June 10, 1952 S. P. VAUGHN 2,600,143

CELLULOSE SPONGE YARN

Filed Feb. 14, 1947

Fig-1

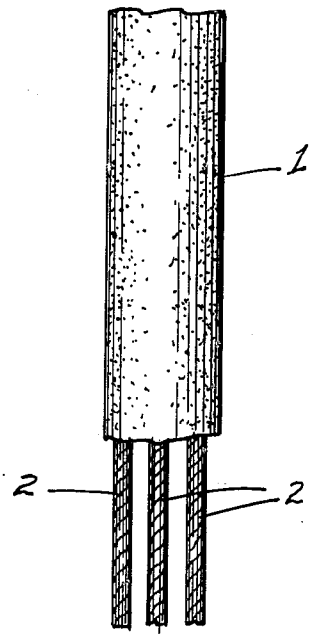


Fig-3

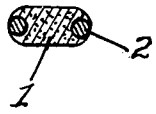


Fig-4

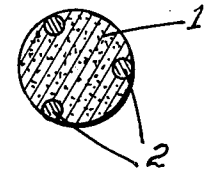
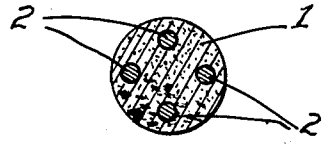


Fig-2



Sidney P. Vaughn

INVENTOR.

Patented June 10, 1952

2,600,143

UNITED STATES PATENT OFFICE

2,600,143

CELLULOSE SPONGE YARN

Sidney P. Vaughn, San Diego, Calif.

Application February 14, 1947, Serial No. 728,566

1 Claim. (Cl. 154—53.6)

1

This invention relates to sponge yarn, and more specifically to sponge yarn made from a pore forming viscose mixture which is coagulated and regenerated into cellulose hydrate, commonly known as cellulose sponge.

Cellulose sponge yarns heretofore developed comprise a single core of relatively heavy cotton yarn encased by a layer of cellulose sponge such as described in Patent No. 2,409,660 and manufactured in accordance with the principles set forth in Patent No. 2,138,712. Such sponge yarn is superior to cotton when used as a cleaning element in mops due to its high water absorbing properties. It is easily cleaned of dirt and does not sour and become unsanitary as quickly as cotton yarn.

The principal objections to cellulose sponge yarn heretofore developed with a single core of cotton yarn is the fact that the sponge casing is easily torn away from its cotton yarn core when subjected to rough usage as a mop cleaning element. The sponge casing itself is very weak structurally and the abrasive action of the surfaces being cleaned breaks the sponge away from the cotton yarn core. In twisting sponge yarn having a single cotton yarn core to expel water, the sponge is twisted around the core, which in time causes the sponge to separate from the core. Then again, the tendency of the pore forming viscose mixture to settle to one side of the single cotton yarn core in manufacturing operations limits the size of the sponge yarn to sizes ¼'' and less in diameter.

In order to improve the construction of sponge yarn and further, in order to make sponge yarn in any desired size, it is the object of this invention to provide cellulose sponge yarn having two or more reinforcing strands of cotton yarn (or other suitable material) concentrically arranged and spaced apart around the central portion or heart of the sponge yarn. The use of a multiplicity of relatively small reinforcing strands of cotton yarn concentrically arranged around the core of the sponge yarn instead of one large core strand will make the sponge yarn more flexible, and more resistant to wear, due to the fact that the strands are at or near the surface of the sponge yarn. The strands of cotton yarn will stand more abrasive action in scrubbing operations than will the sponge itself, especially since each strand will be backed by a cushion of soft cellulose sponge.

The use of a multiplicity of small reinforcing strands instead of one relatively large core strand

2

will provide a greater surface for the viscose mixture to adhere to, and when concentrically arranged around the core of the sponge yarn as contemplated in this invention, the twisting of the sponge yarn to expel the water causes the strands to twist around the heart of the sponge yarn and compress it.

