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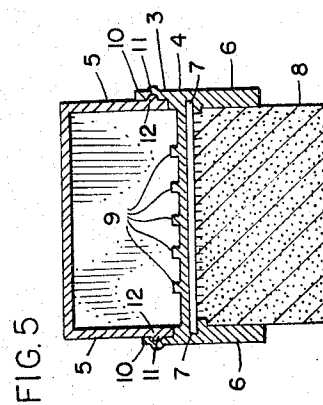
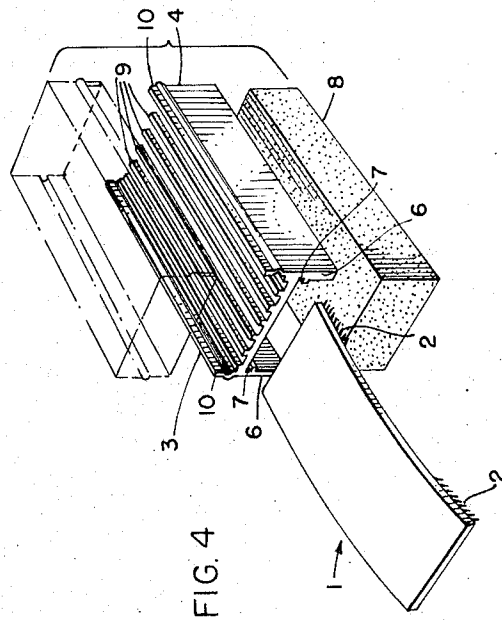
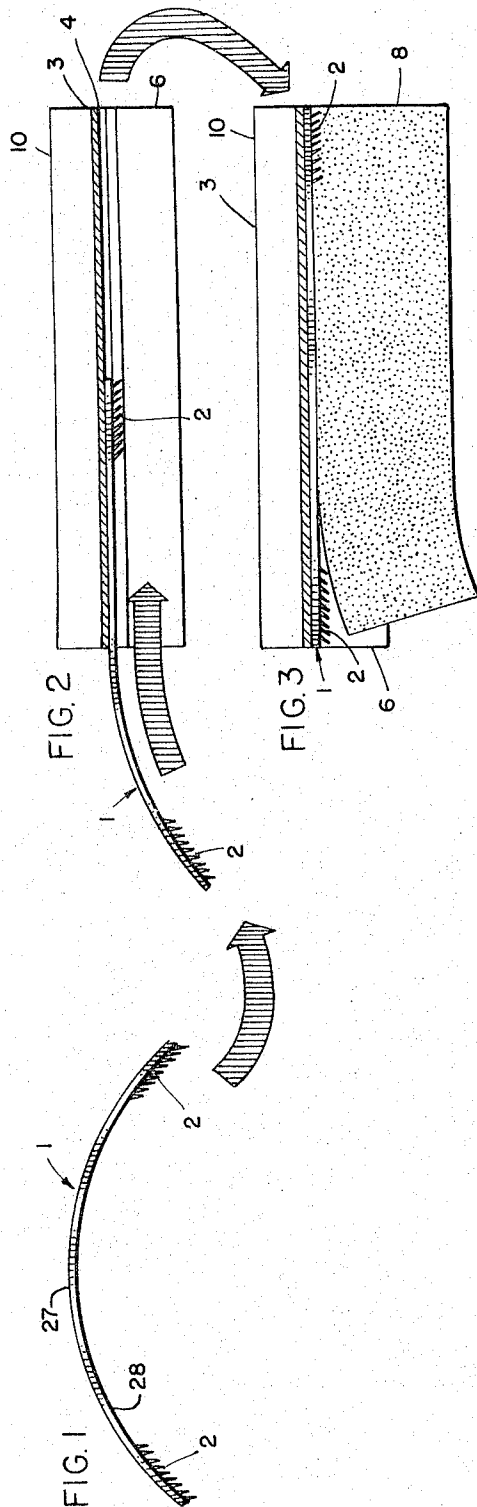
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3,299,462

