I. O. CRITTENDEN.

SURGICAL INSTRUMENT.

APPLICATION FILED NOV. 28, 1913.

1,175,129.

Patented Mar. 14, 1916.

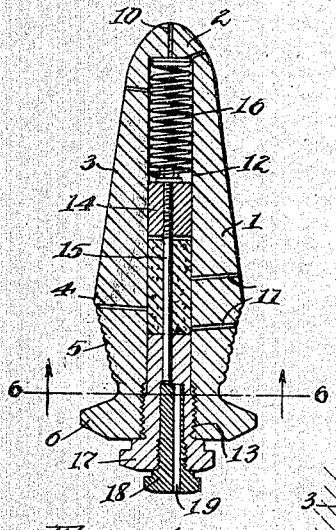


FIG. 1.

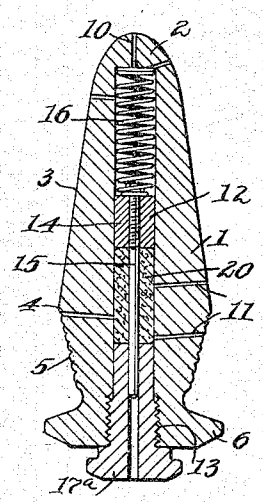


FIG. 2.

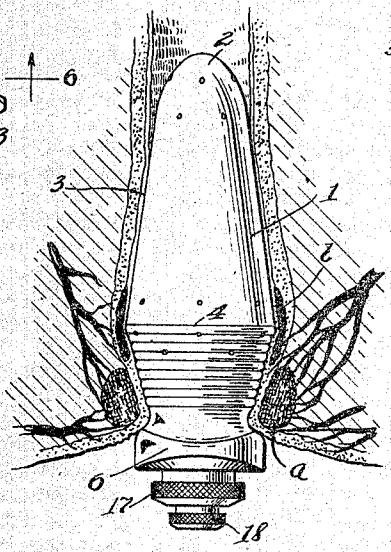


FIG. 3.

FIG. 4.

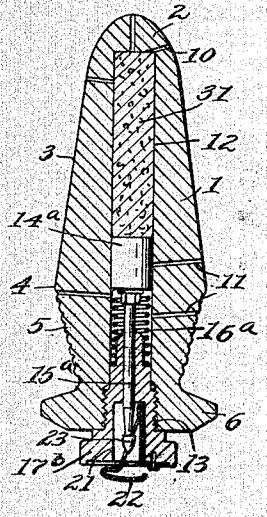
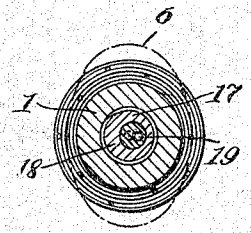
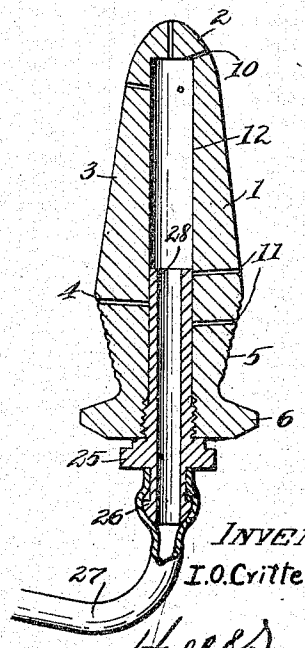


FIG. 5.

FIG. 6.





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SURGICAL INSTRUMENT.

1,175,129. Specification of Letters Patent. Patented Mar. 14, 1916.

Application filed November 28, 1913. Serial No. 803,467.

To all whom it may concern:

Be it known that I, IMMER O. CRITTENDEN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Surgical Instruments, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to surgical instruments and particularly to that class of instruments known as dilators, which are frequently used in the treatment of constipation, piles, hemorrhoids, and kindred diseases.

Among the objects of the invention are the provision of a device of this character the different parts of which are so arranged, constructed and related to each other as to operate most effectively upon the parts involved; the provision of new and improved expedients for retaining the same in place; the provision of new and improved means for effecting the medication of the diseased parts; the provision of new and improved devices for governing the operation of the medicating means; while further objects and advantages of the invention will become apparent as the description proceeds.

