BATH SPONGE OR THE LIKE

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My present invention relates to baths, hand or like washing sponges of cellular rubber. Such rubber sponges have been in use for many years, but because of certain inherent faults they have never attained a full measure of popularity.

The principal drawback to the rubber sponge is its lack of drying powers after having become wet. Because they do not dry easily they are very liable to acquire a sour odor due to the presence of moulds or yeasts.

My concept of the problem in its general phase is that there is at best very little potential circulation of air in a rubber sponge as the open passageways are relatively small in size and tortuous in direction. The central portion of such a sponge has little or no air circulation, hence retained moisture and resultant defects and deficiencies are in this area inevitable.

Lack of drying capacity is by no means the only fault in such rubber sponges. In bathing the sponge comes in contact with all parts of the body. In so doing, dirt, small particles of dead skin, small hairs and other foreign matter are encountered. Each tiny rubber cell, acting as a small pistonless syringe, is capable of drawing this foreign matter in, but it is not capable of forcing it out again. If foreign matter finds its way into the interior cells of the sponge the tiny recurrent streams of water have a tendency to push it further in rather than to expel it. The very act of squeezing the sponge constricts such passages as there may be.

Dirt and foreign matter in the cells of a rubber sponge is objectionable enough but, unfortunately, another and much more serious complication may arise.

Germs or micro-organisms are not infrequently present on the surface of the body. Any cut, scratch, pimple or patch of skin infection may, and often does, harbor bacteria of various types. These highly undesirable invaders may enter the rubber cells.

Here again enters the significance of a damp or half wet sponge. Moisture is one of the three important factors in bacterial growth. If germs find their way into the inner cells of the sponge mass and moisture is present, the germ will then find a breeding place.

Many rubber sponges are now made by cutting or dying out half sponges. These are vulcanized or cemented together with the solid mould surfaces abutting so that there is added to the sponge a solid rubber partition directly in the place where it is least desired and where it will do the most harm. Structures in accordance with my concept may be of extreme simplicity. In use their effectiveness is immediately apparent. The increased capacity for suds is to be remarked and the sustained delivery of streams of suds makes possible the building up and maintenance of a lather that is of high efficiency for cleanliness and in ease of personal bathing is pleasant and exhilarating. The vent months at the contact surface afford lips which are extensible or deformable under pressure and which increase the wiping action of the cellular sponge material. In impersonal washing operations as in washing dishes or automobiles where grease films persist and the repeated direct application of soap is impracticable or undesirable, the sustained extrusion of lather that is repeatedly washed or rinsed away by the surface wiping or rubbing makes for a novel efficiency.

In the specific structure before described, where split slabs of sponge are cemented with their exterior mold skins back to back as in U. S. Letters Patent No. 1,778,270, Oct. 14, 1900, a great advantage is attained because of applicant's internal drainage and drying. This is effective in any sponge body, but of high importance in these commercially desirable internal skin or walled sponges which otherwise trap internal moisture and do not dry readily.

In my concept of the improvement of the rubber sponge, I have studied the structures and life habits of the sea sponges. I had observed that when these structures are dried they appear as having a large number of holes surrounded by a frame-work of matted fibres which resemble very fine wires or stiffened threads.

In considering the problem of my invention I observed that the sea sponge depends on a continuous flow of water which contains the necessary nutriment. The sea water circulation through the body of the sponge is brought about by ciliary action. When observed it is noted that this draws the water in through a series of holes or channels on the external surface. When the water has entered the interior of the sponge body, it is made to flow out again through a second series of channels which extend from the bottom to the top of the sponge body.

Unfortunately, while the holes in the sea sponge are particularly effective, the fibrous framework is correspondingly objectionable. Daily use and contact with hot water soften the fibres to the point where absorption of foreign matter takes place.

My concept is that by cutting arbitrary spaced and relatively large ducts through the rubber
sponge interior I have established new and extremely capable capacity which will effectively drain several hundred thousand rubber cells adjacent to them.

These new afferent channels in the sponge mass establish far better air and water drainage but open the entire sponge mass to the anti-bacterial action of soap and water.

As illustrative I have shown in the accompanying drawing in Fig. I is a view of a sponge in accordance with my invention.

Fig. II is a section on the line II—II, of Fig. I. Fig. III a partly sectioned end view of a modified form of hand sponge.

Fig. IV a partly sectioned end view of a modified form of sponge structure. Fig. V a further modified form showing a tubular construction.

Fig. VI a stiffened form of sponge for increased resistance.

Fig. VII is a diagrammatic view illustrating drainage, and Fig. VIII is an enlarged fragment having arrow indications of the lateral flow from or to the inner cells to ducts.

In the drawing I have indicated at 1 a body of sponge rubber having fine pores or cells. According to my invention these cells or pores may be made very small so that the sponge surface is soft and fine, while still having a suitable friction for rubbing the body.

These fine pores are very desirable on the contacting surface of the sponge but as the internal pores are necessarily of the same size they present the serious problems first described.

