

Jan. 10, 1967

G. N. HEIN

3,297,243

CENTRIFUGE DISC RETAINER

Filed Aug. 6, 1964

FIG. 1

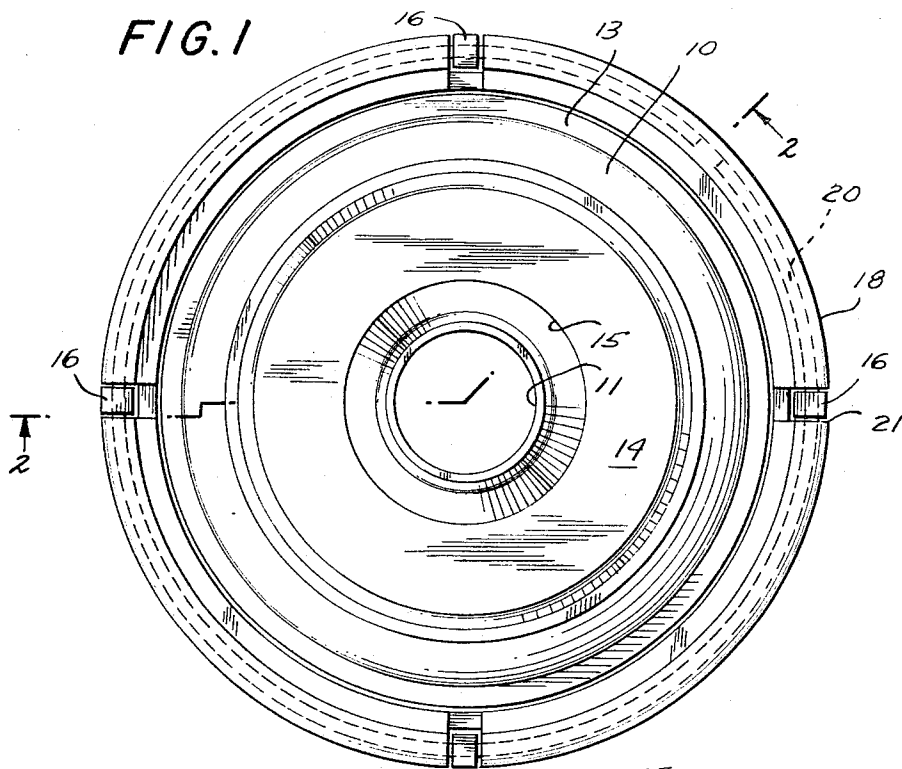


FIG. 2

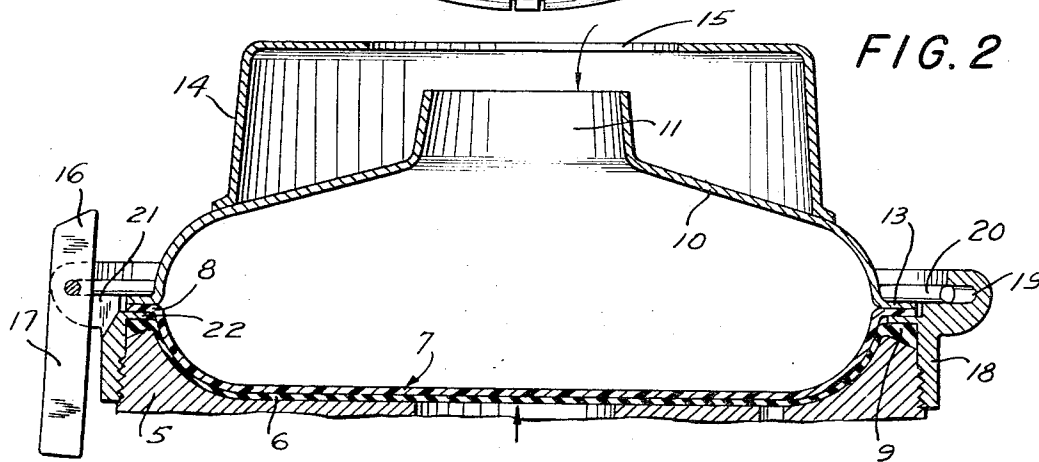
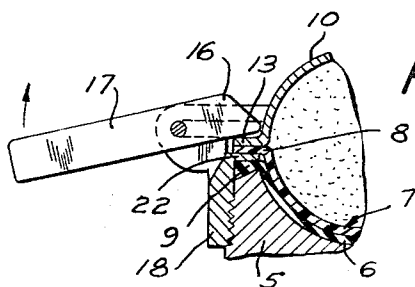


