March 1, 1949. J. T. CLARK 2,463,356

DIAPHRAGM

Filed April 1, 1946

Fig. 1.

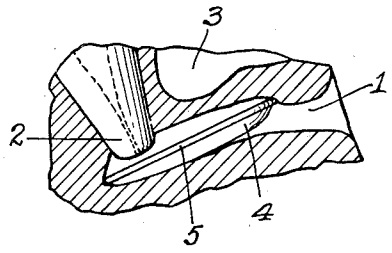


Fig. 2.

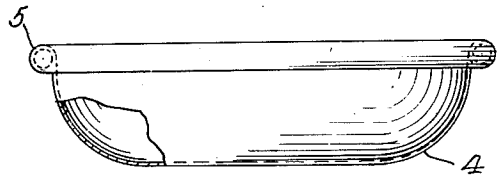


Fig. 3.

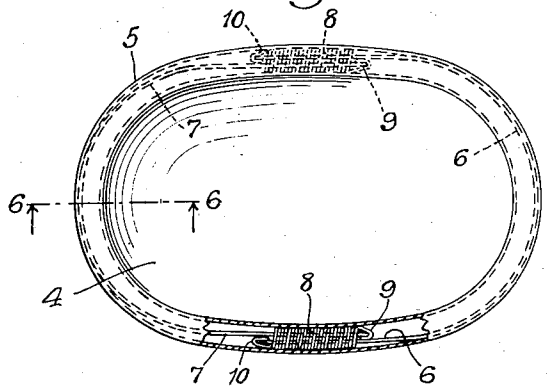


Fig. 6.

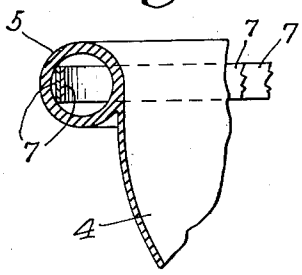


Fig. 4.

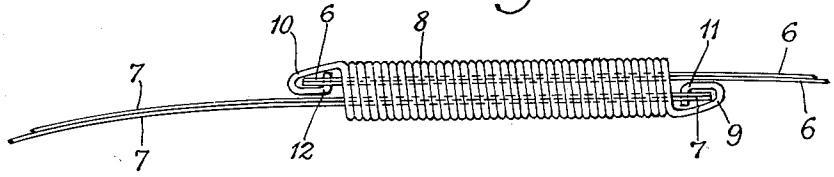
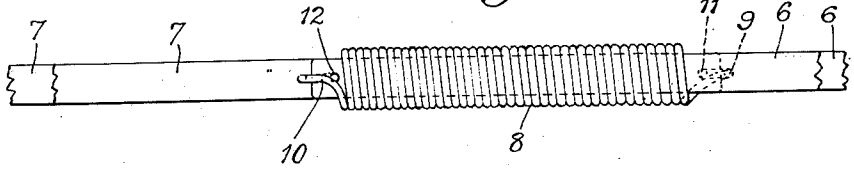


Fig. 5.



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DIAPHRAGM

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Application April 1, 1946, Serial No. 658,833

8 Claims. (Cl. 128—127)

1

This invention relates to a flexible and preferably elastic diaphragm. It has for one object to provide a self-adjusting diaphragm or pessary of variable size.

Another object is to provide in a diaphragm a construction in which the diaphragm, and particularly its periphery, tends to expand of itself to a size suitable to fit the cavity within which it is placed.

Another object is, therefore, to provide a diaphragm construction such that a diaphragm of a single size will automatically adjust itself to organs of many different sizes and hence will reduce the number of sizes of diaphragms which must be manufactured.

Another object is to provide an automatically adjustable diaphragm of such construction that although it is readily compressible, it will automatically expand toward its maximum size, the total expansion being limited by the size of the organ within which it is positioned.

Other objects will appear from time to time throughout the specification and claims.

This invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a diagrammatic view of a vagina with the device in place;

Figure 2 is a side elevation with parts broken away and parts in section, illustrating one form of the device;

Figure 3 is a plan view with parts broken away and parts in section, illustrating the device of Figure 2;

Figure 4 is a plan view on an enlarged scale showing a portion of the spring of the device;

Figure 5 is a side elevation of the spring shown in Figure 4; and

Figure 6 is a detailed section taken on an enlarged scale at line 6—6 of Figure 3.

Like parts are indicated by like characters throughout the specification and the drawings.

A vagina is indicated diagrammatically at 1. A cervix 2 is in communication with or projects into the vagina. The bladder is indicated at 3.

The device is shown in position in Figure 1 and it comprises a flexible and elastic member 4 which is preferably of rubber—natural or synthetic. Formed about the side of the member 4 and preferably integral therewith is a tubular portion 5 within which a spring is fitted freely. The spring in the particular form here shown comprises two flat spring sections joined by coils. The flat spring sections include members 6 and 7. Each of these may be as shown, formed of two

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members, so that the flat springs are in effect double or laminated flat springs, although they are joined to each other only at their ends.

About the adjoining and overlapping ends of the spring sections 6 and 7 are positioned coil springs 8, 8. Each coil spring is provided with loop or engaging portions 9 and 10, these portions being positioned, respectively, at opposite ends of the springs 8. The ends of the spring or springs 7 are perforated to receive the bent end 11 of the spring portion 9, which is thus secured to them. Correspondingly, the ends of the spring or springs 6 are perforated to receive the bent portion 12 of the spring section 10 and thus the spring sections 6 and 7 are positioned with their ends overlapping and are joined by the springs 8.

