United States Patent [19]

Olson

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[54] **VAGINAL SPECULUM**

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[52] **U.S. Cl.** **128/20,** 128/343

[51] **Int. Cl.** **A61b 17/02**

[58] **Field of Search** ..... 128/3, 4, 17, 20, 341, 128/303 R, 343, 354, 345

[56] **References Cited**

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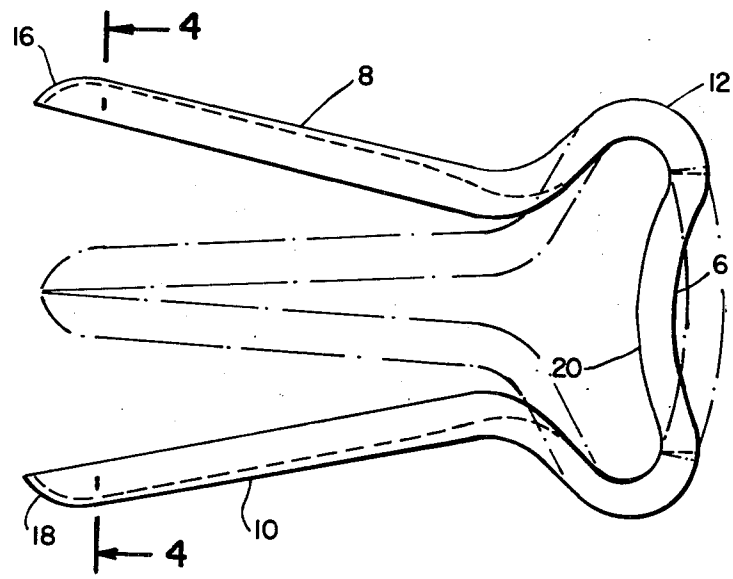
[57] **ABSTRACT**

A vaginal speculum formed as an integral unit and preferably of unitary molded construction. The speculum includes a pair of opposed legs diverging outwardly from an end wall which is suitably apertured to permit the passage of instruments, swabs, etc. The outer surface of the end wall is generally concave, and its connection to the legs produces a spring flexure whereby the distal ends of the legs may be resiliently urged together for insertion and removal of the speculum. The legs are also curved in a transaxial plane, permitting rotation of the speculum after insertion in the vagina. The construction is such permitting its disposal after a single use, but, if desired, permitting resterilization thereof for successive uses.

