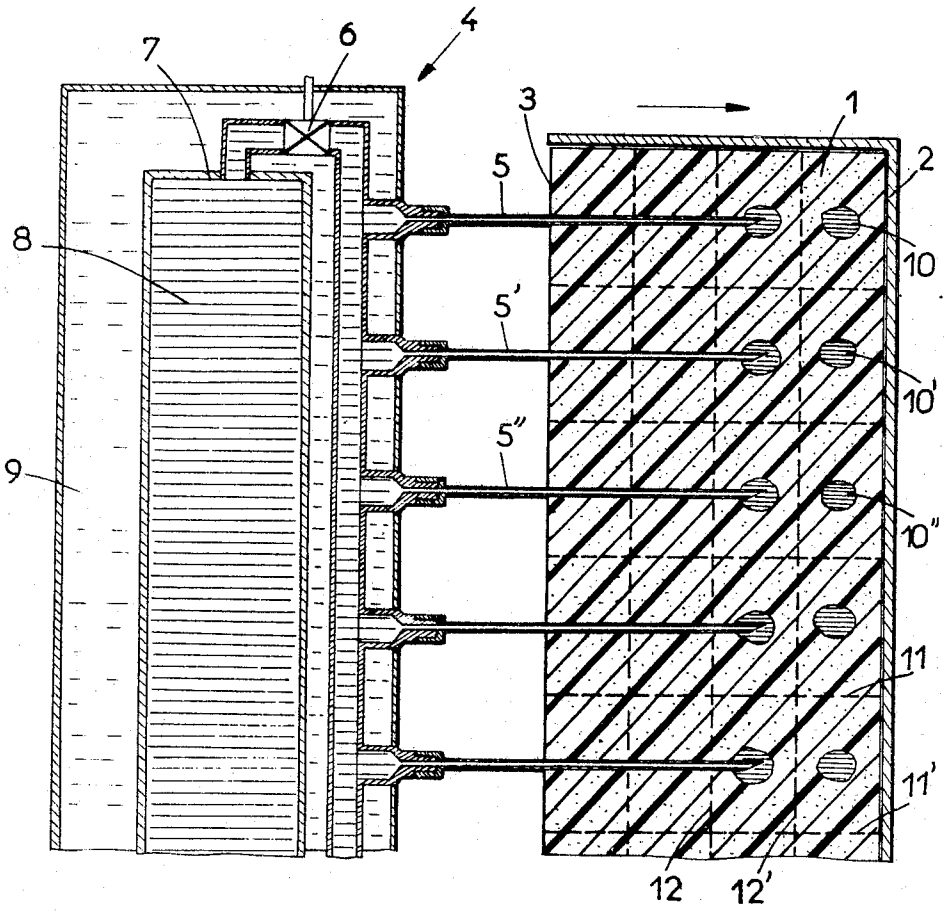
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PROCESS FOR MANUFACTURING SPONGES CONTAINING A CHARGE OF MATERIAL

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PROCESS FOR MANUFACTURING SPONGES CONTAINING A CHARGE OF MATERIAL

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ABSTRACT OF THE DISCLOSURE

A sponge of the type having a body made of an alveolar material of low porosity and having a charge of detergent or other suitable product inserted in the core of the body, and a process for manufacturing such sponges including the steps of injecting the charges in a pasty or solid state in a large body of spongy structure and cutting the large body of spongy structure into a plurality of sponges each including a charge.

This invention relates to improvements in and relating to natural or artificial sponges and the manufacturing process thereof; more especially, the invention relates to the sponges of the type in which a charge of detergent or any other suitable product such as a perfume, therapeutic agent, cleaning product, deodorizer, stain remover, etc., is incorporated in the midst of the sponge; when used with a suitable liquid solvent, for instance with water, these sponges are so adapted as to release a certain amount of the detergent or any suitable product included in the core of the sponge.

Several processes have been proposed to manufacture this kind of sponge and in a more particularly suitable process, the detergent or other product is injected in the pulverulent or pasty state in the midst of the sponge; an injection needle is introduced inside the spongy body and is adapted to deposit the charge of detergent or other product coming out of this needle, under pressure in some of the cells or alveoles of the sponge and preferably situated in the midst of the sponge.

