

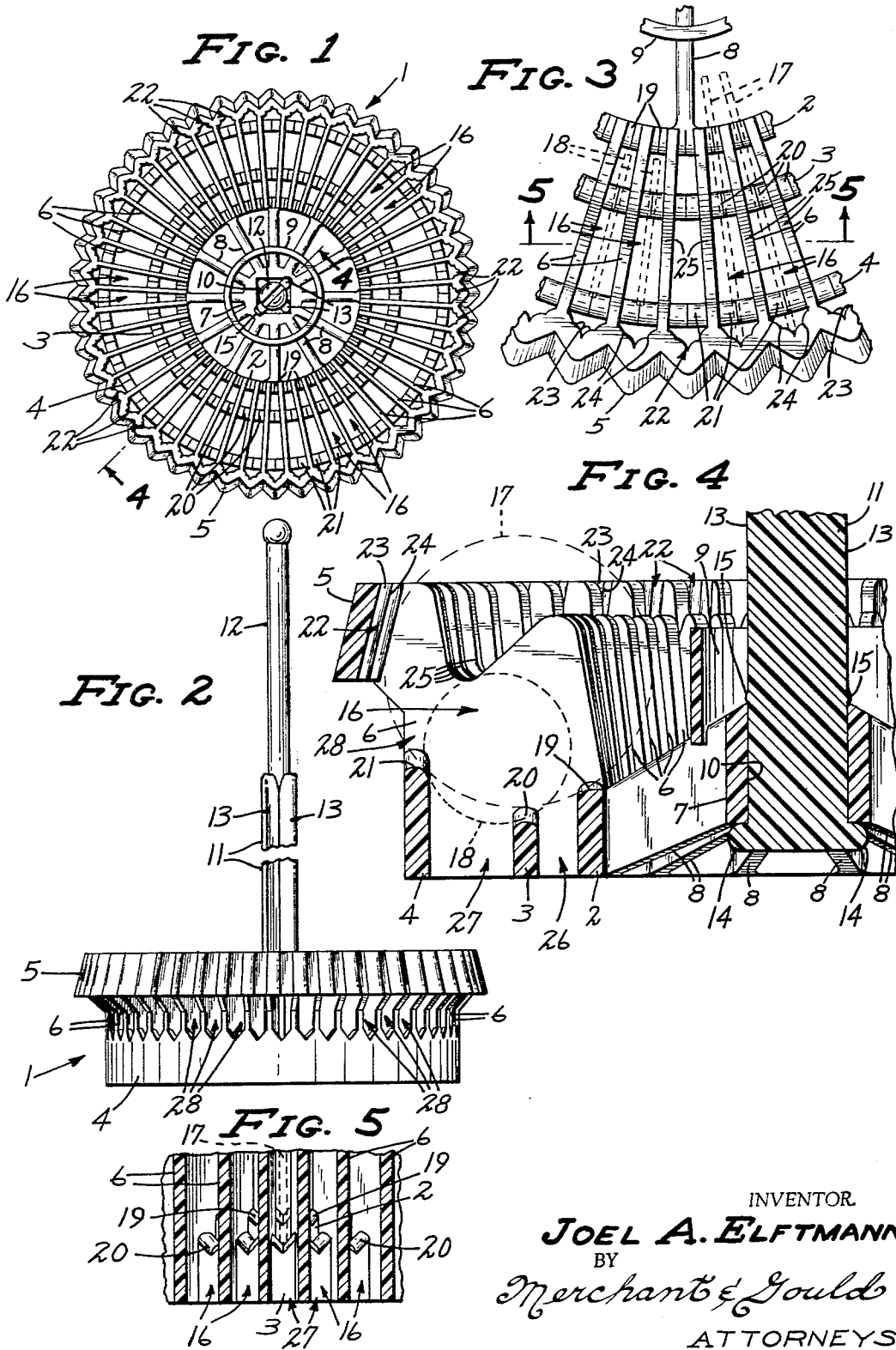
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ARTICLE SUPPORTING BASKET

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ARTICLE SUPPORTING BASKET

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ABSTRACT OF THE DISCLOSURE

A basket for supporting substantially flat articles in a bath of cleaning or plating fluid while engaging a minimum surface area of the articles to be immersed in the fluid; the basket being adapted to be rotated on a generally vertical axis for spin drying the articles after removal thereof from the fluid. Spaced concentric annular support elements and an annular retaining element are connected by circumferentially spaced radial partitions to define open-topped and substantially open-bottomed chambers for the articles.

SUMMARY OF THE INVENTION

In the cleaning and plating of flat disk-like or wafer-like articles, the articles are normally suspended sequentially in baths for cleaning by chemical or ultrasonic methods, and for plating by chemical or electro-chemical means. An important object of this invention is the provision of a compact article supporting rack or basket which will properly support a plurality of articles in closely spaced apart relationship, so that a minimum of space is occupied thereby in the bath without interfering with the free flow of liquid over and between the articles.

Another object of this invention is the provision of a basket which engages a minimum surface area of the articles supported thereby.