9 Claims, 4 Drawing Figures



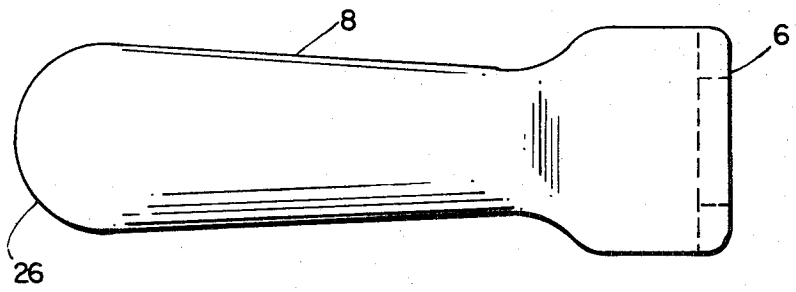


FIG_1

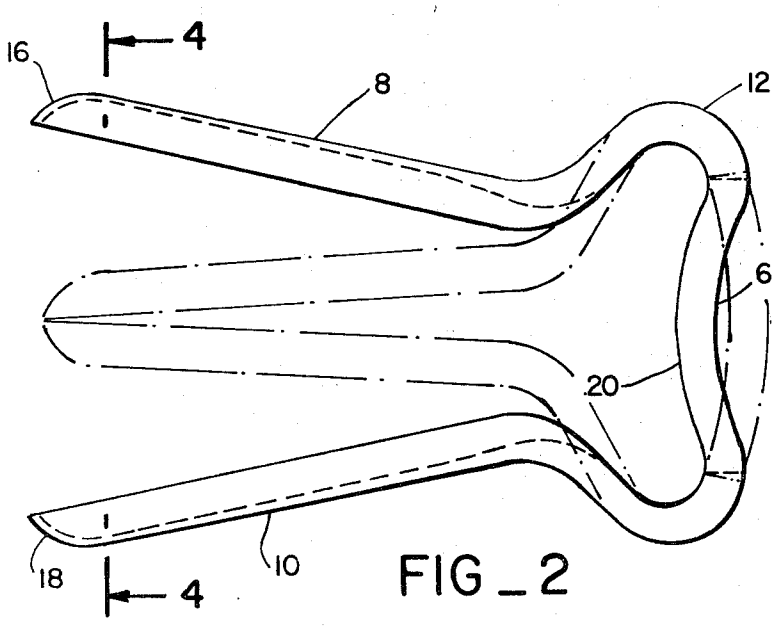


FIG_2

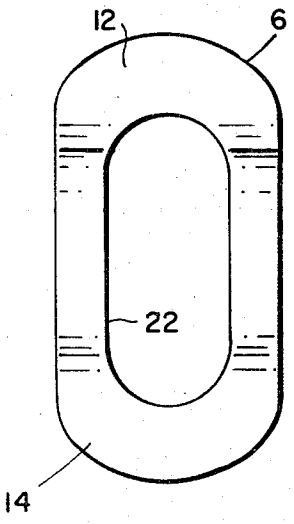
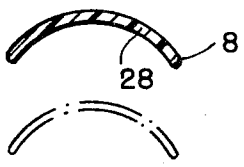


FIG_3



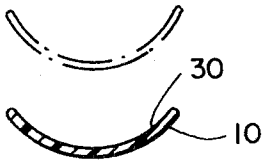


FIG_4

VAGINAL SPECULUM

BACKGROUND OF THE INVENTION

The use of vaginal speculums for the purpose of examination and surgical procedures is an accepted medical practice. However, currently available speculums possess a number of shortcomings and frequently are complicated in construction and difficult to use. For example, some such prior art devices have undesirable fulcrum points, two or more interlocking or interacting members, have screw threads or other mechanical means for effecting an expansive force on the walls of the vagina, are expensive to construct or do not readily lend themselves to a single usage, can cause discomfort to the patient, do not provide a sufficiently large opening for insertion of tools or the like, etc.

It is an object of the present invention to provide a vaginal speculum which overcomes the difficulties of the prior art devices, and which may be economically mass produced in such a manner as to permit the disposal of the same after a single usage, or which, in the alternative, may be resterilized for additional uses.

A further object of the invention is to provide a speculum as above described which may be formed of a material defining a light pipe for illuminating the vaginal cavity, and which is substantially transparent so as to permit a clearer view of the vaginal tissue.

Another object of the invention is to provide a speculum as herein defined which may be injection molded or otherwise formed of a unitary piece of material, which will automatically impose the desired spreading or expansive force when inserted, which may be rotated when in the vagina, and which provides a large end opening or aperture positioned closely adjacent the vaginal opening for facilitating the physician's subsequent procedures.

THE DRAWINGS

FIG. **1** is a top plan view of the vaginal speculum of the present invention;

FIG. **2** is a side elevational view thereof;

FIG. **3** is an end view; and

FIG. **4** is a cross-sectional view taken in the plane indicated by line **4—4** of FIG. **2.**

DESCRIPTION OF THE PREFERRED EMBODIMENT

In broad terms, the speculum of the present invention is of a unitary construction, and preferably injection molded from a plastic material such as polycarbonate. This material is a desirable one since it can properly be formed to give the spring-like effect later to be described; it is approved by the various federal agencies for medical devices of this nature; is generally transparent for better viewing of the tissue; is capable of being autoclaved or otherwise sterilized, but is sufficiently inexpensive to be considered a disposable item; and also can be used as a light pipe. If desired, the speculum could probably be stamped in multiple dies out of a metal such as stainless steel. This, however, would not provide any light pipe, transparency, or other desired features of this invention.

As shown, the speculum includes an end wall **6,** a pair of legs **8** and **10,** and curved connecting portions **12** and **14** connecting the legs to the ends of wall **6.** For purpose of explanation only, the width of end wall **6** is approximately 1 ½ inches while the length of the legs, i.e., from their distal ends **16, 18** to their juncture with portions **12, 14** is about 4 inches.

