

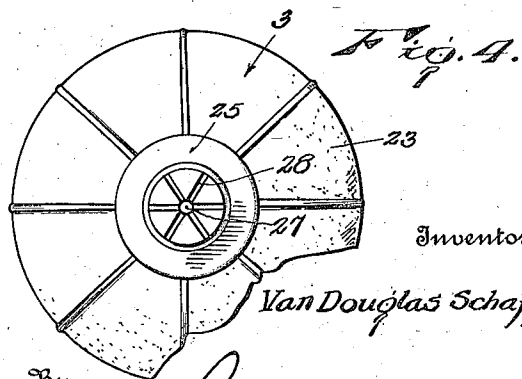
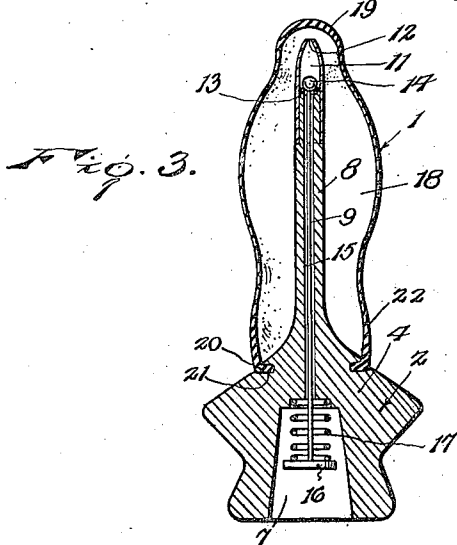
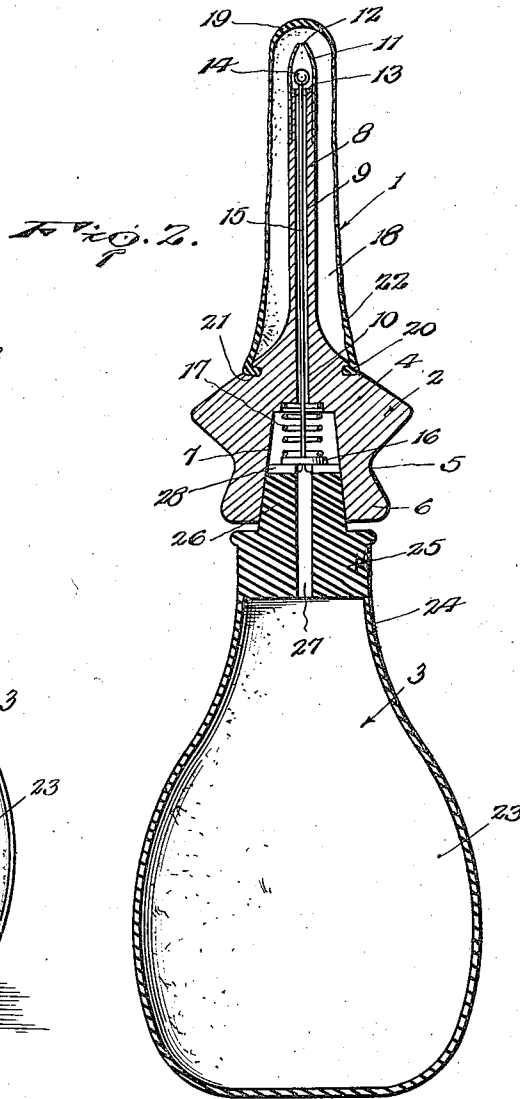
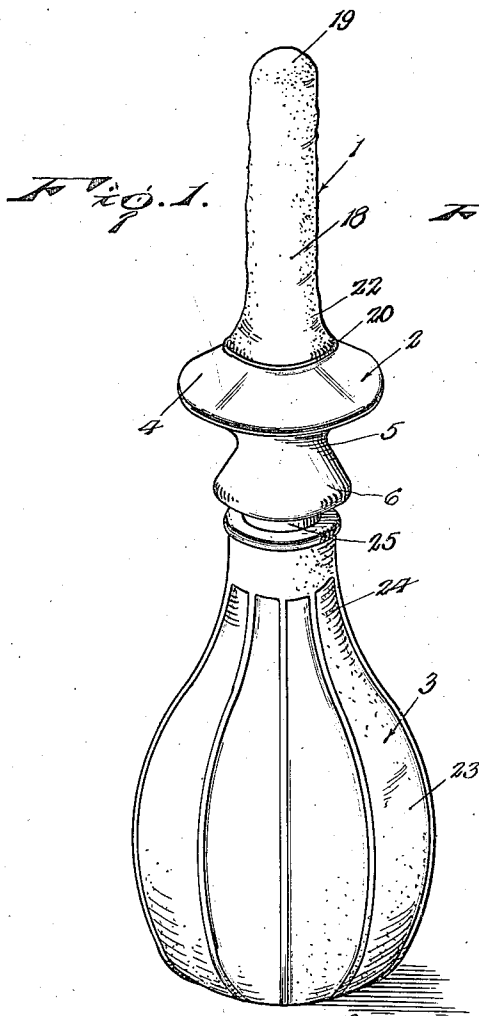
VAN DOUGLAS SCHAFF.

