March 27, 1951 H. E. CURRY 2,546,214

APPLICATOR

Filed March 17, 1947

Fig. 1

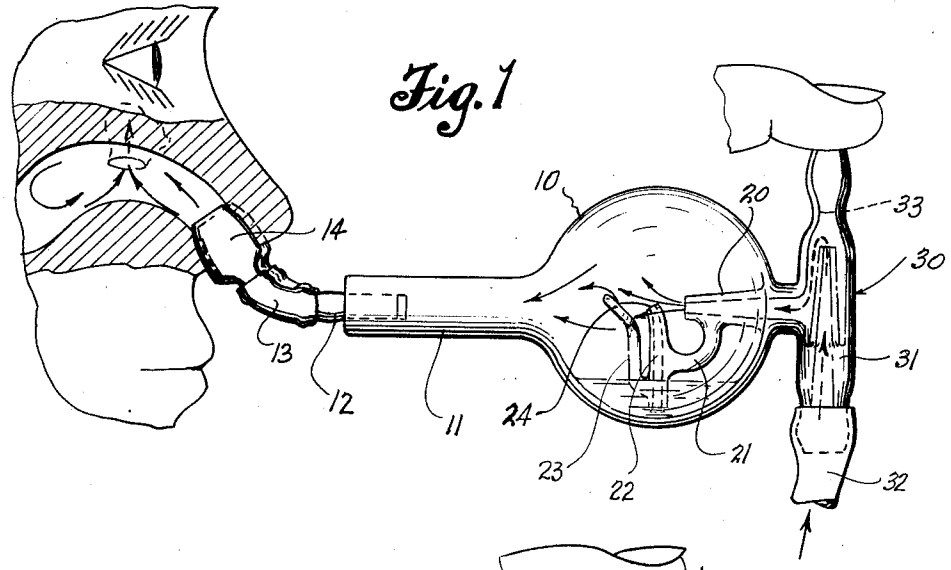


Fig. 2

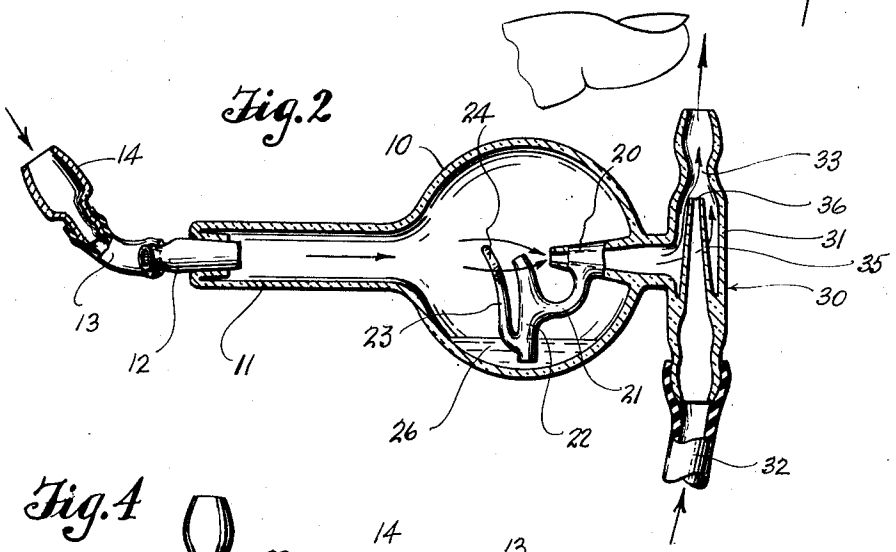
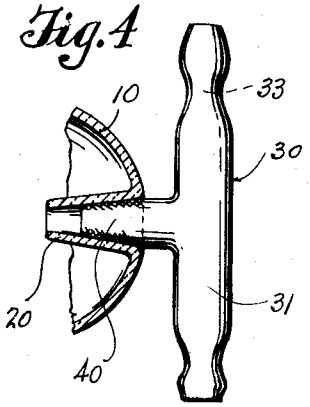


Fig. 4



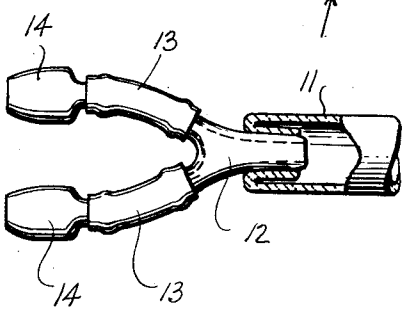


Fig. 3

INVENTOR
HAROLD E. CURRY
BY Cook & Robinson
ATTORNEYS

Patented Mar. 27, 1951 2,546,214

UNITED STATES PATENT OFFICE

2,546,214

APPLICATOR

Harold E. Curry, Seattle, Wash.

