

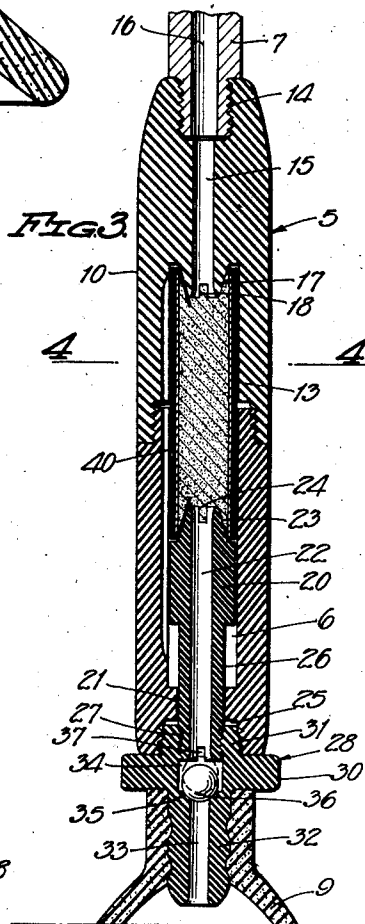
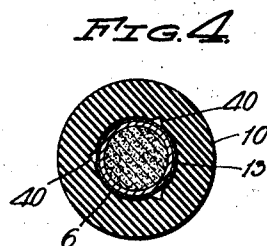
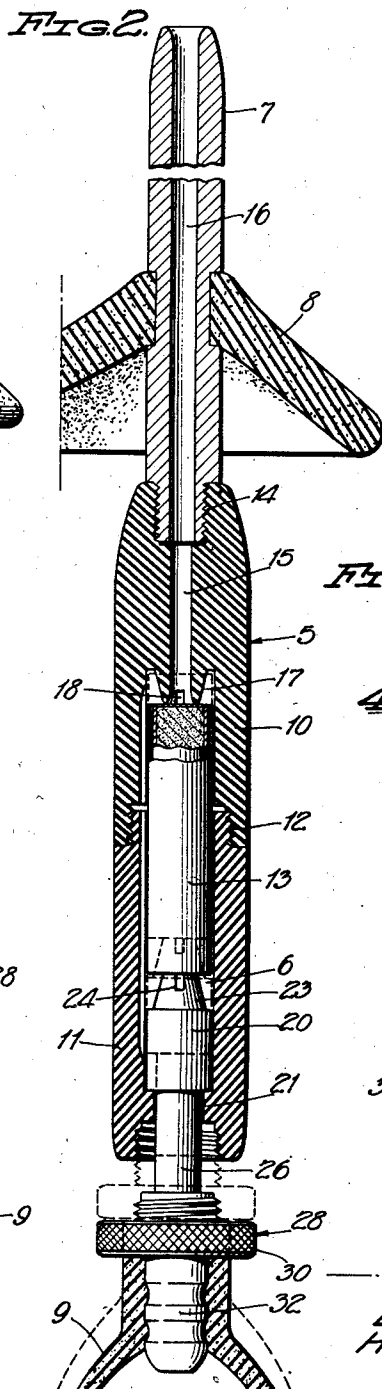
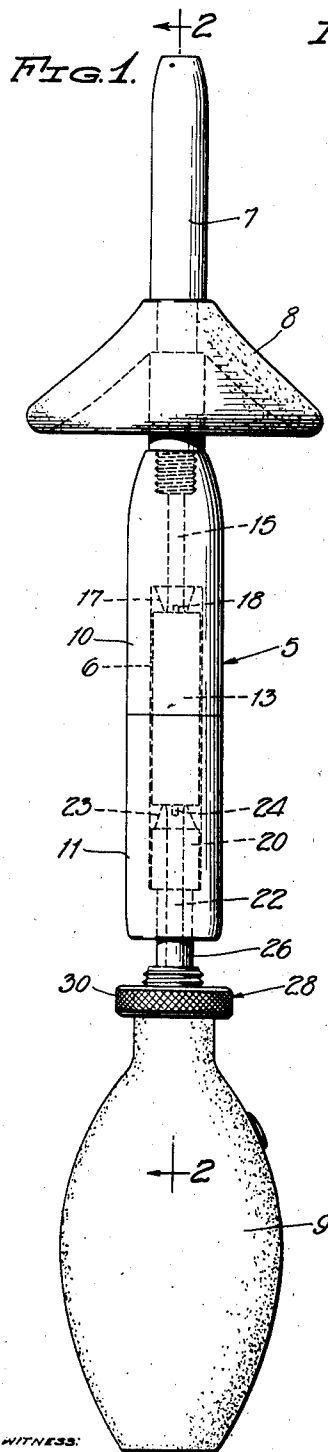
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B. BOLTÉ ET AL