This process allows the manufacturing of detergent sponges offering good mechanical properties, a fine look and long lasting of the detergent or other charge incorporated in the sponge.

It has appeared to the applicant that the sponges of the kind specified above ought to comply with further conditions to the effect of getting entirely satisfactory results and using such sponges with all their practical and technical possibilities.

In plain sponges a spongy material with an open structure, i.e., with widely intercommunicating cells is desired so as to allow the washing liquid to have an easy passage from the outside towards the inside of the spongy body and reciprocally. On the contrary it is suitable for the sponges containing a detergent or other product as a central core, to slow down and clog the interchange between the central product and the peripheral parts of the sponge saturated with the solvent, so as to avoid a rapid using up and watering down of the internal charge of detergent or other product.

This rapid using up of the central core turns out to be real particularly because the users are inclined to handle the detergent or otherwise charged sponges in the same way they do with plain sponges, for instance by using an excess of water or by letting these sponges dip for a long time in a water pail.

The present invention is intended to remedy this disadvantage and the sponges according to the invention are made of a plastic foam with alveolar structure and are characterized in that this material is provided with a

low porosity, for instance the cells of the alveolar material are of small size and the average diameter of the cells is sized between 0.1 and 1 millimeter. Optionally only a part of the cells are adapted to intercommunicate so that the alveolar material is partly spongy.

In either way, the alveolar material that the sponge is made of, allows but small interchange between the central core corresponding to the detergent or other product charge and the peripheral part of the sponge; accordingly the water is denied to get an easy passage from the outside to the core of the sponge where the detergent charge is situated. The water sucked up by the sponge does not flow freely through the whole of the cells, due to either the large number of the cells or the fact that only some of them intercommunicate; since the water flow is constantly hindered inside the sponge, the detergent or other product deposited in the central cells is not quickly dissolved out by a constant flow of fresh water.

It is another object of this invention to ameliorate the practical and technical properties of the sponges containing a central charge and according to a second characteristic of the invention the detergent product incorporated in the central cells of the sponges is associated with an agent appropriate to provide by a chemical, biological or physical way an action of maintenance, protection, beautifying or therapeutic purpose.

According to a preferential form, the detergent product associated with a secondary agent, is a neutral one so as to avoid any acid or basic reaction with either the alveolar material of the sponge, the secondary agent above or the body on which the detergent sponge is to be applied.

Optionally, the detergent product is further associated with a delaying agent suitable to hinder the dissolution of the detergent and thereby to ensure long lasting for the detergent product.

For instance in the case of detergent sponges intended to be used for washing cars it is proposed to associate the detergent with a polish product; in the case of sponges of the type here concerned for corporeal cleaning and care, the detergent is likely to be associated with a beauty product, a perfume, a deodorizer or a therapeutic agent.

The third aim of the invention here specified is to provide a process whereby the sponges including a detergent, or any other suitable product, as a charge incorporated in the core of the sponge could be manufactured quickly and by a continuous process.

In the prior art processes the sponges are cut or sawn from a large mass of plastic foam and each individual sponge is further injected with an appropriate needle which deposits the charge of a suitable product in the core of the sponge; it is understood that such a process is slow and allows but a small quantity of sponges to be obtained by one injection machine even though this machine is mechanised, since each machine is adapted to inject only one sponge at a time.

According to the invention, a plurality of detergent charges or any other suitable product that is desired to be placed in the core of the sponge, is brought in the midst of a unit of plastic foam of considerable size, which is subsequently subjected to a cutting so as to get individual sponges each including a detergent charge.

According to a first embodiment of the present invention, a block or cushion made of plastic, flexible and microporous material, such as polyurethane foam, and of considerable size, is subjected to an appropriate injection machine comprising a plurality of injection needles; the foam cushion after being completely empaled on its large face by the injection machine is moved back and during this motion the injection needles deposit at least one and

preferably a plurality of charges of detergent or any other suitable product inside the cushion.