Application March 17, 1947, Serial No. 735,061

3 Claims. (Cl. 128—172)

1

This invention relates to means for the administration or application of a liquid medicament to cranial or other cavities of the body where a direct application is difficult, impractical or impossible. Specifically stated, the present invention has to do with means for the atomization of a liquid medicament and the self-application thereof, through the nasal passages or mouth, to the cranial cavities, for example, to the sinuses for the treatment of sinus infection; it being understood however that this is only an example of one of the uses for applicators of the present kind.

It is the principal object of this invention to provide an improved form of applicator that is characterized by the combining therein of an atomizing device of the character of that of my U. S. Patent No. 2,111,814 with a form of aspirator through which a gas, such as oxygen, air, or other suitable gaseous medium, under pressure may be caused to flow, and alternately directed through one or the other of two different channels to alternately cause, first, an atomization of liquid in the atomizer and its conveyance by the gas under mild pressure from the atomizing chamber to the area of treatment and second, to produce a condition of slight vacuum in the atomizing chamber which will be transmitted to the cavity under treatment.

It is also an object of this invention to provide an applicator of the kind and for the purpose above stated, that is free of movable valves and non-rigid parts, and which may be easily held by the user in one hand for the self-application of the medicament and manipulated by the same hand in which it is held to control the flow of gas through the aspirator that results in the creation of the above mentioned conditions of pressure and vacuum.

Another object of the invention is to provide an applicator that is compact; light in weight; easy to keep in sterile condition; free of non-rigid parts; and capable of one-hand manipulation for its intended uses.

Other objects of the invention reside in the details of construction of the various parts embodied in the device, in their combination, relationship and mode of use as will hereinafter be fully described.

In accomplishing the above mentioned and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a side view of an applicator embodied by the present invention, showing it as applied in use for the application of a medicament to the sinuses.

Fig. 2 is a longitudinal section of the applicator, particularly illustrating the construction of the aspirator and means for the atomization of

2

the medicament, and whereby the conditions of vacuum and pressure may be established.

Fig. 3 is a view of an adapter that may be used with the applicator for its connection with the nasal passages.

Fig. 4 is a detail, showing an alternative form of connection between the atomizing flask and the aspirator.

The present device comprises, essentially, an atomizer whereby a selected liquid medicament may be vaporized or atomized and an aspirator whereby the cavities being treated may alternately be placed under slight vacuum and under mild pressure of the gas whereby the atomization of liquid is effected and the atomized medicine conveyed to the place of use.

In the administration of a medicament, such for example, penicillin, or any other selected liquid medicament that may be atomized, I prefer to employ a flask type atomizer like or of the general character of that described and illustrated in my United States Patent No. 2,111,841, issued March 22, 1938. However, the invention is not to be restricted in use thereto.

The atomizer which I have herein shown comprises a spherical bulb, or flask 10 of glass or other suitable material, having a tubular discharge neck 11 of substantial length and diameter, extending from one side thereof. The neck 11 is open at its outer end for easy outflow of a gas bearing medicament and at that end has the tubular stem portion of a V-shaped fitting 12 applied thereto in a gas tight joint. The two diverging leg portions of the fitting 12 have short, flexible tubes 13 applied thereto which, at their outer ends, are equipped with hollow plugs or fittings 14 which may be easily and readily applied to the nostrils, thus to provide for the application of the medicament to the treated areas through the nasal passages.

Cast integrally with and extended into the bulb 10 at a location opposite to and in axial alignment with the neck portion 11, is a gas delivery nozzle 20. This is pointed toward the neck and supported therefrom, by an integral branch 21, is a vertically extending capillary tube 22 which is open at both ends and which, at its lower end, terminates slightly from the bottom of the flask with reference to its position of normal use, as seen in Fig. 2. At its upper end the capillary tube terminates directly in the line of delivery of gas from the nozzle 20 and has this end portion curved in a direction away from the nozzle.

Supported from the capillary tube 22 by a branch 23, is a flat surfaced baffle 24 which is set directly in the line of discharge from the nozzle but at an angle of about 45°.

It will be understood that with the flask and other parts of the atomizer so constructed and related in position, and held in position as shown in Fig. 2 with the lower end of the capillary tube

extended into a liquid medicament contained in the flask, and designated by numeral 26, the delivery of gas from the nozzle under pressure will create a condition of vacuum about the upper end of the capillary tube whereby liquid will be drawn up the tube channel and into the gas jet and blown by the jet of gas against the baffle 24 and thereby atomized. The atomized medicament suspended in the gas will then be carried out through the open neck of the flask under the pressure of the incoming gas, and forced through the branches of the fitting 12, and tubes 13 to the nasal passages for delivery to the cavities under treatment.