2,307,986

INSUFFLATOR

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This invention pertains to new and useful improvements in powder applicators, particularly of the type generally classified as insufflators and employed for applying medicaments to cavities of the human body.

In certain cases, it is necessary to effect dilation of the cavity to be treated prior to the application of the medicament thereto and it is the primary object of this invention to provide a novel device of the aforementioned character by which, both dilation of the cavity to be treated and application of the medicament may be accomplished in succession without removing the device from the cavity to be treated.

A feature of the invention resides in a novel construction and arrangement of parts whereby a sealed powder cartridge may be retained intact within the device during the dilation action, and subsequently ruptured in order to discharge from the device the contents of the cartridge for the purpose of applying same to the area to be treated.

A further feature of the invention resides in a novel construction and arrangement of parts whereby air from a common or single source may be employed for the dual purposes of dilating the cavity to be treated and for discharging the contents of the cartridge from the device.

Other features of the invention relate to certain novel and improved constructions, arrangements and combinations of parts hereinafter described and particularly pointed out in the claims, the advantages of which will be readily understood and appreciated by those skilled in the art.

The invention will be clearly understood from the accompanying drawing illustrating the invention in its preferred form and the following detailed description of the constructions therein shown.

Figure 1 is a view in elevation of a device constructed in accordance with the present invention illustrating certain of the parts in one position in full lines and in another position in broken or dash lines,

Figure 2 is a longitudinal sectional view, partly broken away and taken substantially on the line 2—2 of Figure 1, the figure illustrating in full lines the position of the parts prior to rupturing of the cartridge and in broken or dash lines, a position of the parts during their movement to perform the rupturing of the cartridge, one end only of which has been shown as having been ruptured,

view partly broken away, the figure illustrating the position of the parts after the cartridge rupturing operation has been completed, and;

Figure 4 is a transverse sectional view taken substantially on the line 4—4 of Figure 3.

A device constructed in accordance with the illustrated embodiment of the invention comprises a main body portion 5 which constitutes a cartridge receiving chamber 6, a nozzle 7 which may or may not carry a conventional shield 8, and a conventional air compressing bulb 9.

The main body portion 5 preferably consists of two sections 10 and 11 detachably connected together by a threaded connection 12, the said sections being so constructed that when they are secured together, they form the cartridge receiving chamber heretofore referred to. The threaded connection 12 permits of separation of the sections 10 and 11 in order that a cartridge such as designated 13 in the drawing may be positioned within the chamber 6.

The nozzle 7 is shown as removably attached to the section 5 by a threaded connection 14 but obviously, the nozzle could be detachably connected to the section 10 by other means or may be an integral extension thereof, as desired.

Leading through the section 10, there is a passage 15 which constitutes the discharge passage of the chamber 6 and which has communication with a passage 16 leading through the nozzle 7. The inner end of the passage 15 terminates in a conical projection 17 which projects into the chamber 6 and which is formed upon its inner end with laterally extending ports 18 which extend entirely through the side walls of the conical projection 17, but preferably do not extend throughout the length thereof.

Slidably mounted in the section 11, there is a plunger 20 which is slidably mounted in a bearing 21 preferably in the form of a flange projecting inwardly of the member 11. The plunger 20 has a passage 22 extending therethrough and extending from the inner end of the plunger 20, there is a conical projection 23 through which the passage 22 also extends. The conical projection 23 is provided with a plurality of laterally extending ports 24 similar to the ports 18 heretofore mentioned which ports 24 establish communication between the chamber 6 and the passage 22. The section 11 is provided in its outer end with an internally threaded recess 25, the purpose of which will be hereinafter more specifically set forth.

