Aug. 25, 1936. H. V. SMART 2,052,321

TREATMENT OF SINUSES

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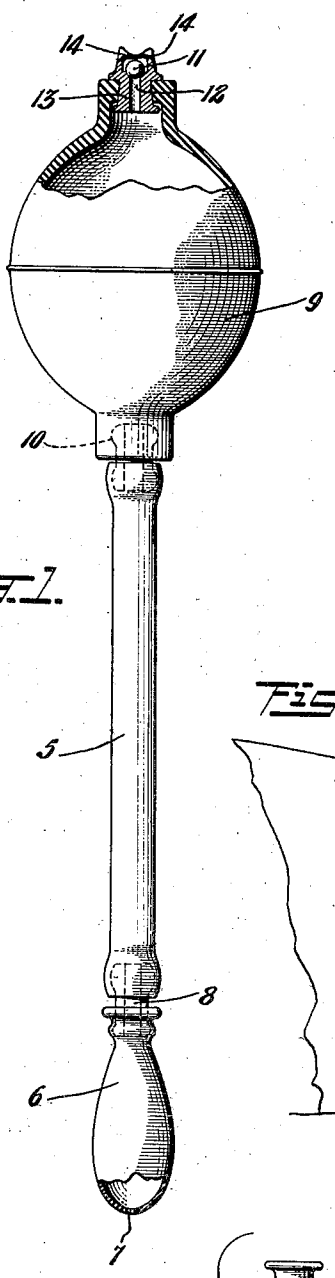


Fig. 1.

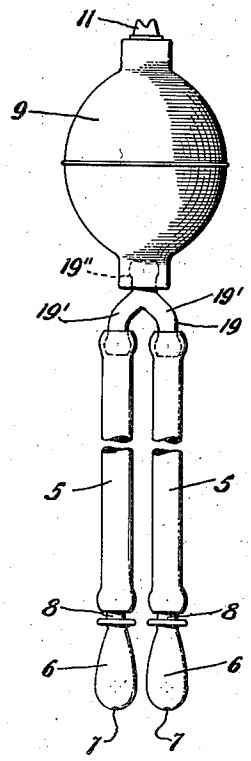


Fig. 4.

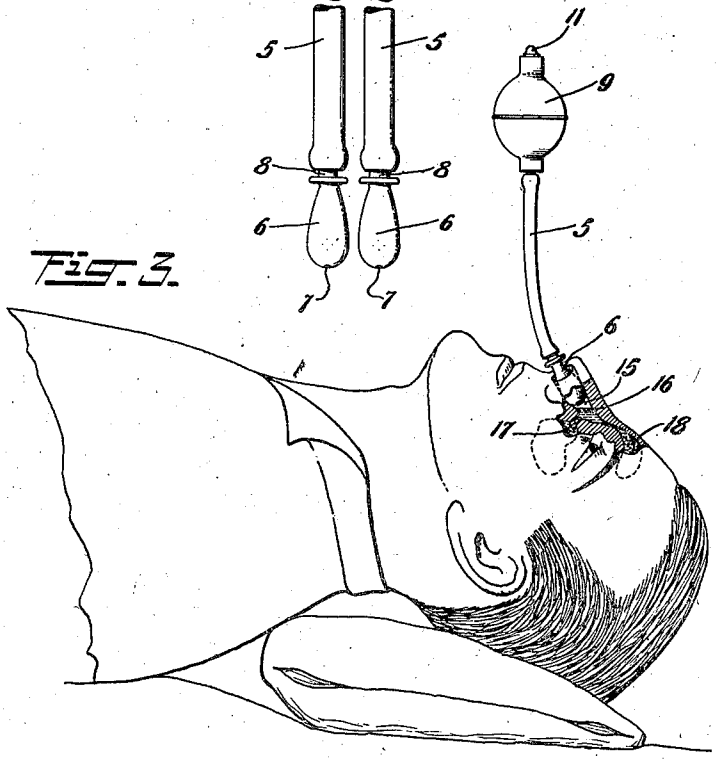


Fig. 3.

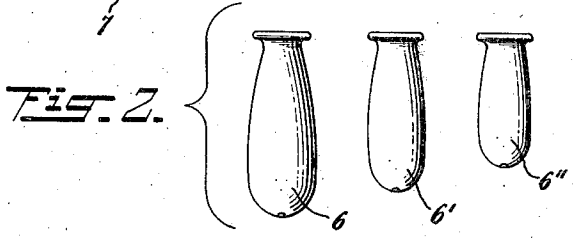


Fig. 2.