The springs 8 limit the outward movement of the flat springs with respect to each other, but permit inward movement so that the flat springs may be compressed and their ends moved along so that they overlap increasingly. As this occurs, of course, the springs 8 are expanded. The springs 8 are biased to close and to move to the position of Figures 3, 4 and 5, in which the overall size of the member formed by the springs 6, 7 and 8 is at its maximum.

Although I have shown an operative form of my invention, it will be recognized that many changes in the form, shape and arrangement of parts can be made without departing from the spirit of the invention, and my showing is therefore to be taken as, in a sense, diagrammatic.

In particular, the spring might be varied substantially. A single spring such as the springs 6 and 7 might be used, or multiple springs might be used. One or two or more than two coil springs might be used. In general the purposes of the invention will be satisfied if a spring construction is used by means of which the diaphragm tends to assume its maximum size when free to do so, but by means of which it may be compressed throughout a wide variation of sizes.

The use and operation of this invention are as follows:

The device will normally be inserted into the vagina by means of a tool which has a handle which is provided with portions to engage the rim 5 and the spring within the rim and thereby to narrow the width of the diaphragm. It is inserted into the vagina and the tool is withdrawn. Thereupon the spring expands to the maximum size possible within the organ and the diaphragm is thus extended over a greater or less area, depending upon the size of the organ and upon the expansion of the spring which that size makes

possible. The spring is of sufficient strength to accomplish this expansion and to hold the edges of the diaphragm in tight contact with the inner surface of the vagina.

The diaphragm thus forms in effect a flexible and elastic partition within the vagina which automatically adjusts itself to the size of the organ. The spring is preferably free within the tubular portion 5 so that in expansion and contraction it does not adhere to the sides of the tubular wall, but is free for relative movement, with respect to this wall. This permits ready expansion and contraction of the spring and avoids any interference with its action by the tubular portion 5 of any other part of the diaphragm, as such.

It is recognized that for many purposes a satisfactory action will be accomplished even if the spring were fixed to the diaphragm, but experience has shown that the freest and readiest adjustment will occur when the spring is free to move within and with relation to the tubular portion 5.

I claim:

1. In combination in a diaphragm structure, a sheet-like portion of concavo-convex section, and a tubular portion integral with and bounding said diaphragm, and a flexible spring positioned within said tubular portion, said spring being biased to expand to its maximum size, said spring being formed of relatively movable members and adapted to be compressed upon itself to reduce the effective circumference of the diaphragm structure.

2. In combination in a diaphragm structure, a sheet-like portion of concavo-convex section, and a tubular portion integral with and bounding said diaphragm, and a flexible spring positioned within said tubular portion and free for relative movement with respect thereto, said spring being biased to expand to its maximum size, and adapted to be compressed upon itself to reduce the effective circumference of the diaphragm structure.

3. In combination in a diaphragm structure, a sheet-like portion of concavo-convex section, and a tubular portion integral with and bounding said diaphragm, and a flexible spring positioned within said tubular portion and free for relative movement with respect thereto, said spring being biased to expand to its maximum size, said spring being formed of relatively movable members and adapted to be compressed upon itself to reduce the effective circumference of the diaphragm structure.

4. In combination in a diaphragm structure, a sheet-like flexible and elastic portion of concavo-convex section, and a tubular portion integral with and bounding said diaphragm, and a flexible spring positioned within said tubular portion and free for relative movement with respect thereto, said spring being biased to expand to its maximum size, and adapted to be compressed upon itself to reduce the effective circumference of the diaphragm structure.

5. In combination in a diaphragm structure, a sheet-like flexible and elastic portion formed of rubber of generally oval plan and concavo-convex section, and a tubular portion integral with and bounding the edge of said diaphragm, and a flexible spring positioned within said tubular portion and free for relative movement with respect thereto, said spring being biased to expand to its maximum size, said spring being formed of relatively movable members and adapted to be compressed upon itself to reduce the effective circumference of the diaphragm structure.

6. In combination in a diaphragm structure, a sheet-like portion of concavo-convex section, and a tubular portion integral with and bounding said diaphragm, and a flexible spring positioned within said tubular portion, said spring being biased to expand to its maximum size, said spring being formed of relatively movable members flexible and adapted to be compressed upon itself to reduce the effective circumference of the diaphragm structure.

7. In combination in a diaphragm structure, a sheet-like portion of concavo-convex section, and a tubular portion integral with and bounding said diaphragm, and a flexible spring positioned within said tubular portion, said spring being biased to expand to its maximum size, said spring being formed of relatively movable members flexible and adapted to be compressed upon itself to reduce the effective circumference of the diaphragm structure, said members including flat spring members positioned to define the border of the diaphragm structure and coil spring members engaging said flat spring members.

8. In combination in a diaphragm structure, a sheet-like portion of concavo-convex section, and a tubular portion integral with and bounding said diaphragm, and a flexible spring positioned within said tubular portion, said spring being biased to expand to its maximum size, said spring being formed of relatively movable members flexible and adapted to be compressed upon itself to reduce the effective circumference of the diaphragm structure, said members including flat spring members positioned to define the border of the diaphragm structure and coil spring members engaging said flat spring members, said coil spring members being biased to hold said flat spring members in outermost position, said flat spring members being readily flexible in a plurality of planes.

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