COMBINED SPONGE AND HOLDER AND ELEMENTS THEREOF

Filed Sept. 27, 1963

2 Sheets-Sheet 1



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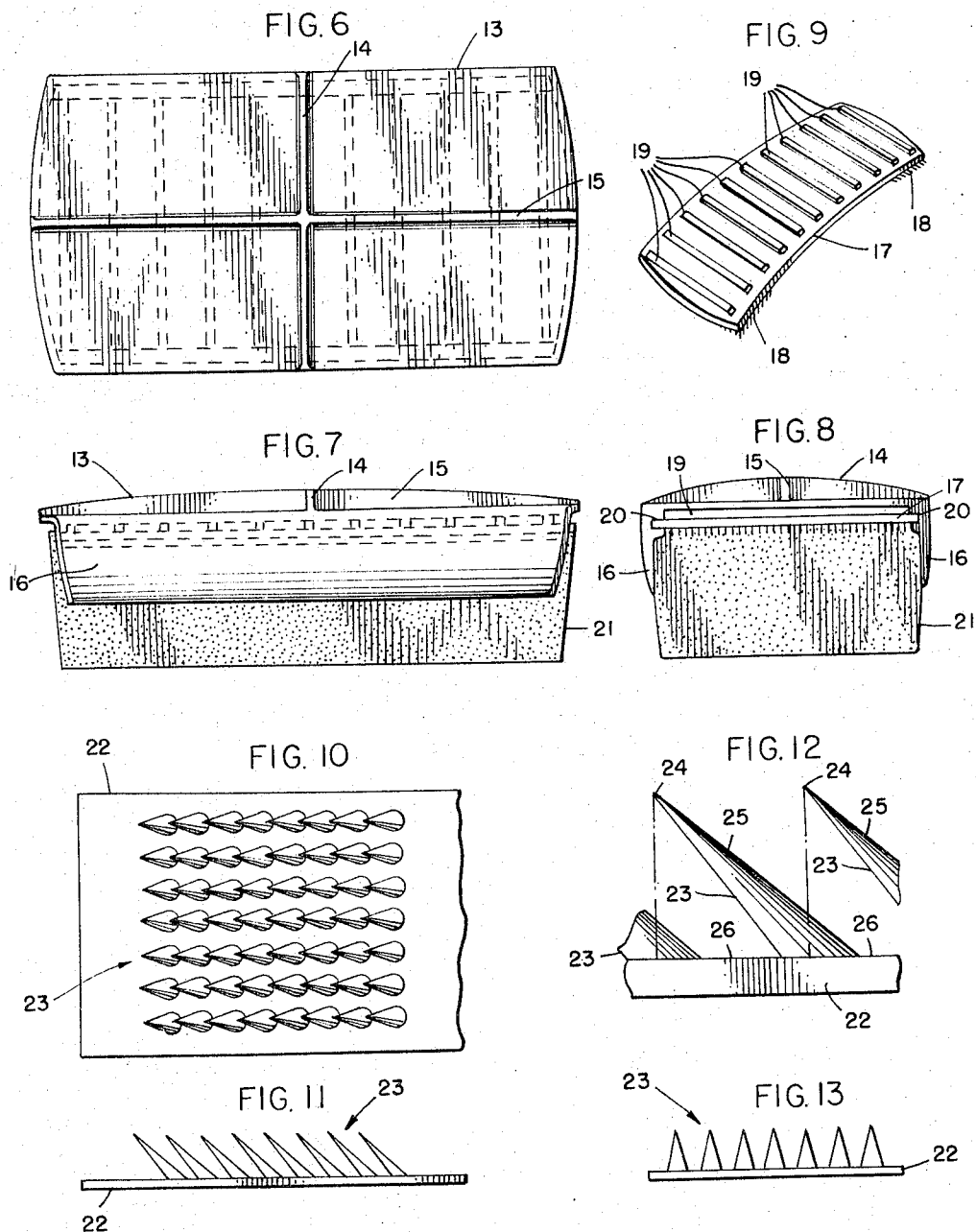
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COMBINED SPONGE AND HOLDER AND ELEMENTS THEREOF

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This invention relates to a holder for sponges and like cellular bodies.

It is an object of the present invention to provide a holder adapted to hold sponges and the like by new and improved fastening means.

Another object of the present invention is to provide a holder for sponges and the like having new and improved fastening means moldable from synthetic resins or polymers.

A further object is to provide a holder of the character described which is simple and easy to manufacture and assemble.

Another object is to provide a holder designed to permit simple and fast attachment and detachment of sponges and the like.

These and other objects and advantages of the present invention will appear from the following description. In the drawings:

FIG. 1 is a side elevation of the supporting member from one embodiment of the present invention;

FIG. 2 is a longitudinal, vertical section taken through a frame of one embodiment of the present invention, with the supporting member shown in FIG. 1 partially inserted thereinto;

FIG. 3 is a longitudinal, vertical section taken through the frame shown in FIG. 2, with the supporting member shown in FIG. 1 inserted in place, and with a sponge attached at one end to the supporting member;

FIG. 4 is an exploded, perspective view of the embodiment shown in FIGS. 1, 2 and 3;

FIG. 5 is a transverse cross-section of the embodiment of the invention shown in FIG. 4;

FIG. 6 is a top view of another embodiment of the present invention;

FIG. 7 is a side elevation of the embodiment shown in FIG. 6;

FIG. 8 is an end elevation of the embodiment shown in FIGS. 6 and 7;

FIG. 9 is a perspective view of the supporting member of the embodiment shown in FIGS. 6, 7 and 8;

FIG. 10 is an enlarged bottom view of one end of a supporting member, showing the fastening projections thereon;

FIG. 11 is an enlarged side elevation of the support member end shown in FIG. 10;

FIG. 12 is an enlarged view of a portion of FIG. 11; and

FIG. 13 is an end elevation of the supporting member end shown in FIGS. 10, 11 and 12.