The plunger 20 has a reduced extension 26 by which it is slidably mounted in the bearing 21

heretofore mentioned and the free end of this extension 26 is externally threaded as at 27.

The reference character 28 designates a combined coupling and locking member which serves to couple the compressible bulb 9 to the plunger 20 and also to lock the plunger 20 against movement in the chamber 6 under certain operating conditions which will be hereinafter described.

This member 28 comprises a flange-like body portion 30 from one face of which extends an externally threaded projection 31 for threaded engagement with the internally threaded recess 25 in the end of the section 11. Projecting from the opposite face of the body portion 11, there is a nipple extension 32 to which the bulb 9 is attached.

Leading through the nipple extension 32 there is a passage 33, the inner end of which is enlarged as at 34 to provide a valve seat 35. The enlarged portion 34 of the passage 33 provides a housing for a ball valve 36 which is retained in the housing by the threaded end of the extension 26 when the several parts are assembled.

That end of the reduced extension which retains the ball valve 36 in its housing, is provided with ports 37 which permit of passage of air from the enlarged portion of the passage 33 when the ball valve is in engagement with the end of the reduced extension. However, when the ball valve is in engagement with the seat 35, passage of air through the passage 33 in the direction of the bulb 9 is prevented. Thus a check valve which will permit of the free passage of air from the bulb 9 to the cartridge chamber 6, but which will prevent passage of air from the cartridge chamber 6 to the bulb 9, is provided.

The operation and manner of use of the device will now be described.

The sections 10 and 11 are separated and a cartridge 13 is placed within one of the members after which they are connected together with the cartridge in the chamber 6.

The cartridge 13 is of a type which has frangible or rupturable end walls and is preferably of such diameter as to fit snugly against the side walls of the chamber 6 and of such length, that when the parts are adjusted to the full line position shown in Figure 2, the conical projections 17 and 23 will engage their respective end walls of the cartridge but without rupture thereof.

To adjust the parts to the full line position shown in Figure 2, the combined coupling and locking member 28 is backed out of threaded engagement with the threaded recess 25 and the plunger is moved in the bearing 21.

It is understood that the fit of the reduced extension 26 of the plunger with the bearing 21 is of the type known as friction fit and will be sufficient to retain the plunger against movement under normal operating conditions.

The several parts are illustrated in the position just described in full lines in Figure 2 of the drawing and in this position of the parts, the device is in condition for the performance of the dilation operation which will now be described.

The nozzle member 7 is inserted into the cavity to be treated after which the bulb 9 is subjected to a series of compressions to force air through the passage 33, the passage 22 of the plunger, from which it is discharged into the chamber 6 through the lateral ports 24 of the conical projection 23.

The air is adapted to be by-passed around the cartridge 13 to the lateral ports 18 of the conical projection 17 through which ports 18 it passes

to the passages 15 and 16 to be discharged from the nozzle member into the cavity to be treated to dilate the same.

It will be remembered that the cartridge 13 was described as being of such a diameter as to fit snugly within the chamber 6 and to provide for by-passing air around a cartridge of this type, channels 40 extend longitudinally of the inner face of the wall of the chamber 6 which channels extend substantially throughout the length of the said chamber 6.

After the dilation operation has been completed and it is desired to apply the contents of the cartridge 13 to the inner walls or surfaces of the cavity, without removing the nozzle of the instrument from the cavity, the combined coupling and locking member 28 is moved to the broken line position shown in Figure 2, the plunger 20 sliding in the chamber 6.

The sliding movement of the plunger just described exerts endwise pressure upon the cartridge and moves it longitudinally of the chamber 6. This longitudinal movement of the cartridge 6 results in the rupturing of one end wall thereof. Which of the end walls will be the first to rupture is problematical and while in Figure 2 the end wall of the cartridge adjacent the nozzle end of the instrument has been illustrated as the ruptured end, this showing is merely an arbitrary one and it may in some instances happen that the opposite end of the cartridge would be the first to rupture.

In either case, however, the combined coupling and locking member moves to the broken line position shown in Figure 2 in which position its threaded extension is in position for threaded engagement with the threaded recess 25. In this last mentioned position, the member 28 is rotated in a clock-wise direction which by reason of its threaded engagement with the thread of the recess 25, moves the plunger 20 still further into the chamber 6 to effect a rupturing of that end of the cartridge which was not ruptured by the first mentioned operation.