A further advantage in using a multiplicity of reinforcing strands arranged concentrically around the central portion or core of the sponge yarn, is the fact that sponge yarn can be made, by extrusion processes, much larger in diameter than would be practicably possible if a single core yarn were used, due to the fact that the reinforcing strands will tend to hold the viscose mixture in its extruded shape until regenerated into cellulose hydrate. The finished product may be made round or in the form of a ribbon, or in any other desired shape, depending upon the number of reinforcing strands used.

For a more complete understanding of the invention reference may be had to the accompanying drawings in which:

Fig. 1 is a side elevation of a section of sponge yarn partly broken away to show reinforcing strands of cotton yarn or other suitable material.

Fig. 2 is a cross sectional view of Fig. 1 showing the concentric and spaced arrangement of the reinforcing strands.

Figs. 3 and 4 illustrate modified forms of spaced arrangement of the reinforcing strands of cotton yarn.

Referring to the drawings, Fig. 1 illustrates a section of cellulose sponge yarn 1 reinforced lengthwise by two or more strands of cotton yarn 2, or other suitable material, spaced apart and concentrically arranged around the central or core portion of the sponge yarn as is illustrated in Fig. 2. This core is substantially thick, and flexible and compressible. The strands of cotton yarn 2 are fed into a pore forming viscose mixture as it is extruded from the extruding nozzle of any conventional form of extruding machine. After the pore forming viscose mixture is extruded with the reinforcing strands of cotton yarn embedded therein, it is coagulated and regenerated into cellulose hydrate or cellulose sponge. The cellulose sponge may be made in accordance with any of the processes described in U. S. Patents Nos. 1,142,619, 1,611,056 or 1,907,629, or in accordance with any other known process. The pore forming viscose mixture may be extruded from any suitable type of mixing and extruding machine such as illustrated and described in Patents Nos. 2,011,160 and 2,026,177. Special attach-

ments may be added to the machine to feed the reinforcing strands of cotton yarn into the viscose mixture as it is extruded.

Figs. 3 and 4 illustrate modified forms of arrangement of the reinforcing strands of cotton yarn 2. The reinforcing strands are embedded in the outer surface of the sponge yarn. These forms of construction simplify the extrusion mechanism and avoids splitting the viscose mixture and folding it around the reinforcing strands as would be the case in manufacturing sponge yarn as illustrated in Figs. 1 and 2. When sponge yarn is manufactured in accordance with the construction illustrated in Figs. 3 and 4, the reinforcing cotton strands lie against the inner walls of the extruding tube and follow the flow of the viscose mixture as it is extruded. As the viscose mixture is extruded it will enfold the greater portion of the strands of cotton yarn and adhere thereto.

The sponge yarn, cord or cable made in accordance with this invention may be used for many purposes such as the making of cleaning elements for mops and other cleaning devices of various types. It is not only lighter than cotton yarn of similar volume but its absorbtive properties are many times greater than cotton yarn.

From the foregoing description it should be evident to those skilled in the art of making cellulose sponge that various arrangements of the reinforcing strands may be made and that the

sponge yarn may be made in various cross sectional shapes without departing from the spirit or scope of this invention as set forth in the appended claim.

I claim:

A mop yarn comprising an elongated substantially thick cellulose hydrate sponge body which is flexible and compressible and includes a core integral therewith, and a plurality of flexible cotton reinforcing strands extending longitudinally of the body and embedded within the body and anchored thereto adjacent to the outer face of the body, the outer sides of the reinforcing strands being uncovered and extending to the outer face of the body, the reinforcing strands being arranged in a group surrounding the core.

SIDNEY P. VAUGHN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,905,392	Freydberg	Apr. 25, 1933
1,978,041	Dodge	Oct. 23, 1934
2,207,156	Neville	July 9, 1940
2,377,846	Dreyfus et al.	June 5, 1945
2,382,355	Warren	Aug. 14, 1945
2,409,660	Briggs	Oct. 22, 1946