Another object of this invention is the provision of a basket which may be rotated at a speed sufficient to spin dry the articles supported therein without permitting escape of the articles from the basket, and arranged for ready discharge of liquid centrifugally therefrom during rotation thereof.

Another object of this invention is the provision of a basket which will properly support disk-like articles of various diameters and wafer-like articles having different outlines.

To the above ends, I provide an open-topped basket or rack comprising radially spaced concentric support rings or elements disposed on a generally vertical axis, an outer annular retainer element or ring upwardly and radially outwardly spaced from the support elements and concentric therewith, and a plurality of circumferentially spaced radial partition elements joining the support and retainer elements. The support elements or rings have upper edges that define indentations between the partition elements, the retainer element having indentations on its inner surface between the partitions. The support, retainer and partition elements define open-topped and substantially open-bottomed chambers, each for reception of an article to be plated. The indented inner surface of the retainer element slopes radially outwardly and downwardly to engage edge portions of the articles to hold the articles against escaping from the basket during rotation of the basket on its axis to spin dry said articles.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in top plan of an article supporting basket produced in accordance with this invention;

FIG. 2 is a view in side elevation, some parts being broken away;

FIG. 3 is an enlarged fragmentary view corresponding to a portion of FIG. 1;

FIG. 4 is an enlarged fragmentary section taken substantially on the line 4-4 of FIG. 1; and

FIG. 5 is a fragmentary section taken on the line 5-5 of FIG. 3.

DETAILED DESCRIPTION

The basket or rack of this invention, indicated in its entirety by the numeral 1, is preferably molded in one piece from a suitable plastic material, such as Teflon, to provide a fairly strong rigid structure. The basket 1 is formed to provide concentric inner, intermediate and outer annular support elements 2, 3, and 4 respectively, an annular retainer element 5, and a plurality of circumferentially spaced radial partition elements 6, which join the support elements 2-4 and retainer element 5. The basket 1 is further formed to provide a tubular hub 7 that is joined to the inner annular support element 2 by a plurality of radial spokes or the like 8, and a tubular flange 9 concentric with the support elements 2-4 and hub 7 and projecting upwardly from the spokes 8 between the support element 2 and hub 7. With reference to FIG. 4, it will be seen that the bottom edges of the annular support members 2, 3 and 4 are disposed in a common horizontal plane and form the bottom of the basket 1. The tubular hub 7 is disposed in upwardly spaced relation to the bottom of the basket, the spokes 8 sloping radially outwardly and downwardly from the hub 7 to the inner support element 2. The tubular hub 7 defines a non-circular or substantially square axial opening 10 for axially slidable reception of the shaft portion 11 of an elongated handle 12. Preferably, the handle 12 is circular in cross section, the shaft portion 11 comprising a plurality, as shown four, of circumferentially spaced radial ribs 13 that slidably engage the corner portions of the axial opening 10. At their lower ends, the ribs 13 are formed to provide radially outwardly projecting lugs 14 that engage the lower end of the hub 7 to limit upward movement of the handle 12 relative to the basket 1. As shown in FIG. 4, at least a pair of opposed ribs 13 are formed to provide detents 15 which are of a size to be easily forced through the opening 10, but which normally overlie the upper end of the hub 7, when the lugs 14 are in engagement with the lower end thereof, to prevent accidental downward movement of the handle 12, relative to the basket 1.

The annular supporting elements 2, 3 and 4 cooperate with the retainer element 5 and partitions 6 to define a plurality of circumferentially spaced radial chambers 16 for reception of flat disk-like articles shown by dotted lines in FIGS. 3 and 4 and indicated at 17 and 18, the articles 17 and 18 being received one in each of the chambers 16. The upper edges of the annular support elements 2, 3 and 4 are formed to provide upwardly opening notches or indentations 19, 20 and 21 respectively, the radially inner surface of the annular retainer element 5 being formed to provide generally V-shaped notches or indentations 22 which slope radially outwardly and downwardly from the top edge of the retainer element 5 to the bottom edge thereof, see particularly FIG. 4. Also as shown, the indentations 19-22 are disposed between adjacent ones of the partition elements 6. As shown in FIGS. 4 and 5, the sides of the indentations 19-21 are rounded, so as to engage a minimum surface area of the disk-like articles 17 and 18 and only at the peripheral corner edges of the articles. As shown particularly in FIG. 3, the indentations 22 in the retainer element 5 each comprise a pair of radially outwardly converging wall surfaces 23 each having an intermediate portion defining an inwardly opening notch 24 that extends longitudinally of its respective indentation 22 from the top to the bottom edge of the retainer element 5. Further, as shown in FIG. 4, each of the partition elements 6 is formed at its upper edge to provide a relatively deep upwardly opening notch 25 to facilitate

insertion of tweezers or similar tools between adjacent partitions 6 to remove the smaller articles 18 from the chambers 16. The radial spacing between the support elements 2, 3 and 4 provide relatively large passages 26 and 27 to the chambers 16, rendering the basket 1 substantially open-bottomed. Further, the vertical spacing between the indentations 21 of the outer support element 4 and the bottom edge of the retainer element 5 cooperate with the partition elements 6 to provide radial passages 28 to the chambers 16.