In the drawings accompanying and forming a part of this application I have illustrated certain constructions in which my invention can be embodied although it will be apparent that the devices herein illustrated are only a small number of those in which my inventive idea can be employed.

In these drawings Figure 1 represents a central longitudinal cross sectional view through a preferred form of my invention; Fig. 2 represents a similar view of a modified form of device; Fig. 3 is a similar view of another modification arranged to effect the medication at the opposite ends of the device; Fig. 4 is a similar view showing the arrangement of the device for employment as a syringe; Fig. 5 is a view showing the device in operative position, the dilator being shown in elevation; Fig. 6 is a cross sectional view taken upon line 6—6 of Fig. 1.

Describing the parts by reference characters 1 represents the body of the instrument and consists of a tubular cannula of hard rubber or the like insoluble and non-corrodible substance, preferably having a blunt or rounded extremity 2, merging with a slowly tapering portion through which it reaches its maximum diameter substantially at the point 4 from which it decreases gradually in size as at 5 to the base of the instrument which is defined by a flange 6. The flange is preferably of an oval shape as shown in Figs. 5 and 6 the better to be accommodated by the shape of the parts with which the instrument is to be used, and the distance of the portion 4 from the flange 6 is preferably substantially $1\frac{1}{8}$ inches. The reason for this dimension lies in the fact that the most important of the parts to be treated consist of two muscles, the external and internal sphincters, the former of which (shown at *a* in Fig. 5) is voluntary, and the latter (shown at *b* in Fig. 5) is involuntary. The involuntary muscle is the one which more frequently requires treatment and this ordinarily occurs at from 1 inch to $1\frac{1}{4}$ inches within the body. Accordingly the construction of the instrument in the manner I have described causes the same to exert a maximum of effect upon this internal sphincter, a consideration which, so far as I know, has never before been attended to.

The portion 5 of the instrument is preferably formed with a plurality of rounded circumferential corrugations the better to effect the retaining of the device in operative position, the same being of uniform size and regular contour so as to irritate the parts to the smallest extent and also be susceptible of easy cleaning.

For permitting medication of the parts I provide the instrument with a plurality of ducts 10—10 opening through the end 2 and also with ducts 11—11 opening through the body adjacent to the portion 4, all of these ducts communicating at their inner ends with the internal chamber 12. This chamber is of cylindrical shape and extends from a point adjacent to the end 2 through the flange 6, the outer end of this chamber being screw-threaded as at 13. As previously explained the internal sphincter is the seat of most ailments for which devices of this character are used, but previous devices of this character have generally been at fault in applying medication, if at all, at a point so far inside of this muscle as to lose much of their effect. According to the preferred form of my invention I provide the chamber 12 with a closely fitting slidable piston 14 having projecting from one side an axial rod or stem 15 and having secured to its opposite side a compression spring 16. In the

threaded portion 13 of the chamber I mount a plug 17 having an axial bore adapted to receive snugly the stem 15. The outer end of this bore preferably merges with an internally threaded, eccentric recess in which is located the rotatable button 18. This button is in turn provided with an eccentric bore 19 arranged to be turned into and out of alinement with the stem 15 as the button is rotated in its recess. Thus when the button is turned as shown in Fig. 1 the piston 14 is prevented from advancing and the spring 16 is maintained under compression until such time as the button is rotated so as to bring its bore into alinement with the stem which can easily be done by the patient himself. The medicament may be of a pasty or salvey consistency and may be introduced between the plunger of piston 14 and the end of the plug 17.

In the modification illustrated in Fig. 2 I have shown the same piston 14, stem 15 and spring 16 but the plug 17^a is of simpler construction, the button or other catch being omitted. The medicament is, as before, inserted at 20 between the plug and piston and in this case must necessarily be of greater consistency than before inasmuch as it must withstand the pressure of spring 16 during the application of the instrument. A material such as cocoa butter is frequently used in this instrument as a base for the medicament, the same being provided in the form of a cylindrical, axially bored cake which will become softened by the body temperature so as to become expressed through the ducts 11; though other bases could obviously be employed.