DILATOR.

APPLICATION FILED JULY 30, 1921.

1,413,789.

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DILATOR.

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Specification of Letters Patent. Patented Apr. 25, 1922.

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To all whom it may concern:

Be it known that I, VAN DOUGLAS SCHAFF, citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Dilators, of which the following is a specification.

This invention relates to improvements in dilators and while the dilator of the present invention is designed primarily for rectal use, the principles of the invention may find embodiment in dilators for other body cavities.

The primary object of the present invention is to provide a dilator which will prove highly efficient in acting upon the muscles, for example, the sphincter muscles, to increase the elasticity and strengthen the muscles.

Another object of the invention is to provide a dilator so constructed that it may be employed in massaging the muscles by alternate distension and relaxation, and may be also employed as a more or less permanent dilating medium.

The dilator embodying the invention includes as one of its component parts, an inflatable distending member, and another object of the invention is to provide valved means for inflating this member and thus dilating the same to the required dimensions, and which means may be so manipulated as to provide for alternate dilation and collapse of the distending member or a more or less permanent dilation of the said member.

Another object of the invention is to support the distending member in such a manner that it may be readily inserted in the cavity to be dilated and in proper position to best perform this function.

Another object of the invention is to provide, in a device of this class, an inflating means for the distending member which may be readily and conveniently assembled with and separated from the support for the member so that, when occasion requires, the inflating means may be employed to inflate the distending member and may then be separated from the support for the said member, leaving the member inflated and within the cavity.

Another object of the invention is to provide in connection with the support for the inflatable distending member, a valve arranged to close automatically instantly upon

separation of the inflating means from the said support so that after the distending member has been inflated, the inflating means may be separated from the support for the said member and said member will remain inflated.

Another object of the invention is to so construct the inflatable distending member as to provide for dilation of this member in a manner to best act upon the muscles of the cavity and without producing any appreciable elongation of said member.

Other objects and advantages will appear as the description proceeds.

In the accompanying drawings:

Figure 1 is a perspective view of the dilator embodying the invention.

Figure 2 is a vertical axial sectional view therethrough.

Figure 3 is a detail sectional view through the distending member and its support, the said member being inflated to a degree.

Figure 4 is a plan view looking at the upper end of the inflating bulb.

In general, the dilator embodying the invention comprises an inflatable distending member indicated in general by the numeral 1, a support therefor indicated by the numeral 2, and an inflating means indicated by the numeral 3, separably assembled with the support 2 and adapted to be manipulated to supply air to the inflatable distending member 1. The support 2 comprises a head 4 which may be of hard rubber or any other material found suitable for the purpose and which is approximately of double conical form and which is formed, below its line of maximum diameter, with a circumscribing groove 5 located above a circumscribing shoulder 6, which groove and shoulder permit the head to be firmly grasped in the hand while the dilator is being positioned and while the inflating means 3 is being assembled with the head or separated therefrom. The head is provided in its lower end with a tapered socket 7, the purpose of which will presently be explained, and the head is formed at its upper end with an axially extending elongated valve casing 8 of tubular form. The casing 8 may be integral with the head or formed separate therefrom and suitably connected therewith, and the bore of this casing is indicated by the numeral 9 and is continued as at 10, through the upper end portion of the head and communicates at its lower end