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Fig. 5.

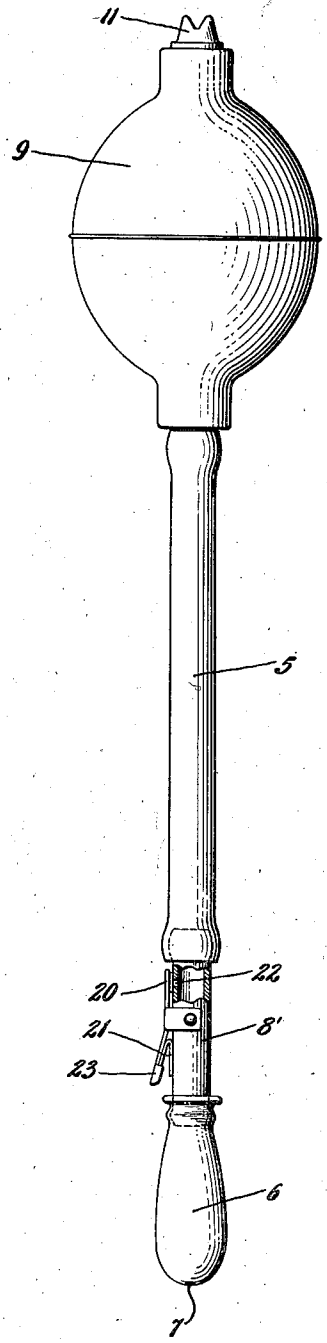
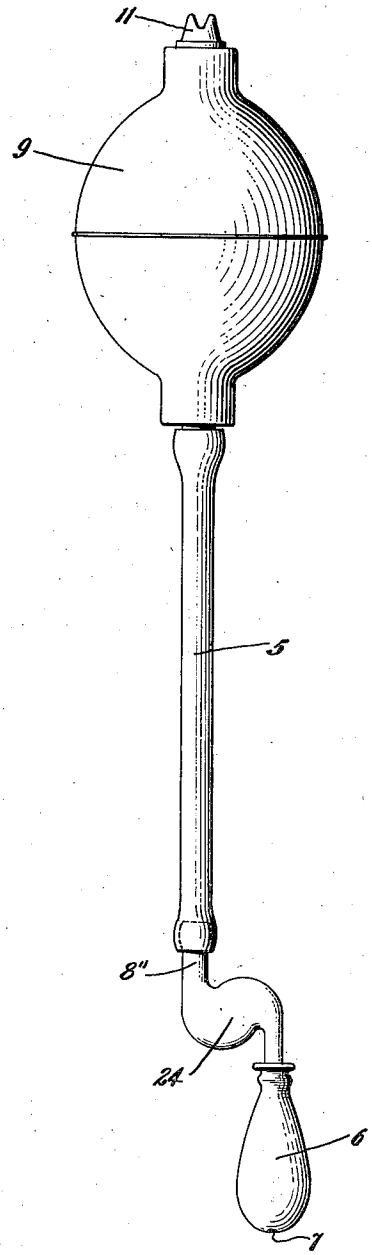


Fig. 6.



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TREATMENT OF SINUSES

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Application July 25, 1934, Serial No. 736,863

2 Claims. (Cl. 128—250)

This invention relates to the treatment of sinuses and has for an object the provision of a novel, inexpensive, and effective method and apparatus for introducing medicine thereinto. The introducing of medicine through the nostrils into adjacent sinuses has long presented a problem because of the shape and location of these passages and of the air at atmospheric pressure therein. Attempts to solve the problem have resulted in the production of special apparatus wherein there is placed the medicine to be introduced and which apparatus is designed to evacuate air from the sinuses and thereafter to introduce the medicine into the sinuses through the nostrils. Such apparatus is highly expensive and is usually to be found only in the offices of doctors who are specialists in sinus treatment. My invention provides for the expeditious and effective introduction of medicine into the sinuses in a novel and simple manner, which avoids the necessity of costly apparatus and which may be carried out in the patient's home and by the patient himself. The invention in this connection follows from my discovery that it is unnecessary to reduce the air pressure in the sinuses before the medicine is placed in the nostril, and that the desired reduction of pressure may be readily accomplished after the medicine is in the nostril. A further feature of the invention resides in the provision of a novel method and apparatus for applying suction to sinuses for the withdrawal of pus or other foreign matter therefrom. The invention, together with further objects and advantages thereof, will be best understood from the ensuing description, and its scope from the claims appended hereto.