I overcome this difficulty according to my invention by cutting spaced drainage ducts 2 through the sponge from face to face. These are of a size and spacing, according to the dimensions of the sponge, so as to give a predetermined drainage of the intersected areas, as indicated diagrammatically in Fig. VII. By simply determining the cellular capacity of a sponge of a given size its normal rate of intake and discharge can be increased to any predetermined amount by simple standards set by experiment. In Fig. VII I have indicated the sponge material 1 as divided by theoretical lines A, the arrows being intended to indicate the flow to and from the ducts 2. The ducts 2 also increase the sponge capacity of the sponge as it can take up the soap more completely and more rapidly and thus gain and maintain a maximum lather. Also conversely the lather and any other matter in the internal pores may be rapidly and completely rinsed out through the ducts 2 when desired. As shown on the drawing, the ducts are spaced apart a distance greater than the maximum cross-sectional dimension of a duct, and as more particularly shown in Figures 7 and 8 the space between ducts is at least twice the maximum cross-sectional dimension of a duct.

The ducts 2 are shown as square in cross section and are preferably so but may be of any shape. They are also preferably formed by an incising punch which when the rubber is wet gives a clean cut and opens up the cells or pores to give free passage to the adjacent areas of the sponge.

The holes may be quite large in cross section without interfering with the comfort of the sponge surface as sponges in accordance with my invention are so completely lubricated by soap and water that their rubbing action while fully efficient gives a pleasant sensation and a healthful stimulating action on the skin.

The large ducts 2 are not seriously restricted by the pressures of use or by squeezing and make a free exit for bodies of lather sufficient to carry along with them larger particles of foreign matter that may have lodged or concentrated in the interior of the sponge.

In making up my sponges I am able to effect certain structural advantages and have shown certain illustrative embodiments.

The sponge shown in Figs. I and II is a simple type preferably composed of two parts or boards A and B, these parts preferably having opposite their porous contact surface a skin like rind such as is formed by the mold face. In this type the two skin surfaces 3 are abutted and cemented together giving a strong bond. This, however, is not objectionable because the barrier so formed is pierced by the ducts 2.

In the form shown in Fig. III, the two sections C and D are united only at their ends as by a strap 4. This makes a nut-like sponge into which the hand can be thrust.

In some types of sponges a certain degree of rigidity is desired. This I can effect by introducing a slightly stiff sheet or layer of solid rubber of the desired character. As shown in Fig. IV a strip of sponge E may be cemented around a slab 5 preferably having the ends e bevelled and overlapped and cemented. The ducts 2 pass through the slab 5 and as in the other forms give free vent to the interior.

Another type is shown in Fig. V. In this the porous rubber is formed as a tube F held to gather centrally and slightly spaced by a strip of sponge rubber 6 to which it may be cemented, the whole being perforated as by the ducts 7.

Another similar type is shown in Fig. VI, the porous rubber bodies G and H being cemented to the end strips 7. In this form I provide a spaced disc or similar block 8 cemented to the inner surface of one of the bodies but free from the other so that the sponge can be opened up.

In using the term cement I am to be understood to include any usual manner of rubber attaching as by the usual cements, latex with or without vulcanising. The drainage ducts pass through laterally scavenge drain, fill and dry out the cells or pores laterally adjacent.

While my invention contemplates a scientific predetermined relation of the ducts 2 to the adjacent bodies or areas of cellular rubber to get maximum efficiency, they may of course be of varied number and arrangement as well as of different size. In fact, in one aspect of my invention I may arrange the vents 2 in designs, patterns or symbols and for advertising purposes the arrangement may be such as to appear on the surface as letters for advertising good purposes.

Where this is done I recommend the use of different size or shape holes which will contrast with the others, but supplement the drainage and give full efficiency and sanitation which my invention now makes possible.

What I therefore claim and desire to secure by Letters Patent is:

1. A sponge rubber article comprising two sponge rubber boards superposed one on the other and secured together with a sheet of non-porous material therebetween, said article having distributed over substantially its entire area a plurality of spaced normally open ducts extending entirely through it transversely of said non-
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porous sheet whereby the sponge cells adjacent thereto are freely vented.

2. A sponge-rubber lathering and washing appliance, comprising two sponge-rubber boards, superposed one on the other and secured together, at least one being a split of a sponge-rubber slab, and at least one having skin on its abutting face, to provide an intermediate reinforcement, and at least one having cut sponge on its face opposite said abutting face, said article having distributed over substantially its entire area a plurality of normally open ducts which extend therethrough from face to face, said ducts being spaced apart from each other a distance greater than the maximum cross-sectional dimension of a duct.

3. A sponge-rubber article, comprising a body of sponge rubber, said body having distributed over substantially its entire area a plurality of normally open ducts which extend therethrough from face to face, certain of said ducts being spaced apart from each other a distance at least twice the maximum cross-sectional dimension of a duct.

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