In accordance with the present invention, a supporting member, of synthetic polymer material, is mounted on a hand grip member. On the bottom side of the supporting member, at each end thereof, a plurality of smooth sided, substantially rigid, closely spaced projections is integrally formed of the synthetic polymer. The projections taper from their bases to relatively sharp tips, and slant toward their respective ends of the supporting member.

Preferably the hand grip member is substantially rectangular with a pair of parallel downwardly extending side walls, said walls having a pair of opposed grooves therein. Preferably, the edges of the supporting member fit into

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the opposed grooves in the walls of the hand grip member and are anchored therein.

The hand grip member may be of one piece, but preferably it comprises a base frame portion, to which the supporting member is attached, and a removably mounted, substantially hollow storage portion.

It is preferred that the hand grip member be provided with strength imparting ribs. Similarly, the said flexible, synthetic polymer supporting member may be provided with strength imparting ribs.

It is preferred that the integrally molded plurality of projections slant toward the respective ends of the supporting member at an angle of about 30 to 80°. The projections are preferably closely spaced in parallel rows in which they all extend in the same direction and the rows are close enough together that the tips of the projections in one row extend above the sides, or partially overlap, the projections in an adjacent row. In other words, if a vertical line were drawn from the tip of one projection it would intersect the side of an adjacent projection. The projections are preferably conical or pyramidal and are spaced from one another at their bases a distance of 0.030 to 0.100 inch. They also preferably have a center-to-center spacing at their tips from 0.030 to 0.250 inch. The size of the bases of the projections is preferably at least 0.01 inch in one dimension. The vertical height of the tips of the projections from the supporting member is preferably within the range of 0.020 to 0.150 inch. The number of projections is preferably within the range of 100 to 500 per square inch.

As a typical example, the projections may be 0.050 inch in length, and slanted at an angle of 45° with the supporting member, the vertical height from the supporting member to the tip of the projections, thus, being 0.035 inch. The bases of these projections may be 0.030 inch in diameter and taper to a tip having a diameter of 0.010 inch. The supporting member may be 0.014 inch in thickness at places where there are no projections, and the over-all thickness from the tips of the projections through the supporting member may be 0.049 inch. There may be a projection tip every 0.050 inch, or about 400 points per square inch.

As another example, the thickness of the supporting member may be $\frac{1}{32}$ inch. The projections may be slanted at an angle of 55°. The projections are disposed in rows in two directions, the rows being $\frac{1}{16}$ inch apart, center-to-center, in each row. The vertical height from the tips of the projections to the top of the supporting member can be $\frac{1}{16}$ inch. Considering each projection as a cone, the base may be $\frac{1}{32}$ inch. The projections may overlap each other to the extent that a vertical line drawn from the tip of one projection substantially intersects the midpoint of the base of the preceding projection. Projections of the character described, arranged in longitudinal rows of eight projections, with seven rows laterally on the supporting member, occupy approximately one-half square inch, allowing room for margins.

The size and arrangement of the projection will vary to some extent on the size of the supporting member and the type of sponges to be held. In most cases, however, it is preferable that the projections be integrally formed or molded on a supporting member at an angle of about 45 to 60°, that the adjacent projections be separated from each other, center-to-center, by a distance of from 0.060 to 0.150 inch, and that the vertical height from the tips of the projections to the surface of the supporting member be from 0.060 to 0.150 inch.

A sponge, as for example a sponge of polyurethane foam, or other article having a multiplicity of surface openings may be attached to the supporting member by stretching and hooking it at each end over the plurality

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of oppositely slanting projections. The projections pass through the surface openings in the sponge or other article in such a way as it is held under tension between the opposite ends of the supporting member.

The supporting member, with the plurality of slanting projections thereon, is preferably molded as one integral unit from synthetic polymer. The synthetic polymer from which the supporting member is formed may be a homopolymer, such as a polymer of formaldehyde (e.g., Delrin), or a polymer of tetrafluoroethylene (e.g., Teflon), or polyethylene, polypropylene, or a copolymer (e.g., nylon). These may also be described as thermoplastic, synthetic resins.

