plasticizer. Such a plasticizer should be of a staple and non-drying type. Suitable examples of such material are tri-cresyl-phosphate, dibutyl phthalate, dioctyl phthalate, diethylene glycol, monolaurate, or any other suitable form of plasticizer. It is but necessary that a plasticizer be chosen which is in accordance with the grade, purpose, temperature and application for which the pad is best suited.

With respect to the manner of casting or depositing the filaments, it should be understood that spraying, while being one preferred step, the invention is not necessarily limited thereto. Any other suitable means of casting, depositing, etc., may be utilized. However, in any event this step should be done under suitable conditions so that the plastic is in the form of filaments by the time it contacts a surface of the reciprocating member or rotating mandrel. Also, it is to be understood that any suitable means of securing the deposited mass can be employed. If, for example, the material is thermoplastic or thermosetting, a suitable cooling method can be arranged. If the resin is of the solvent type, evaporating of the residual solvent can be practiced.

A cleansing and scouring spongiform pad such as that hereindisclosed has many advantages. Being of a plastic nature, it is non-absorbent and consequently no odors result after a period of time following use. Particularly advantageous is the fact that the plastic threads individually are coated upon their surfaces and also impregnated with a suitable abrasive substance which is not eliminated by a short period of use but remains with the pad as it wears down so that at all times, for the life of the pad, suitable abrasive characteristics are imparted thereto for cleansing and scouring purposes. Also of particular advantage is the fact that the individual threads or filaments, where they come in contact with each other, are welded into the form of a spongiform mass so that they interlockingly adhere to each other in a manner whereby the entire mass is reinforced and disintegration of the pad becomes correspondingly difficult. In addition to this, there are other advantages, such as the fact that, unlike metallic wool pads, there is no rusting characteristic nor are splinters penetrated into the hands of the user. Furthermore, the resiliency and flexibility of the pad, because of the plasticizer, makes it highly desirable for penetrating sharp angles and crevices. Being plastic, the material can be made additionally attractive because of the fact that various colors may be used in the manufacture of such pads.

It will thus be seen that the objects hereinbefore set forth may readily and efficiently be attained, and since certain changes in carrying out the above process, and certain modifications in the article which embody the invention may be made without departing from its scope, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A method of providing an article of the character described which comprises, casting a plurality of molten plastic filaments onto a reciprocating member to provide a fibrous mass of interlocked threads to be formed into pads, and dispersing an abrasive substance throughout said mass to coat said filaments and to impregnate the same with said abrasive before said mass has set.

2. A method of manufacturing an article of the kind described which comprises, spraying a plurality of molten plastic filaments onto a rotatable reciprocating mandrel to provide a fibrous mass of welded together threads, dispersing an abrasive substance throughout said mass to coat said filaments and impregnate the same with said abrasive before said mass has become welded together, and thereafter forming the resulting tube of plastic material into a tubular abrasive spongiform cleansing and scouring pad.

3. A method of producing a spongiform cleansing and scouring pad, which comprises forming a plurality of continuous filaments of plastic material, evenly dispersing a comminuted abrasive substance throughout said filaments in the process of their formation, gathering said abrasively treated plastic filaments into a mass onto a receptacle, reciprocating said receptacle relative to said filaments to provide a crisscross pattern of filaments superimposed upon each other in layers, and allowing said mass to set until said filaments, where they are in contact with each other, are autogenously bonded together.

4. A method of producing a spongiform cleansing and scouring pad, which comprises spraying a plurality of substantially continuous filaments of a plasticized plastic from a molten plastic mass, gathering said filaments into an irregularly dispersed pattern onto a receptacle, reciprocating said receptacle relative to said filaments to provide said pattern, dispersing an abrasive substance throughout said filaments before they have cooled, and allowing said filaments to cool and become autogenously bonded together where they are in contact with each other.

5. An article of manufacture, which comprises a spongiform cleansing and scouring pad constituting a plurality of intertwined filaments of plastic material, said filaments having evenly dispersed therein a comminuted abrasive substance, and said abrasively treated plastic filaments being interlocked to each other to provide an interstitial mass having adjacent and overlying intertwined filaments autogenously bonded together.

6. An article of manufacture, which comprises a spongiform pad composed of a plurality of intertwined threads of plastic from a molten plastic mass, said threads being interlocked together into an irregularly dispersed pattern to form an interstitial mass having adjacent and overlying threads autogenously bonded together, and

said mass of threads being coated and impregnated with an abrasive substance.

7. An article of the kind described, which comprises a plurality of intertwined plastic filaments, said filaments being autogenously bonded together at their points of contact to provide a spongiform mass, and said filaments and said mass being impregnated with an abrasive substance.

8. An article of the kind described, which comprises a plurality of irregularly intertwined threads of plastic material each autogenously bonded together at a plurality of points where they are in contact with each other to provide an interstitial pad, said pad having dispersed through its interstices an abrasive substance.

9. A method of producing a spongiform cleansing and scouring pad, which comprises forming

a plurality of continuous filaments of plastic material, gathering said plastic filaments into a mass onto a receptacle, reciprocating said receptacle relative to said filaments to provide a crisscross pattern of filaments superimposed upon each other in layers, and allowing said mass to set until said filaments, where they are in contact with each other, are autogenously bonded together.

10. An article of manufacture, which comprises a spongiform cleansing and scouring pad constituting a plurality of intertwined filaments of plastic material, and said plastic filaments being interlocked to each other to provide an interstitial mass having adjacent and overlying intertwined filaments autogenously bonded together.

LEONARD H. ENGLUND.