Application of the medicament by use of the applicator might also be through the mouth in like manner. The pressure of the conveying gas would depend upon the amount and pressure under which the gas was supplied to the atomizer through nozzle 20.

It is preferred that the nozzle 20 be cast or formed integrally with flask 10 as shown in Fig. 2. The present drawings, in Figs. 1 and 2, show the outer end of the nozzle to be integrally formed with an aspirator that is designated in its entirety by reference numeral 30. This comprises an aspirator tube 31 that is disposed substantially at a right angle to the axial line of the nozzle, and at one end is open and there equipped for connection with a gas supply hose or tube, preferably a flexible rubber tube as designated by numeral 32. The opposite end of the tube 31 also is open and within that end portion is formed with a Venturi passage, as at 33.

The nozzle 20 leads from the tube 31 at a point between the Venturi passage and the lower end of the tube as seen in Fig. 2 and within the tube is a nozzle 35 that is open at its larger or base end directly to that end of tube 31 to which the gas pressure is supplied by hose 32. The nozzle 35 tapers to a restricted opening 36 just below the Venturi passage. The axial line of the nozzle 35 coincides with the axis of the tube 31 and Venturi passage and the nozzle itself extends from below upwardly and beyond the outlet to nozzle 20 so that with the upper end of tube 31 open and gas being discharged from nozzle 35 and through the Venturi passage, suction will be created in tube 31, and transmitted through nozzle 20 to the flask 10 and this will create a condition of partial vacuum in the flask that will be transmitted through the nasal connectors and nasal passages to the cavities being treated.

Should the upper end of tube 31 be closed while gas is being delivered from nozzle 35, for example, by placing a finger over the open end, as shown in Fig. 1, then pressure will be built up in the tube 31 and this gas under pressure discharged through the nozzle 20 to the flask to effect the atomization of liquid which is carried in suspension in the gas from the atomizer to the cavities being treated. Thus, by simply applying the finger momentarily over the upper end of tube 31, and removing it, the conditions of pressure and vacuum in the flask will be established in sequence and incident thereto, liquid medicament will be atomized and applied, and the cavities placed under that condition of vacuum that aids in the removal or draining off of mucus and augments the entry of the medicine laden gas.

In Fig. 4, I have illustrated an alternative construction wherein the nozzle 20 is open at its outer end, and the tube 31 is equipped with a tapered, lateral stem 40, adapted to be removably fitted in the open end of the nozzle 20, thus to provide a rigid connection, but one that permits disconnection of parts when it is desired.

The particular advantage of the present construction and arrangement of parts, whereby a rigid structure is provided, resides in the fact that it is possible for the user to easily hold the device in one hand and with one finger of that hand, control the gas flow so as to cause the atomization and application of the medicine, and then for a period of any desired extent to create a condition of vacuum or suction that is beneficial to the administration and also to clearing the cavities being treated.

It is not the intent that the invention be restricted in any way to the type or details of construction of the atomizer that has been illustrated, or to the specific place and mode of application of the aspirator thereto, but that the invention be considered broadly as the combination of an aspirator and atomizer, joined as a rigid construction, operable by one hand and capable of performing the atomizing and applying actions substantially as specified.

Having thus described my invention, what I claim is new therein, and desire to secure by Letters Patent, is:

1. An applicator of the character described comprising, in combination, an atomizer and an aspirator; said atomizer having a closed chamber adapted for containing a supply of liquid for atomization, and formed with a wall passage through which vacuum may be drawn in the chamber or gas injected thereinto by the aspirator, and having also an outlet through which a connection may be made with a cavity under treatment, and devices in the chamber for the atomization of liquid incident to the injection of gas into the chamber through the said wall passage; said aspirator comprising a tubular member equipped for connection at one end with a source of gas under pressure and open at its other end and having its suction connection in direct communication with the said wall passage of the atomizer chamber for the drawing of vacuum in the chamber in normal operation of the aspirator and through which gas will be injected into the atomizing chamber to effect the atomization of liquid and its conveyance with the gas to the treated area incident to a momentary closing of the open end of the aspirator tube.

2. A device as in claim 1 wherein the aspirator tube is rigidly associated with the atomizer for one hand holding and operation of the applicator in its functional use.

3. A device as recited in claim 1 wherein the aspirator tube is rigidly associated with the atomizer for one hand holding of the applicator in its functional use, and wherein the outlet from the atomizer chamber comprises a tubular extension, and an adapter is fitted in said extension as a tubular connector between the said outlet and cavity under treatment.

HAROLD E. CURRY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
938,648	De Vilbiss	Nov. 2, 1909
1,196,344	De Florenz	Aug. 29, 1916
1,263,079	Leon	Apr. 16, 1918
2,343,231	Talley	Feb. 29, 1944