According to the invention an injection machine comprising for instance ten rows of injection needles, each row comprising ten needles and each needle being adapted to deposit four charges of detergent product inside the foam cushion, can inject four hundred charges in the foam cushion, such injection requiring but about two or three minutes.

According to an other embodiment of the invention the charges of detergent or any other suitable product in the solid state are regularly secured to a linear support for instance the charges are mounted or spitted on rods regularly inserted in the mould, in which the spongy material is to be expanded; when the plastic material gets its expanded and alveolar state and its final size in the mould the charges of detergent or other product are thus constrained in the core of the whole foam cushion and it is possible to withdraw the supports, for instance the rods on which the charges were secured; due to the alveolar structure of the sponge and to the resiliency of the material, the rods will not leave any perforation marks after they have been removed.

In either embodiment above, it is possible to get a large sized foam cushion or block of spongy structure in which a lot of detergent charges are incorporated and situated according to a regular network; it is therefore possible to cut the cushion both vertically and horizontally so as to obtain sponge units each containing a detergent charge. In the process of the invention the charges of detergent or any other suitable product are brought in place at the same time or immediately after the spongy component is manufactured and gets its alveolar and expanded structure so that there is not any stoppage in the manufacturing process.

The invention is illustrated in the description which follows given by way of example and which refers to the accompanying drawing.

The figure is a diagrammatic view of an injection machine according to the invention.

The cushion of plastic foam **1** has reached in the mould **2** its expanded state and its final size; the lid of the mould is then removed and the face **3** of the cushion **1** is brought in front of the injection machine **4** comprising a plurality of injection needles **5**, **5'**, **5''**, situated on the injection machine according to vertical and horizontal rows; a valve **6** is adapted to control the flow of detergent or any other suitable product **8** in a pasty state contained under pressure in the feed chamber **7**; a hot jacket **9** containing a thermostatic liquid maintains the pasty product to be injected at a constant temperature.

After the needles have entered the cushion the latter is moved back and during this withdrawal, the needles controlled by the valve **6** deposit a certain amount of pasty product two, three or four times so as to leave two, three, four or more charges referred to **10**, **10'**, **10''** in the drawing.

After the charges are brought in the sponge cushion,

the same is cut according to the horizontal levels **11**, **11'** and the vertical ones **12**, **12'** so as to form sponge units containing a charge of detergent or any other suitable product.

What I claim is:

1. A process for manufacturing sponges including an interiorly deposited charge of material comprising the steps of employing a plurality of needles communicating with a source of said material in a viscous stage, injecting said needles into the interior of a common body of a plastic foamed substance, the discharge ends of the needles being disposed in a common plane, depositing a charge of material from all of the needles into the common body, withdrawing all of said needles a predetermined distance without removing them from the body, depositing another charge of material into the common body from all of the needles, removing the needles from the body and subdividing said body into a plurality of units, each of which units includes a charge of said material.

2. The process defined in claim 1, wherein said needles are arranged in parallel, injected into said body of a foamed plastic substance in a common direction, and are withdrawn simultaneously an equal distance after depositing a charge.

3. The process defined in claim **1**, wherein successive charges of material are deposited by each of said needles after successive withdrawals thereof.

4. The process defined in claim **3**, wherein said body of a foamed plastic is subdivided into units, each of which units contains only a single charge of said material.

5. The process of claim **4**, wherein each of the charges is deposited wholly in the interior of a subdivided unit of said body of a foamed plastic.

6. A process of manufacturing sponges each including a charge of material therein, comprising the steps of mounting a plurality of rods on a support, placing a charge of material to be deposited in the sponges spitted on the end of each of the rods in a semi-solid state, placing the support in position to dispose the spitted charges in a mould in which a spongy material is to be expanded, forming the spongy material in said mould with said charges in place, and removing said rods.

References Cited

UNITED STATES PATENTS

2,783,491	3/1957	Bellam	300—21 XR
3,094,735	6/1963	Hanlon	300—21 XR
3,284,963	11/1966	Lanham et al.	15—104.93 XR

FOREIGN PATENTS

1,120,959	4/1956	France.
1,161,888	3/1958	France.

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15—104.93; 264—45; 401—201