When the member 28 has been screwed home, in which position it is illustrated in Figure 3, the rupturing of both ends of the cartridge has been completed as illustrated in said figure.

By reference to Figure 3 of the drawing it will be noted that the conical projections 17 and 23 have passed into their respective ends of the cartridge and that the ends of the cartridge seat tightly against their respective conical projections in such a manner that the conical projections completely close the ends of the cartridge. In this position of the parts, the ports 18 and 24 are completely within the cartridge and the by-pass channels 40 are completely cut off. If now the bulb 9 be compressed, air is discharged from the passage 22 directly into the cartridge 13 forcing its contents through the passage 16 of the discharge nozzle from which the contents of the cartridge are discharged into the cavity to be treated.

From the foregoing it will be apparent that the present invention provides a device by means of which a cavity may be dilated, dilation of the cavity maintained and a medicament applied to the surfaces of the cavity to be treated without necessitating removal of the instrument after it has been once positioned within the cavity.

While the invention has been herein illustrated in its preferred form, it is to be understood that it is not to be limited to the specific construction herein employed and that such modi-

fications of construction as rightfully fall within the purview of the appended claims may be resorted to without departing from the spirit of the invention.

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

1. In a device of the character described, a cartridge receiving chamber having an air discharge passage leading from one end thereof, a projection extending inwardly of the discharge end of the chamber, and through which the air discharge passage extends, ports extending laterally of said projection for establishing communication between the air discharge passage and the interior of the chamber, a plunger movable longitudinally of the chamber, means for moving the plunger in the chamber, a projection extending from the inner end of the plunger and forming in combination with said aforementioned projection when the plunger is in one position, means for positioning a cartridge within the chamber and in an advanced position of the plunger, means for rupturing the opposite ends of a cartridge within the chamber, an air inlet for the chamber, said air inlet extending through the plunger and projection thereof, and ports extending laterally of the projection of the plunger for establishing communication between the air inlet passage and the interior of the chamber, and means for by-passing air around a cartridge in the chamber when the plunger is in its cartridge positioning position, said air by-passing means being cut off when the plunger has been moved to its cartridge rupturing position.

2. In a device of the character described, a cartridge receiving chamber having an air discharge passage leading from one end thereof, a tapered projection extending inwardly of the discharge end of the chamber, and through which the air discharge passage extends, ports extending laterally of the inner end of said projection for establishing communication between the air discharge passage and the interior of the chamber, a plunger movable longitudinally of the chamber, means for moving the plunger in the chamber, a projection extending from the inner end of the plunger and forming in combination with said aforementioned projection when the

plunger is in one position, means for positioning a cartridge and holding the same against movement within the chamber and in an advanced position of the plunger, means for rupturing the opposite ends of a cartridge within the chamber, an air inlet for the chamber, said air inlet extending through the plunger and the projection thereof, and ports extending laterally of the projection of the plunger for establishing communication between the air inlet passage and the interior of the chamber, and means for by-passing air around a cartridge in the chamber when the plunger is in its cartridge positioning position, said air by-passing means being cut off when the plunger has been moved to its cartridge rupturing position.

3. In a device of the character described, a cartridge receiving chamber having air channels extending longitudinally of the inner face of the walls thereof, an air discharge passage leading from one end thereof, a projection extending inwardly of the discharge end of the chamber, and through which the air discharge passage extends, ports extending laterally of said projection for establishing communication between the air discharge passage and the interior of the chamber, a plunger movable longitudinally of the chamber, a projection extending from the inner end of the plunger and cooperating with said aforementioned projection when the plunger is in one position to provide means for positioning a cartridge within the chamber and when the plunger is in an advanced position to provide means for rupturing the opposite ends of a cartridge within the chamber, an air inlet for the chamber, said air inlet extending through the plunger and the projection thereof, and ports extending laterally of the projection of the plunger for establishing communication between the air inlet passage and the interior of the chamber, the channels of the cartridge receiving chamber forming means for by-passing air around a cartridge in the chamber when the plunger is in its cartridge positioning position, said air by-passing means being cut off when the plunger has been moved to its cartridge rupturing position.

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