FIG. 3



INVENTOR
GEORGE N. HEIN
BY
Kane, Dalsimer & Kane
ATTORNEYS

1

3,297,243

CENTRIFUGE DISC RETAINER
George N. Hein, 331 Chesham Ave.,
San Carlos, Calif. 94070
Filed Aug. 6, 1964, Ser. No. 387,942
2 Claims. (Cl. 233-26)

This application is a continuation-in-part of my prior application Serial No. 277,759 filed May 3, 1963, now Patent No. 3,244,362 granted April 5, 1966, and entitled, "Centrifuging Apparatus and Fractionating System," which is, in turn, a continuation-in-part of my prior application Serial No. 822,561 filed June 24, 1959, now Patent No. 3,096,283 granted July 2, 1963.

This invention relates to a structurally and functionally improved retaining means for a receptacle which contains liquid such as blood to be subjected to the action of centrifugal force and thus separate the components of the liquid solution.

The present teachings are particularly applicable to a centrifuge of the type shown in my prior application for United States Patent, Serial No. 277,759, filed May 3, 1963, and entitled, "Centrifuging Apparatus and Fractionating System." As will hereinafter be apparent, the structure and principles disclosed in the present application would be equally applicable to similar apparatus.

It is a primary object of the invention to furnish a structure which will function automatically upon the centrifuge being operated and serve to anchor a liquid-containing receptacle in place in association with the centrifuge. This relationship will be maintained throughout the entire operating cycle of the apparatus.

A further object is that of designing a structure which will be of a simple and inexpensive nature and which will function in a positive manner; the operator experiencing no difficulty in applying or placing the receptacle in the assembly and removing it therefrom while the centrifuge is at rest.

With these and other objects in mind, reference is had to the attached sheet of drawings illustrating one practical embodiment of the invention and in which:

FIG. 1 is a plan view of the centrifuge head assembly;

FIG. 2 is a sectional side view of that assembly taken along the line 2-2 in the direction of the arrows in FIG. 1; and

FIG. 3 is a fragmentary sectional view of certain of the parts as shown in FIG. 2, but illustrating the positions which they assume when subjected to the action of centrifugal force.

In these views, the numeral 5 indicates the head assembly of a centrifuge which is preferably dish shaped to receive a similarly contoured diaphragm 6 conveniently formed of rubber. In turn, disposed upon the latter is a receptacle 7 which may be formed of a suitable plastic and having an outstanding peripheral flange 8 overlying a similar flange 9 of diaphragm 6.

A cover part of the receptacle 7 is also conveniently formed of plastic and includes a body 10 having a central upwardly extending neck portion 11. An outwardly projecting flange 13 is provided at the periphery of this cover or disc and overlies flange 8. An inverted dish-shaped member 14 may in turn overlie disc 10 and has a central opening 15 in its base as shown in my prior application.

A structure to anchor and retain the receptacle 7 in position upon rotor head 5 will involve pressure creating

2

means sensitive to the generation of centrifugal forces. A form of anchoring means has been shown and includes the short arms 16 of lugs pivotally supported adjacent the periphery of the assembly. This point of support is adjacent and slightly above the position assumed by flange 13 when in contact with flange 8. Therefore, and as shown in FIG. 3, if arms 16 is swung downwardly, its lower edge will engage and press against the upper surface of the disc flange to establish and maintain the desired relationship.