As best shown in FIG. **2,** end wall **6** is curved inwardly as indicated at **20** towards the legs, and as shown in FIG. **3,** an aperture **22** occupies most of the area of such end wall. As will be understood, when the speculum is inserted in the vagina, the curvature **20** assists in the spring flexture of the legs **8** and **10,** and equally important, positions the aperture **22** closer to the vaginal opening than if the wall **6** was straight. This permits both better viewing by the physician and closer access for any surgical or other procedures through the opening **22.** Also, since such opening is relatively large, the insertion of instruments therethrough is facilitated.

Legs **8** and **10** diverge outwardly from their connection with the reentrant curved portions **12** and **14** but due to the shape of the latter and the curve **20** in the end wall **6,** the legs may be inwardly flexed, as shown in dot-dash lines in FIGS. **2** and **4,** by squeezing the same together until they assume a generally parallel configuration, and with the distal ends of the legs generally in contact with each other. In this position of the legs, the end wall **6** will also flex as indicated by the dot-dash lines. In this position the speculum may be inserted in the vagina, and in plan, the ends of the legs are of generally semi-circular shape, as indicated at **26,** to facilitate such insertion. After insertion, the spring flexure of the legs will tend to cause them to go back to their normal divergent condition. Preferably a maximum spring pressure of about 10 to 15 pounds is provided which is sufficient to effect a proper opening of the vaginal cavity without damage or undue discomfort to the patient.

In cross-section, each leg is outwardly curved, i.e., the confronting surfaces **28, 30** of legs **8** and **10** are of concave configuration. Such curvature not only permits more ready insertion of the device, but permits rotation of the speculum when within the vaginal cavity without collapsing or pulling or otherwise causing discomfort to the patient.

It will also be noted that each leg, in plan, slightly tapers from a maximum width adjacent its distal end to a minimum width adjacent its juncture with the curved re-entrant portions **12** and **14.** Such taper will prevent the accidental ejection of the speculum due to any involuntary muscle spasm, but will not create any problem in the deliberate removal of the device.

As above mentioned, by making the speculum of a clear plastic such as polycarbonate, and by abrading the edge surfaces of the legs, except for the ends **16, 18,** the speculum can be used as a light pipe with light being introduced into the end wall **6** in any conventional manner.

The construction described above is extremely simple but provides a highly efficient mechanical spring without possibility of injury to the patient. Even if the speculum should fracture or break after or during insertion, no damage would result to the vaginal tissue. Also, since the speculum portions in contact with the vaginal wall are all curved, comfort and safety are further assured. The opening **22,** due to the end wall curve **20,** is positioned closely adjacent to the vaginal opening for better visibility and access, and the opening **22** is sufficiently large to accommodate the necessary instru-

ments, swabs or the like which may be required for exploratory or surgical procedures.

I claim:

1. A U-shaped vaginal speculum comprising a web end wall, legs resiliently and integrally formed in one piece with said end wall, said legs extending substantially transversely from said end wall and normally diverging angularly each from the other in the unstressed condition, said legs and end wall being constructed of spring material so that said legs are resiliently movable to a generally parallel relationship without any permanent deformation, and said end wall including an arcuate portion normally curved inward toward said legs in the unstressed condition, and said arcuate portion having an aperture therethrough constituting means providing examination and operating access.

2. A speculum as set forth in claim **1** in which said end wall is annular with a small relative thickness so that said aperture extends for substantially the entire area of said end wall.

3. A speculum as set forth in claim **1** in which each leg is curved in cross-section generally perpendicular to its extent with the confronting surfaces of said legs being of concave configuration.

4. A speculum as set forth in claim **1** in which the distal end of each leg opposite said end wall is rounded so that when said legs are resiliently deformed together, they will form a rounded end for easy insertion in the vagina.

5. A speculum as set forth in claim **1** in which the outer surfaces of said legs are of convex configuration in cross-section generally perpendicular to their extent and in which said legs in their generally parallel positions have their distal ends spaced closer together than the height of said end wall.

6. A speculum as set forth in claim **5** in which the end portions of said end wall curve outwardly, then upwardly and then inwardly to join with said legs.

7. A speculum as set forth in claim **1** formed of a clear synthetic resin material.

8. A speculum as set forth in claim **7** in which portions of said material are roughened whereby said legs constitute light pipe means for conducting light from said end wall inwardly along the length of said legs.

9. A speculum as set forth in claim **1** in which said legs are tapered in width from closely adjacent their distal ends to said end wall to provide means for maintaining the device in the vagina.

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