with the socket 7. At its outer end, the tubular valve casing 8 is provided with a substantially conoidal tip 11 provided at its apex with an opening 12 for the passage of air. At the base of the tip 11, the casing is formed interiorly with a valve seat indicated by the numeral 13, and the numeral 14 indicates the ball valve which is designed to rest upon the seat 13 and to control the passage of air through the bore of the valve casing. A stem 15 extends from the valve head 14 through the bore 9 and the portion 10 thereof and at its lower end into the socket 7 in the head 2, this stem being provided at its said lower end with a flat circular head 16 against which bears the lower end of a coil spring 17 disposed about the lower end portion of the valve stem 15, the upper end of this spring bearing against the top wall of the socket 7 as clearly shown in Figures 2 and 3 of the drawings. It will now be understood that the spring 17 normally holds the valve 14 to its seat 13 and that when the valve is closed, air cannot pass through the bore of the valve casing. However, the valve is to be moved to open position in a manner and by means to be presently described.

The inflatable distending member 1 is preferably formed of soft rubber and the same comprises a tubular body 18 closed at its outer end as at 19, and provided at its inner end with a circumscribing bead 20 which is fitted into a circumscribing seating channel 21 formed about the upper portion of the body 4 of the head 2. The bead 20 is designed to have a snug fit in the channel 21 so as to provide an air-tight connection between the inner end of the member 18 and the head 2. By reference to Figures 2 and 3 of the drawings, it will be observed that inflatable distending member 18 completely encloses the tubular valve casing 8 and that the said casing is of a length nearly equal to that of the body 18 of the member 1 so that even when the said member 1 is deflated it will be afforded support by the tubular valve casing and particularly in the operation of introducing the member 1 into the rectum or other cavity to be dilated.

The member 1 is preferably formed with relatively thin walls so as to provide for ready inflation and distension but it is preferable that the end 19 of said member be formed somewhat thicker than the walls of the body 18 and that the member at its inner end be likewise somewhat thickened as indicated by the numeral 22, so that in the first instance, the admission of air under pressure into the member 1 will tend to circumferentially distend or expand this member without likelihood of any appreciable elongation thereof due to the increased thickness of the head 19, which because of

its increased thickness is not so readily distensible as the walls of the body 18. Likewise, by forming the walls of the said body somewhat thicker at the inner end of the body, these portions will not be dilated or distended to the same extent as the main portion of the walls of the body.

The inflating means of the device comprises a bulb which is indicated by the numeral 23 and which is provided with a short neck 24 terminating in a nipple 25. The nipple 25 has an outer end portion 26 which is reduced in diameter and tapered to conical form as shown in Figure 2 of the drawings, and is of a diameter to fit more or less snugly within the socket 7 of the head 2. The nipple 25 is provided with an air passage 27 communicating at one end with the bulb and opening at its other end through the extremity of the portion 26 of the nipple. The base of the nipple at its end is provided with a series of air passages 28 in the form of grooves radiating from the outer end of the passage 27, and while, when the nipple is fitted in the socket 7 its said end will contact the head 16 at the lower end of the valve stem 15, this head will not close the end of the passage 27, but air may pass around the said head 16 through the grooves or passages 28. It will now be evident, and particularly by reference to Figure 2 of the drawings, that when the nipple 25 has its portion 26 fitted into the socket 7 in the head 2, the end of the said portion 26 will engage the head 16 at the lower end of the valve stem 15, and the stem will be shifted longitudinally in the bore of the tubular valve casing, thereby lifting the valve 14 from its seat 13. Then, when the bulb 23 is compressed, air will be delivered through the passage 27 and the bore of the valve casing and through the openings 12 in the end of the casing, into the inflatable distending member 1, and the said member 1 will be inflated and distended substantially as shown in Figure 3. When the bulb 23 is relieved of pressure, air will flow back from the member 1 into the bulb, and the said member will collapse. Thus, by repeatedly compressing the bulb 23 and relieving the same of pressure, the member 1 may be alternately inflated and deflated and will, therefore, be expanded and collapsed, thus massaging the muscles of the cavity in which the device is inserted. Should it be desired to more or less permanently distend the cavity into which the distending member 1 is fitted, this may be accomplished by pressing the bulb 23 to inflate and distend the member 1 to the requisite degree, whereupon the bulb 23 may be immediately separated from the head 2 while pressure is maintained thereon, thus permitting the spring 17 to act to close the valve 14 and trap the air which has been delivered into the distending mem-