Operating means may preferably form parts, or extensions of the lugs. To this end the latter will include arm portions 17 of greater length than arms 16 and extending beyond the point of pivotal support. The arms 17 will involve greater mass than arms 16 and swing outwardly under the action of centrifugal force to thus shift the inner short arms of the lugs in positions as illustrated in FIG. 3. Obviously, as rotation of the head assembly ceases, the lugs will assume the position shown in FIG. 2 in which it is obvious that the receptacle 7 may readily be lifted from the rotor 5. While at least two lugs should be used (at points diametrically opposite each other in the periphery of the assembly) it is preferred as shown that four lugs be provided. As the need arises, more may be employed.

The lugs may be supported in a manner such that they may be readily removed and will in no way interfere with the receptacle and its parts. To this end, a bezel 18 may have screw threaded connection with the head assembly. Its upper part is provided with an inwardly facing groove 19. The latter receives a wire 20 which tends to expand and thus seat within the groove. The wire passes through openings in the lugs to thus pivotally support them. As illustrated especially in FIG. 1, the bezel is interrupted by slots 21 at points where the lugs are positioned. The width of these slots is greater than that of the lugs. Accordingly, these are free to swing outwardly from the position shown in FIG. 2 to that illustrated in FIG. 3 and to return to their initial positions. It is preferred that the bezel have an inwardly extending flange 22, which will lie between the flanges 8 and 9 to furnish a fixed assembly.

Under such circumstances, the head assembly is stationary. Therefore, the short arms 16 of the lugs are free of all receptacle parts. Accordingly, an operator will—without difficulty—take a receptacle 7 and place the latter in position on the rotor 5 and immediately initiate operation of the centrifuge. As rotation is initiated the retaining members will swing inwardly to maintain the desired retaining relationship. After rotation has ended, then the operator will have no difficulty in removing the cover.

It is obvious that among others the several objects of the invention as specifically aforementioned are thus achieved. Numerous changes in construction and rearrangement of the parts may be resorted to without departing from the spirit of the invention.

I claim:

1. In combination a rotatable centrifuge head assembly including an open topped rotor having a central dish-shaped recess accessible from the rotor open top, a flexible diaphragm in and conforming to said recess, said diaphragm providing an upper receiving surface and adapted to be flexed under fluid pressure while the rotor is rotating, a receptacle disposed upon said surface and adapted to contain liquid to be centrifuged, said recep-

3

tacle having lower flexible portions adapted to be engaged by said diaphragm and adapted to be flexed along with said diaphragm to change the capacity of said receptacle, centrifugally induced retaining means carried by the rotor and automatically movable under the action of centrifugal force to grasp and retain said receptacle against said diaphragm, said retaining means comprising a plurality of spaced lugs, each pivotally supported by said assembly to provide a smaller and a larger arm, the latter arm swinging outwardly under the action of centrifugal force and the smaller arm moving into clamping relationship and engagement with said receptacle as said larger arm thus swings.

2. In a structure as defined in claim 1, a bezel providing a part of said head assembly and having an inner surface formed with an outwardly extending groove, a wire within said groove and passing through openings in said lugs to provide pivots for the latter and said bezel

4

being formed with slots for the accommodation of said lugs.

References Cited by the Examiner

UNITED STATES PATENTS

955,355	4/1910	Preston et al.	233—29
1,303,203	5/1910	Hughes et al.	233—21
1,709,939	4/1929	Hewitt	233—20
2,883,103	4/1959	Whitehead et al.	233—27
3,133,882	5/1964	Mitchell et al.	233—26

FOREIGN PATENTS

1,250,997	12/1960	France.
1,260,968	4/1961	France.

M. CARY NELSON, *Primary Examiner.*

H. T. KLINKSIEK, *Assistant Examiner.*