When it is desired to clean and plate a quantity of the articles 17 and 18 or similar flat articles, these are placed one each in a different one of the chambers 16, the lower edge portions of the article resting in a given pair of the indentations 19, 20 and 21. As shown in FIG. 4, the smaller articles 18 normally engage adjacent indentations 20 and 21, whereas the lower edge portions of the larger articles 17 rest in cooperating indentations 19 and 21. Normally, when the articles are placed in the chambers 16, they will tend to lean against one or the other of the adjacent partition elements 6. However, when the article laden basket is dipped into a cleaning or plating bath, movement of the liquid upwardly through the basket and between the partition elements 6 and the articles contained therein tends to center the articles 17 and 18 between their adjacent partition elements 6 so that the liquid covers substantially the entire surface of the articles 17 and 18. It will be noted that the tubular flange 9 is sufficiently closely spaced from the adjacent support element 2 so that, during any upward and downward agitating movement which may be imparted to the basket 1 in the bath, the smaller articles 18 cannot work themselves radially inwardly and fall from the basket between the spokes 8.

When the basket 1 is lifted from the plating or cleaning bath, the liquid drains rapidly from the basket between the spokes 8 and through the passages 26, 27 and 28. Then, to remove any liquid which might adhere to the basket or to the articles 17 and 18 therein, the basket is manually or otherwise rotated on its axis at a speed which will centrifugally remove any moisture from the articles and basket, radially outwardly through the openings 28. During such rotation of the basket 1, the articles 17 and 18 are moved by centrifugal action radially outwardly into engagement with the indentations 22, this engagement tending to support the articles in spaced relation to the adjacent partition elements 6. Should any one of the articles 17 or 18 become cocked or angularly displaced with respect to the radial dimension of its chambers 16, the edge of the article may engage one of the grooves 24 in the indentation wall 23 to prevent further angular displacement thereof. The outward and downward slope of the indentations 22 guides liquid downwardly to the radial passages 28 so that the liquid may escape outwardly there-through. Further, the radially outward and downward slope of the indentations 22 tends to hold the articles 17 and 18 within their respective chambers 16 when the basket 1 is rotated at drying speed. It will be noted that the retainer element 5 is disposed sufficiently above the outer support element 4, so that the center of any article which is of a size to be received and supported in the basket 1 will be disposed below the level of the top edge of the retainer element 5. Hence, when the basket 1 is rotated to dry the articles, the downward and radially outward slope of the indentations 22 will guide the articles 17 and 18 angularly downwardly toward the support indentations 21 and effectively hold the articles from being accidentally dislodged from their respective chambers 16.

While a commercial embodiment of the basket of this invention has been shown and described, it will be understood that the same is capable of modification without departure from the spirit and scope of the invention, as defined in the claims,

What is claimed is:

1. A basket for supporting substantially flat articles in a bath of cleaning or plating fluid without materially reducing the surface area of the article available to the bath, comprising:

- (a) a pair of radially spaced radially inner and outer concentric annular support elements disposed on a generally vertical axis and each having upper edges formed to provide circumferentially spaced upwardly opening indentations;
- (b) an outer annular retainer element concentric with said support elements and disposed in upwardly and radially outwardly spaced relation to said support elements, said retainer element having top and bottom edges and a radially inner surface defining a plurality of circumferentially spaced radially inwardly opening indentations sloping radially outwardly and downwardly from the top to the bottom edges thereof;
- (c) and a plurality of circumferentially spaced radial partition elements joining said support and retainer elements between said indentations;
- (d) said support, retainer and partition elements cooperating to define open-topped and substantially open-bottomed chambers for reception of said articles, said indentations engaging edge portions of said articles to hold said articles in spaced relation to said partition elements, whereby to provide for free passage of fluid through said chambers and over said articles.

2. The basket defined in claim 1, in which said bottom edge of the retainer element is disposed in a plane in upwardly spaced relation to the indentations in said support elements to provide openings for passage of fluid radially outwardly of said chambers.

3. The basket defined in claim 1, in further combination with an intermediate annular support element disposed between and in radially spaced concentric relation to said inner and outer support elements, said intermediate support element having an upper edge defining circumferentially spaced upwardly opening indentations and being connected to said partition elements between said indentations.

4. The basket defined in claim 3, in which the indentations of said intermediate support element are disposed at a level below the indentations of said radially inner and outer support elements.

5. The basket defined in claim 1, in which said retainer element indentations each comprise a pair of radially outwardly converging wall surfaces each having an intermediate portion defining an inwardly opening notch extending longitudinally between the top and bottom edges of said retainer element.

6. The basket defined in claim 1 characterized by an axial core portion for reception of mounting means whereby the basket is selectively moved vertically in a fluid bath and spun on its axis for centrifugal movement of fluid from said chambers and from articles supported therein.

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