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F. W. KOFF  
SURGICAL APPLIANCE  
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2,707,956

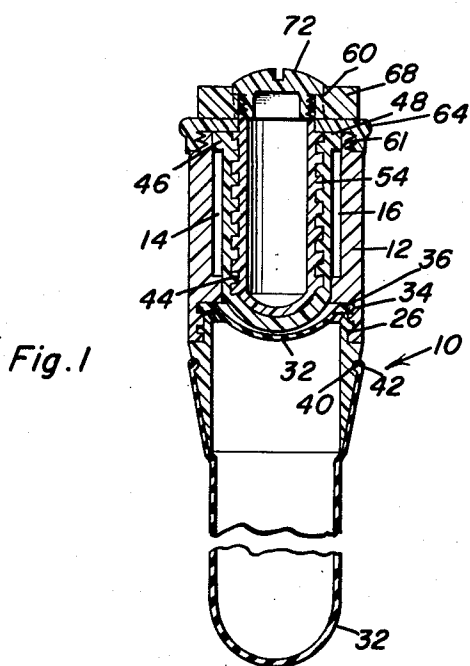


Fig. 1

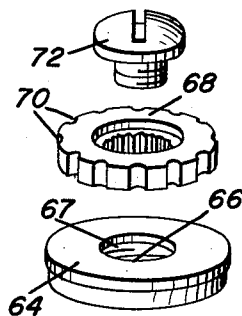


Fig. 3

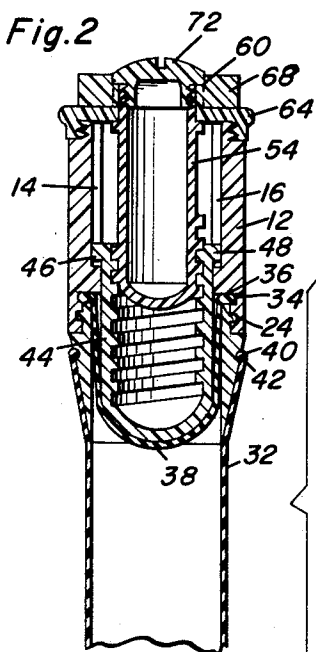


Fig. 2

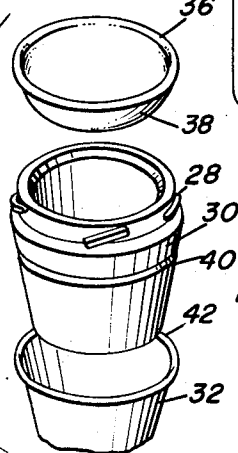


Fig. 4

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1

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## SURGICAL APPLIANCE

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Application June 1, 1954, Serial No. 433,501

5 Claims. (Cl. 128—341)

This invention relates to a surgical appliance and more particularly to an improved flexible dilator and is a continuation-in-part of the co-pending application U. S. Serial No. 325,619, filed December 12, 1952, for Surgical Appliance.

The application of heat in the treatment of many ailments is of therapeutic value. When applying heat to the various body openings it is common practice to use a dilator. However, some of the openings in the body in which dilators have been used have an inner lining or layer of muscular convolutions which resist dilation and cause discomfort to the patient when such surgical appliance is used. It is therefore the primary object of this present invention to provide a dilator which is capable of being made rigid for insertion but after entering the body openings, pressure can be reduced within the confines of the dilator to permit the dilator to readily conform to the shape of the body opening and to thus afford the patient greater comfort than afforded by prior art devices.

A further object of this invention resides in the provision of a surgical appliance which has means for adjusting the rigidity and internal pressure of the dilator with a great degree of sensitivity.

A further object of the invention resides in the provision of means for assuring that the incompressible fluid such as water used in the dilator will remain sealed within the container portion of the dilator thereby maintaining the dilator at its preset rigidity and internal pressure.

The construction of this invention features a novel plunger which actuates a diaphragm to control the rigidity of a flexible container.

Still further objects of this invention reside in the provision of a surgical appliance which is strong and durable, comparatively simply in construction and manufacture, which can be made of materials easily sterilized and yet of relatively low cost so that the device can be widely utilized and distributed.

These, together with the various ancillary objects and features of the invention which will become apparent as the following description proceeds, are attained by this improved surgical appliance, a preferred embodiment of which has been illustrated in the accompanying drawings, by way of example only, wherein:

Figure 1 is a vertical sectional view of the improved surgical appliance shown in a non-pressurized position;

Figure 2 is a sectional detail view of the invention shown in a rigid and pressurized position;

Figure 3 is an exploded perspective view of the upper portions of the invention; and

Figure 4 is an exploded perspective view of other portions of the surgical appliance.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views, reference numeral 10 generally designates the improved surgical appliance comprising the present invention which in-

2

cludes a body 12 having keyways 14 and 16 provided in the interior walls 18 formed by the axial bore 20 extending therethrough. The body 12 has a neck portion 22 of reduced cross sectional area which is externally threaded as at 24.