In the accompanying drawings:

Fig. 1 is a view in elevation, partly in section and with parts broken away, showing a form of apparatus for evacuating air from sinuses in the practice of my invention.

Fig. 2 is a detail view showing different sizes of rubber bulbs which may be interchangeably employed with the apparatus of Fig. 1.

Fig. 3 is a view illustrating the carrying out of the invention with the apparatus of Fig. 1.

Fig. 4 is an elevational view of an alternative form of air-evacuating apparatus.

Fig. 5 is a detail view showing a further modification of said apparatus.

Fig. 6 is an elevational view showing a further modified form of suction or air-evacuating apparatus especially adapted for the withdrawal of undesirable material from sinuses prior to the introducing of the medicine.

Referring to the drawings, one form of apparatus for reducing the air pressure in the sinuses in the carrying out of my invention may, as shown in Fig. 1, comprise a tube 5, having connected to one end thereof a cap or bulb 6, which may, for example, be the bulb of an ordinary medicine dropper having one or more holes 7 therein. The cap or bulb 6 may conveniently be fitted over one end of a tubular fitting 8 of hard rubber or the like, the other end of which fitting is firmly engaged in one end of the tube 5. At its opposite end said tube communicates with a member compressible and expansible to produce a negative pressure, such as a bulb 9 of rubber or like material, which bulb may be connected with the tube 5 through fitting 10 similar to the fitting 8 aforesaid. The bulb 9 may be the bulb of a conventional atomizer with the exception that the valve 11 is reversed so that air is evacuated through the valve when said bulb 9 is compressed. As shown, the valve 11 cooperates with a passage 12 in the fitting 13 in an end of the bulb 9, which fitting may be of a conventional type, having suitable retaining members such as indicated at 14, for maintaining the valve in assembled relation to the fitting. When the bulb 9 is compressed, the valve 11 permits air to flow freely from the interior of the bulb through the passage 12 to the outside of the bulb; but when the latter is thereafter released, the valve aforesaid blocks the passage 12 and prevents air from entering into the bulb through said passage.

In the practice of my invention the patient first lies on his back as indicated in Fig. 3. Then the desired amount of medicine (argyrol, for example) with which the sinuses are to be treated is introduced into one of the nostrils 15 in any convenient way, as by an ordinary medicine dropper. In Fig. 3 the medicine in the nostril is indicated at 16, while the numerals 17, 18 refer to diagrammatic representations of sinuses communicating with said nostril. The bulb or cap 6 is now inserted into the nostril 15 and the bulb 9 is compressed, with resultant evacuation of the air from said bulb 9 through the aforesaid passage 12. Bulb 9 is now released, whereupon air from the sinuses passes through the medicine in the nostril and into the bulb, equalizing the pressures in the bulb and sinuses and producing less than atmospheric pressure in the sinuses. When the pressure on the bulb 9 is released as aforesaid, the patient should swallow or maintain the soft palate in such position as to close communication between the mouth and nose, and at the same time should hold closed the nostril into which the cap 6 has not been inserted, thereby insuring flow of air from the sinuses into bulb 9 and consequent reduction of air pressure in said sinuses. Following said reduction of pressure, the cap 6 is withdrawn from the nostril, whereupon the pressure of the atmosphere forces the medicine from said nostril into the sinuses. The foregoing method of introduction of medicine into sinuses has been tested repeatedly and found thoroughly efficacious

and satisfactory. The reduction of pressure in the sinuses following the introduction of the medicine into the nostril takes place readily and expeditiously, and upon removal of the pressure-reducing apparatus from the nostril the medicine is forced promptly into the sinuses by the action of the atmosphere. The introduction of the medicine should of course preferably be preceded by treatment of the sinus for the withdrawal of pus or other foreign matter therefrom as is well understood in the art. It will be apparent that the invention avoids the necessity of expensive apparatus and that it may be carried out with facility in the patient's home. The invention provides, in short, for the facile introduction of the medicine in an inexpensive, convenient, and efficient manner.

The degree of pressure reduction obtained by a given extent of compression of the bulb **9** and the subsequent release thereof is of course dependent upon the size of the bulb and its resilience, and such size and resilience may be varied as desired.