The hand grip member may be formed of substantially any suitable material in any convenient manner. It is preferred, however, to form the hand grip member by molding or extruding synthetic polymer materials.

Referring now specifically to the drawings, a supporting structural 1 is shown in FIG. 1 as a longitudinally curved, molded, thermoplastic resin plate or bar having a convex face 27 and a concave face 28. It has a normal curvature downwardly from the center to the ends, as shown in FIG. 1. At each end of the concave face 28 of supporting structure 1 is a plurality of projections 2 slanting toward the respective ends of the structure.

FIG. 5 shows a hand grip 3, consisting of a substantially rectangular base frame 4 and an interfitted, cap member 5. Opposite, parallel downwardly extending side walls 6 are provided on base frame 4. Opposed grooves 7 are formed in walls 6, grooves 7 being wide enough to slidably receive the edges of the supporting structure or plate.

FIGS. 1, 2 and 3 show sequentially the assembly of the parts of the sponge holder. FIG. 2 shows supporting structure 1 partially inserted in base frame 4. FIG. 3 shows the supporting structure 1 fully inserted in the base frame 4, the edges of structure 1 fitting into grooves 7. Supporting structure 1 is held under the tension resulting from holding the normally curved structure 1 in a substantially flat configuration. It is preferred that support structure 1 be cemented in position in grooves 7. FIG. 3 also shows a sponge 8 attached at one end of the supporting structure 1, the plurality of projections 2 passing through the surface openings in the cellular sponge 8. Side walls 6 of the base frame 4 extend downwardly far enough that when sponge 8 is hooked in position on projections 2, walls 6 partially cover and protect the sides of sponge 8.

Base frame 4 is provided on its top side with a plurality of longitudinal strength imparting ribs 9. Base frame 4 has a pair of opposite, parallel, upwardly extending side walls 10, with a pair of opposed grooves 11 therein. Substantially hollow storage member 5 has a pair of longitudinal ribs 12 on its side walls. Storage member 5 is designed to be removably attached to base frame 4 by sliding ribs 12 into grooves 11. Access to the hollow compartment of storage member 5 is had by slidably removing member 5 from base frame 4. Storage compartment 5 and base frame 4 make up the hand grip portion 3 of the sponge holder.

FIGS. 6, 7, 8 and 9 illustrate another preferred embodiment of the present invention. FIG. 6 is a top view of the device showing a substantially rectangular hand grip 13, with mutually perpendicular strength imparting ribs 14, 15 formed on its top side. Hand grip 13 is of a size and shape that permits it to conveniently be held in the hand. FIGS. 7 and 8 show opposed pairs of side walls 16 extending downwardly from the top of hand grip 13.

FIG. 9 is a perspective view of normally curved supporting structure 17, having a plurality of endwardly slanting projections 18 at each end. The top side of supporting structure 17 is provided with a plurality of lateral strength imparting ribs 19. A pair of opposed grooves 20 is formed in side walls 16 of hand grip 13. Grooves 20 are sufficiently wide to permit the edges of supporting

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structure 17 to slide therein. In assembling the holder, supporting structure 17 is slid into grooves 20, tension being developed as supporting structure 17 is forced away

15 A relatively thin flexible supporting structure or plate

A sponge 21 is stretched and hooked over the plurality of slanting projections 18, projections 18 passing through the surface openings in sponge 21, thereby firmly holding sponge 21 in position. Side walls 16 extend downwardly far enough that, when sponges 21 is hooked in position on projections 18, the side walls 16 partially cover and protect the sides of sponge 21.

FIGS. 10, 11, 12 and 13 are enlarged views of the plurality of projections molded on the supporting structures. A relatively thin flexible supporting structure or plate 22 is shown, on which is formed by molding a plurality of conical projections 23, which are slanted at an angle of approximately 55° between their axes and the plate or supporting structure 22. In the side view shown in FIG. 12, it is seen that the tips 24 of the projections 23 slightly overlie the sides 25 of each preceding projection. The bases of the projections are spaced from each other at 26, and the rows of projections are spaced from each other as shown in FIG. 10.

25 Many modifications and variations may be made without departing from the spirit of the invention. The hand grip member may be made in substantially any suitable size and shape to accommodate sponges of varying configurations. In all cases, the novel utilization of the plurality of opposed endwardly slanting projections permits rapid mounting and removal of sponges, and other like articles having a multiplicity of surface openings, yet allows them to be securely held.