The body 12 is internally threaded as at 26 in the lower portions thereof for reception of the externally threaded portion 28 of an adaptor 30 to which a flexible container 32 is attached. The body 12 has an annular groove 34 for reception of the peripheral edge 36 of a diaphragm 38, the edge 36 being if desired of rolled or beaded construction. The adaptor 30 may be provided with a peripheral groove 40 for reception of the rolled edge 42 of the flexible container 32. The flexible container 32 may be formed of relatively thin material.

Movably positioned within the body 12 is a plunger 44 which has keys 46 and 48 thereon which is adapted to seat within the confines of the keyways 14 and 16.

The plunger 44 is internally threaded as is shown at 50 for threaded engagement with the externally arranged threads 52 on an operating shaft 54. The operating shaft 54 is of hollow construction and is internally threaded at its upper end 56 while being provided with a plurality of ribs 60 which are annularly arranged at the upper end thereof. A collar portion 62 is also formed on the operating shaft 54.

A holding collar 64 having an opening 66 therethrough is positioned about the operating shaft 54 and adapted to seat on the collar 62. The holding collar 64 is internally threaded as at 67 for threaded engagement with the threads 24 on the body 12 to lockingly hold the operating shaft 54 against axial movement while permitting the rotation thereof. A disk 68 for rotating the shaft 54 which is knurled or provided with ribbed portions as at 70 is positioned over the rib portions 60 of the shaft 54 and held in place by means of a fastener 72 having a head holding the disk 68 in position while being threadedly engaged with the threads 56 of the operating shaft 54.

The operation of this device is quite simple. With a substantially incompressible fluid such as water within the container 32, the disk 70 may be rotated until the shaft 54 has caused the plunger 44 to move to the position as is shown in Figure 2 thus moving the diaphragm 38 inwardly of the container 32 and applying pressure upon the fluid. This rigidifies the container 32. After the dilator has been inserted, the disk 68 may be rotated in the reverse direction to back off on the plunger 44 so that the pressure on the container 32 may be eased permitting the container 32 to conform to the convolutions of the internal cavity in which the device is being utilized. Further, it is to be recognized that the entire device may be heated as desired and that the fluid contained within the container 32 can provide the heat necessary to render the therapeutic treatment.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A surgical appliance comprising a hollow cylindrical body, means attaching a flexible tubular container to said body, said container being filled with a substantially incompressible fluid, a plunger in said body, a diaphragm extending across said body closing

3

said body, and means for actuating said plunger to expand said diaphragm pressurizing and rigidifying said flexible container.

2. A surgical appliance comprising a hollow cylindrical body, means attaching a flexible tubular container to said body, said container being filled with a substantially incompressible fluid, a plunger in said body, a diaphragm extending across said body closing said body, said plunger being internally threaded, an operating shaft, a collar secured to said body rotatably attaching said shaft to said body against axial movement of said shaft with respect to said body, and means for rotating said operating shaft to move said plunger to expand said diaphragm pressurizing and rigidifying said flexible container.

3. A surgical appliance comprising a hollow cylindrical body, means attaching a flexible tubular container to said body, said container being filled with a substantially incompressible fluid, a plunger in said body, a diaphragm extending across said body closing said body, said plunger being internally threaded, an operating shaft, a collar secured to said body rotatably attaching said shaft to said body against axial movement of said shaft with respect to said body, and means for rotating said operating shaft to move said plunger to expand said diaphragm pressurizing and rigidifying said flexible container, said means for rotating said operating shaft comprising a disk keyed to said shaft, said shaft being internally threaded, and a fastener engaging said disk threadedly secured to said shaft holding said disk on said shaft.

4. A surgical appliance comprising a hollow cylindrical body, means attaching a flexible tubular container to said body, said container being filled with a substantially incompressible fluid, a plunger in said

4

body, a diaphragm extending across said body closing said body, said plunger being internally threaded, an operating shaft, a collar secured to said body rotatably attaching said shaft to said body against axial movement of said shaft with respect to said body, and means for rotating said operating shaft to move said plunger to expand said diaphragm pressurizing and rigidifying said flexible container, said body having at least one keyway therein, said plunger having a key attached thereto engaged in said keyway for preventing rotation of said plunger while permitting axial movement of said plunger relative to said body.

5. A surgical appliance comprising a hollow cylindrical body, means attaching a flexible tubular container to said body, said container being filled with a substantially incompressible fluid, a plunger in said body, a diaphragm extending across said body closing said body, said plunger being internally threaded, an operating shaft, a collar secured to said body rotatably attaching said shaft to said body against axial movement of said shaft with respect to said body, and means for rotating said operating shaft to move said plunger to expand said diaphragm pressurizing and rigidifying said flexible container, said body having at least one keyway therein, said plunger having a key attached thereto engaged in said keyway for preventing rotation of said plunger while permitting axial movement of said plunger relative to said body, said means for rotating said operating shaft comprising a disk keyed to said shaft, said shaft being internally threaded, and a fastener engaging said disk threadedly secured to said shaft holding said disk on said shaft.

No references cited.