Different sizes of caps, such as **6**, **6'**, **6''** (Fig. 2) for different sizes of nostrils may be interchangeably applied to the tube **5**, as will be apparent. The tube **5** may be of rubber of suitable stiffness or of any other suitable material, and of any convenient shape. It will be apparent that if desired the tube **5** may be shaped to fit the nostril, in which event the cap aforesaid may be dispensed with.

If desired, my invention may be applied to the introduction of medicine into sinuses through both nostrils simultaneously. For this purpose, pressure reducing apparatus such as shown in Fig. 4 may be utilized. Such apparatus may comprise twin tubes **5**, **5**, each with a cap **6** at one end, which tubes at their other ends are applied to the Y-shaped fitting **19**. The latter is shown as comprising diverging branches **19'**, **19'** for engagement by said tubes and a vertical branch **19''** for insertion into the bulb **9**. With this apparatus the caps **6**, **6** may be applied concurrently to both nostrils, following the insertion of medicine therein; whereupon by pressing and releasing the bulb **9** the pressure in the sinuses communicating with said nostrils will be reduced and upon withdrawal of the apparatus the medicine will be forced by the atmosphere from said nostrils and into said sinuses.

The withdrawal of the apparatus from the nostril to subject the medicine to atmospheric pressure may be avoided by providing manually operable means in connection therewith for placing the interior thereof in communication with the atmosphere while the apparatus remains inserted in the nostril. Thus, as indicated in Fig. 5, the tubular fitting **8'** may have mounted thereon a valve **20** normally maintained by a spring **21** in the position shown, wherein air cannot pass through the opening **22** into said fitting. By pressing upon the lever **23**, however, the operator can retract the valve **20**, following the creation of reduced pressure in the sinus, thus admitting air at atmospheric pressure into said fitting and thence into the nostril, with consequent driving of the medicine into the sinus. It will be readily understood that the embodiment of Fig. 5 need not include the valve **11** of Figs. 1 and 3, since the spring **21** may be of such tension as to yield readily to permit the escape of air during compression of the bulb **9**. The valve **11** may, however, be retained if desired.

While the sinuses may have pus and other matter withdrawn therefrom by means well-known in the art, prior to the introduction of the medicine as above described, such matter may be readily withdrawn by apparatus of the type hereinbefore described for creating reduced pressure in the sinuses. In Fig. 6, I have shown a form of my invention especially adapted for this purpose. In this embodiment, the tube **5**, and bulb **9** may be of the same construction, and equipped with the same valve **11**, as hereinbefore described. Inserted into the opposite end of the tube **5**, there is shown a fitting **8''** having at one end a cap **6** insertible into the nostril. The fitting **8''**, as shown, may comprise an enlarged intermediate basin portion **24**. Upon the insertion of the cap **6** into the nostril and compression of the bulb **9**, air is evacuated from the outer end of said bulb; and upon then releasing said bulb the latter expands and reduces the pressure in the sinuses, drawing air therefrom together with pus and foreign matter therein. In other words, suction is applied to said sinuses with resultant withdrawal of detrimental matter therefrom. The pus and other undesirable matter is caught in the basin portion **24** of the fitting **8''** while the air continues its travel into and through the bulb **9**.

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

I claim:

1. Means for causing the introduction of medicine into a sinus, said means comprising a manually compressible element connectable to only one nostril, a single tube extending from one end of said element and having a cap for insertion into said nostril, valve means carried by said element at its other end adapted to enable air to flow from said element through said other end when said element is compressed and adapted to prevent a flow of air through said end into the interior of said element when pressure thereon is released, whereby, upon release of pressure on said element following insertion of said cap into said nostril after the introduction of medicine into said nostril, air is drawn from said sinus through said medicine and the pressure in said sinus is reduced.

2. Means for causing the introduction of medicine into a sinus, said means comprising a manually compressible element connectable to only one nostril, a single tube extending from one end of said element and having a flexible bulb for insertion into said nostril, valve means carried by said element at its other end adapted to enable air to flow from said element through said other end when said element is compressed and adapted to prevent a flow of air through said end into the interior of said element when pressure thereon is released, whereby, upon release of pressure on said element following insertion of said flexible bulb into said nostril after the introduction of medicine into said nostril, air is drawn from said sinus through said medicine and the pressure in said sinus is reduced.

HARRY VINCENT SMART.