This invention is hereby claimed as follows:

35 1. A holder for sponges and the like comprising a hand grip member; an elongated flexible, synthetic polymer supporting member attached to said hand grip member; and a plurality of small, smooth sided, substantially rigid, closely spaced projections integrally formed of said synthetic polymer at each end of said supporting member, said projections tapering from their bases to relatively sharp tips, and said projections slanting toward the respective ends of said supporting member, said projections at each respective end of said supporting member slanting outwardly from said supporting member at an angle of 30° to 80°, being spaced apart center-to-center 0.030 to 0.250 inch, and having a vertical height of the tips thereof from said supporting member of 0.020 to 0.150 inch.

45 2. The holder claimed in claim 1 wherein there are 100 to 500 of said projections per square inch.

3. The holder claimed in claim 1 wherein said projections at each end of said supporting member all extend toward said end and are arranged in a plurality of transversely-extending, parallel rows, said rows being spaced closely enough that the tips of the projections in one row overlap the sides of the projections in an adjacent row.

4. A holder for sponges and the like comprising a substantially rectangular hand grip member having a pair of opposite, parallel downwardly extending side walls, said walls having a pair of opposed, straight grooves therein; an elongated, flexible, synthetic polymer supporting member, the edges of said member fitting in said opposed grooves in said hand grip member; said support member being a normally longitudinally bowed plate-like member which is flexed resiliently into a substantially flat shape when inserted in said grooves; and a plurality of smooth sided, substantially rigid, closely spaced projections integrally formed of said synthetic polymer at each end of said supporting member, said projections tapering from their bases to relatively sharp tips, and said projections slanting outwardly from said supporting member toward the respective ends thereof at an angle relative to said supporting member of 30 to 80°, said projections having a size at their bases of at least 0.020 inch in one dimension, said projections at each end being

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spaced apart, center-to-center, 0.030 to 0.250 inch, the vertical height of the tips of said projections being about 0.020 to 0.150 inch, said projections at each end being arranged in a plurality of parallel rows, said rows being spaced closely enough that the tips of the projections in one row extend above the sides of the projections in an adjacent row, there being about 100 to 500 of said projections per square inch at each end of said supporting member.

5. The combination of a cellular sponge and a sponge holder comprising a hand grip member; an elongated flexible, synthetic polymer supporting member attached to said hand grip member; and a plurality of smooth sided, substantially rigid, closely spaced projections integrally formed of said synthetic polymer at each end of said supporting member, said projections tapering from their bases to relatively sharp tips, and said projections slanting toward the respective ends of said supporting member, said projections extending into said sponge in opposite directions at opposite ends of said supporting member, said sponge being longitudinally stretched and thereby being attached to said holder via the penetration and gripping of said sponge by said projections.

6. A supporting member for sponge holders and the like which comprises a relatively thin, substantially rectangular, flexible, longitudinally bowed synthetic polymer piece having a concave face and a convex face and also having a plurality of smooth sided, substantially rigid, closely spaced projections integrally formed of said synthetic polymer on said concave face at each end thereof, said projections tapering from their bases to relatively sharp tips, and said projections slanting toward the respective ends of said supporting member.

7. A supporting member for sponge holders and the like which comprises a relatively thin, substantially rectangular, flexible, longitudinally bowed synthetic polymer piece having a concave face and a convex face and also having a plurality of smooth sided, substantially rigid, closely spaced projections integrally formed of said synthetic polymer on said concave face at each end thereof, said projections tapering from their bases to relatively sharp tips, and said projections slanting at an angle of

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30 to 80°, said projections having a size at their bases of at least 0.020 inch in one dimension, said projections at each end being spaced apart, center-to-center, 0.030 to 0.250 inch, the vertical height of the tips of said projections being about 0.020 to 0.150 inch, said projections at each end being arranged in a plurality of parallel rows, said rows being spaced closely enough that the tips of the projections in one row extend above the sides of the projections in an adjacent row, there being about 100 to 500 of said projections per square inch at each end of said supporting member.

8. A holder for sponges and the like comprising a substantially rectangular hand grip member having a pair of opposite, parallel, downwardly extending side walls, said walls having a pair of opposed, straight grooves therein; an elongated, flexible, synthetic polymer supporting member, the edges of said member fitting in said opposed grooves in said hand grip member; said support member being a normally longitudinally bowed plate-like member which is flexed resiliently into a substantially flat shape when inserted in said grooves; and a plurality of smooth sided, substantially rigid, closely spaced projections integrally formed of said synthetic polymer at each end of said supporting member, said projections tapering from their bases to relatively sharp tips, and said projections slanting outwardly from said supporting member toward the respective ends thereof at an angle of 30° to 80°.

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