In case it be desired to apply the medicament to a more interior portion the arrangement shown in Fig. 3 may be adopted. In this embodiment a plunger 14^a is employed and the stem 15^a and spring 16^a are located upon the same side thereof. The threaded end 13 of the chamber is provided with a plug 17^b having an axial bore for the reception of the stem. This bore, as before, merges with a recess 21 but this recess is provided with a spring catch 22 and the stem 15^a is provided with a head 23 adapted to engage this catch and be retained thereby against the force of the spring 16^a. In the present embodiment the catch 22 consists of a V-shaped spring having in one of its sides an aperture adapted to receive the head 23. The medicament is inserted into the end of the chamber as shown at 31.

In case it is desired to employ this device for the giving of enemas the plug 17 is replaced by a tube connection 25, the same having at its outer end a nipple 26 adapted for the attachment of a suitable conduit 27 and preferably having its inner end extended as at 28 so as to cover up the ducts 11 and prevent the escape of liquid therethrough.

It will be obvious that this instrument could be made in a large number of different sizes and diameters and with different designs while still retaining the important and desirable features hereinbefore pointed out. It will therefore be understood that the attached claims are intended to extend to and include all such modifications and variations of the said device so far as the same fall within the scope of my inventive idea.

Having thus described my invention, what I claim is:—

1. In a device of the character described the combination with a cannula having an interior cylindrical chamber extending from its base to a point adjacent to the tip thereof, the wall of said cannula being formed adjacent to said base with a plurality of ducts communicating with said chamber, of a slidable plunger for said chamber, a compression spring located between said plunger and the inner end of said chamber, and a plug adapted for insertion into the outer end of said chamber and arranged to project to a point adjacent said ducts, the space between said plug and plunger when the latter is repelled serving for the reception of medicament.

2. In a device of the character described the combination with a cannula having an interior cylindrical chamber extending from its base to a point adjacent to the tip thereof, the wall of said cannula being formed adjacent to said base with a plurality of ducts communicating with said chamber, of a slidable plunger for said chamber, a stem carried by said plunger and projecting from its forward side, a compression spring carried by the opposite side of said plunger and arranged to be compressed against the inner end of said chamber, and a plug adapted for insertion into the outer end of said chamber and having a bore adapted to receive said stem, the space between said plug and plunger when the latter is repelled serving to receive medicament.

3. In a device of the character described the combination with a cannula having an interior cylindrical chamber extending from its base to a point adjacent to the tip thereof, the wall of said cannula being formed adjacent to said base with a plurality of ducts communicating with said chamber, of a slidable plunger for said chamber, a stem carried by said plunger and projecting from its forward side, a compression spring carried by the opposite side of said plunger and arranged to be compressed against the inner end of said chamber, a plug adapted for insertion into the outer end of said chamber and having a bore adapted to receive said stem, and a manually releasable catch carried by said plug and adapted to engage said stem and prevent the advance of said plunger until displaced, there being a space

between said plug and plunger when the latter is repelled serving to receive medicament.

4. In a device of the character described the combination with a cannula having an interior cylindrical chamber extending from its base to a point adjacent to the tip thereof, the wall of said cannula being formed adjacent to said base with a plurality of ducts communicating with said chamber, of a slidable plunger for said chamber, a compression spring adapted to be interposed between said plunger and the inner end of said chamber, means for closing the outer end of said chamber, said plunger when displaced against the force of its spring defining in connection with said closing means a medicament receiving space, and displaceable means for maintaining said plunger against advancing movement.

5. In a device of the character described, the combination, with a cannula having an interior cylindrical chamber extending from its base to a point adjacent the tip thereof, the wall of said cannula being formed adjacent to said base with a plurality of ducts communicating with said chamber, of means for closing the end of said chamber so as to retain medicament therein, and means for pressing said medicament toward said closing means so as to express the same through said ducts.

6. In a device of the character described, the combination, with a cannula having an interior cylindrical chamber extending from its base to a point adjacent the tip thereof, the wall of said cannula being formed adjacent to said base with a plurality of ducts communicating with said chamber, of a plug adapted for insertion into the outer end of said chamber, said plug having a bore and an eccentric recess with which said bore communicates, a slidable plunger for said chamber, a stem carried by said plunger and adapted to extend through said bore, a compression spring arranged to be introduced between said plunger and the inner end of said chamber, and a rotatable member in said recess, said member having an eccentric bore arranged to be brought into and out of alinement with said first bore.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

IMMER O. CRITTENDEN.

Witnesses:
HAROLD E. SMITH,
BRENNAN B. WEST.