ber 1. When it is desired to remove the distending member from the cavity, the finger may be inserted in the socket 7 and the valve stem shifted by pressure to unseat the valve and permit the escape of the trapped air, or, if desired, the bulb 23 may be fitted to the head 2 and in this operation, as previously explained, the valve will be automatically moved to open position.

10 While, as previously stated, the member 1 is preferably formed of thin, soft rubber, and is provided with the thickened portions 19 and 22, the same may, if desired, be formed of a combination of rubber and
15 fabric.

Having thus described the invention, what is claimed as new is:

1. A dilator comprising a head, an elongated valve casing extending therefrom and having an air passage in its outer portion, a valve seat within the casing, a valve for coaction with the seat and having a stem extending within the casing and into the head, an inflatable distending member enclosing the valve casing and afforded support thereby, and inflating means separately connected with the said head and adapted to be manipulated to inflate the distending member.

2. A dilator comprising a head, an elongated valve casing extending therefrom and having a tip, said casing being formed with an air passage opening through the end of the tip, a valve seat within the casing, a valve for coaction with the seat and having a stem extending within the casing and into the head, an inflatable distending member enclosing the valve casing and afforded support thereby and connected with the said head, and inflating means connected with the head and in communication with the adjacent end of the air passage in the valve casing.

3. A dilator comprising a head, an elongated valve casing extending therefrom and having an air passage in its outer portion, a valve seat within the casing, a valve for coaction with the seat and having a stem extending within the casing and into the head, an inflatable distending member enclosing the valve casing and afforded support thereby in its collapsed condition, the head having a socket into which the end of the valve stem projects, and inflating means including an element removably insertable in said socket and adapted upon insertion to engage the end of the valve stem and shift the same to unseat the valve.

4. A dilator comprising a head, an elongated valve casing extending therefrom and having an air passage in its outer portion, a valve seat within the casing, a valve for coaction with the seat and having a stem ex-

tending within the casing and into the head, an inflatable distending member enclosing the valve casing and afforded support thereby in its collapsed condition, the head having a socket into which the end of the valve stem projects, and inflating means including an element removably insertable in said socket and adapted upon insertion to engage the end of the valve stem and shift the same to unseat the valve, and a spring upon the valve stem within the socket in the head normally tending to seat the valve.

5. A dilator comprising a head having a socket, an elongated valve casing extending from the head and having an air passage in its outer portion, a valve seat within the casing, a valve for coaction with the seat and having its stem extending within the casing and into the socket in the head, an inflatable distending member enclosing the valve casing and afforded support thereby in its collapsed condition, a bulb provided with a nipple removably fitted in said socket and having an air passage therethrough, a head upon the valve stem within the socket engageable by the end of the nipple when the nipple is fitted into the socket whereby to effect opening of the valve, and means influencing movement of the valve to closed position.

6. A dilator comprising a head having a socket, an elongated valve casing extending from the head and having an air passage in its outer portion, a valve seat within the casing, a valve for coaction with the seat and having its stem extending within the casing and into the socket in the head, an inflatable distending member enclosing the valve casing and afforded support thereby in its collapsed condition, a bulb provided with a nipple removably fitted in said socket and having an air passage therethrough, a head upon the valve stem within the socket engageable by the end of the nipple when the nipple is fitted into the socket whereby to effect opening of the valve, and means influencing movement of the valve to closed position, the said end of the nipple being provided with air passages radial to the first mentioned passage in the nipple whereby to conduct air past the head upon the valve stem.

7. A dilator comprising an inflatable distending member, a head supporting the same, a valve for controlling the passage of fluid under pressure to the distending member, and inflating means separably assembled with the head and including an element coacting with the valve, in its assembled relation, to unseat the same.

In testimony whereof I affix my signature.

VAN DOUGLAS SCHAFF. [L. S.]