

Feb. 1, 1944.

E. J. NAWOJ ET AL

2,340,419

CLOSURE

Filed Nov. 3, 1941

Fig. 1

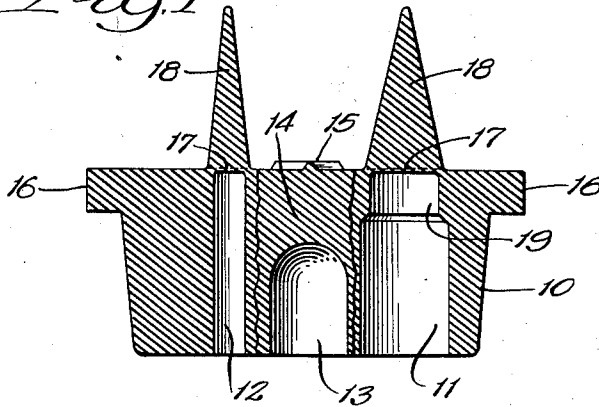
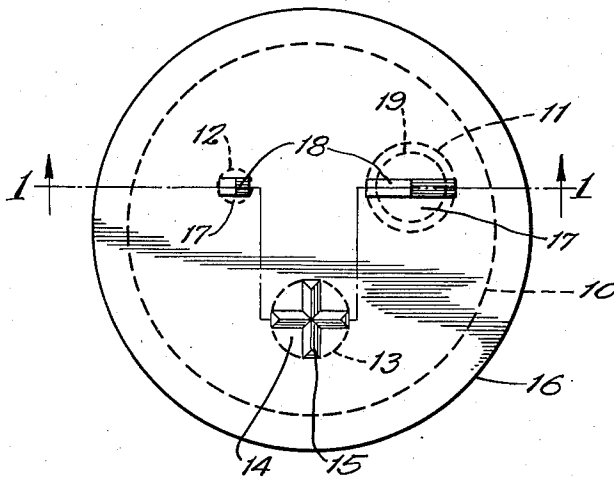


Fig. 2



Inventors:
Edward J. Nawoj
and John Störner,
By Dawson Combs and Borth,
Attorneys.

UNITED STATES PATENT OFFICE

2,340,419

CLOSURE

Edward J. Nawoj, Chicago, and John Storner,
Glenview, Ill., assignors to Baxter Laboratories,
Inc., Glenview, Ill., a corporation of Delaware

Application November 3, 1941, Serial No. 417,604

3 Claims. (Cl. 215—47)

This invention relates to a closure. The closure plug is particularly adapted for use with containers for intravenous or parenteral fluids.

An object of the present invention is to provide a closure well adapted for sealing a container for parenteral fluids, the closure providing means whereby the liquid within the container may be utilized to moisten or lubricate the passage through which an outlet tube is inserted while at the same time providing an integral closure for the passage or passages. A further object is to provide a closure plug equipped with an integral diaphragm across the top of the flow passage therein, together with means for quick removal of the diaphragm. Another object is to provide a closure plug having a plurality of passages there-through and integral diaphragms closing the passages, integral tabs being provided for the accurate and ready removal of the diaphragms. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated in a preferred embodiment, by the accompanying drawing, in which—

Figure 1 is a transverse sectional view on line 1—1 of Fig. 2 of a closure plug embodying our invention; and Fig. 2, a top plan view.

In the illustration given, the closure plug is shown as consisting of an integral body 10 having a flow passage 11 extending from the bottom to the top, and an air inlet passage 12 extending from the bottom to the top of the plug. A short passage 13 extends about halfway through the plug opening in the lower portion thereof, and a thick diaphragm 14 extends over the opening 13 and is marked by an X 15 which is integrally molded with the plug.

The closure plug may be formed of rubber or any other suitable material. It is desired to have the plug resilient so as to seat tightly within the container neck and provide an airtight seal therefor.

The plug is provided with an annular flange 16 adapted to engage the top of the container neck.

To seal the passages 11 and 12, I provide a diaphragm portion 17 which is connected with the plug at its edges along a relatively thin and frangible line. Each of the diaphragms is provided with an integral tab extension 18 by means of which the diaphragm can be readily removed.

The closure plug may be used with any suitable container as, for example, the type of container such as is shown in D. E. Baxter Patent No. 1,941,071, which issued December 26, 1933. While adapted to the type of container so illus-

trated, it will be understood that the closure may be used with almost any type of container having a neck to receive the plug.

With respect to the diaphragm 17, it will be understood that, if desired, the diaphragm may be extremely thin, and since it appears at the top of the closure plug, can be readily grasped to remove it. The extensions 18, however, provide a ready and accurate means for removing the diaphragm and for removing it evenly from around the entire edge of the passage. The removal by drawing upon the tabs 18 leaves circular even passages which are accessible for the introduction of tubes, etc.

It is usually difficult to introduce a glass tube into the outlet flow passage of a closure plug because of the high resistance of dry rubber. With the present structure, it will be noted that the liquid within the container may be caused to enter the passage 11 and wet the walls thereof up to the very top of the passage. The wet walls of the passage permit the tube to be easily inserted so that the rim of the outlet tube extends below the shoulders 19 formed in the top of the passage.

In the operation of the device, the closure plug is introduced into the top of the container filled with parenteral fluids or other materials, and ordinarily a vacuum is drawn within the container by placing the container and the closure 10, fitting loosely in the neck thereof, within a closed chamber. The chamber is evacuated to remove the air from that portion of the container not filled with liquid, and then the chamber is subjected to atmospheric pressure which immediately causes the plug 10 to seat tightly within the neck of the container. A metal closure about the neck of the bottle and plug is then formed to maintain the plug securely in place. Since this metal closure is well known, it is believed not necessary to describe it in detail. After the product has been sterilized by heat, it is ready for shipping and for use.

When it is desired to inject the solutions, the operator removes either or both of the tabs 18. A withdrawal tube or nipple is inserted within the passage 11 until the bead thereof falls below the shoulders 19. If desired, after passage 12 is opened, an air filter may be brought into connection with the passage. When the container is inverted, as illustrated in the said Baxter Patent No. 1,941,071, liquid will flow out of the container through the nipple and by means of connecting tubes to an injection needle.

While in the illustration given, we have shown the diaphragms equipped with rather large up-

wardly-extending ribs or fingers, it will be understood that, if desired, the extensions may be rather short or slight in size while still providing means for readily grasping them to remove the diaphragms. Sealing rings may be employed for securing the annular flange 16 upon the neck of the bottle and a cap may be employed to enclose the integral diaphragms and their extensions.

While the closure has been described in connection with a specific use, it will be understood that it may be employed for other uses. It will be understood that the details and specific steps set out herein for the purpose of illustration may be varied widely by those skilled in the art without departing from the spirit of our invention.

We claim:

1. In a closure of the character set forth, a resilient plug adapted to be received within the neck of a container and equipped with at least one passage extending from the bottom to the top thereof, an integral diaphragm extending across the upper portion of said passage to close the same, the lower surface of said diaphragm being substantially flat and being disposed below the top of the plug, and an upwardly-extending projection on said diaphragm providing means for the removal of said diaphragm, said diaphragm being thin and frangible about the periphery thereof where the diaphragm is connected to the body of the plug whereby the exertion of tension on said projection causes said diaphragm to be torn about the periphery thereof and within the passage.

2. In a closure of the character set forth, a resilient plug adapted to be received within the neck of a container and equipped with a plurality of passages extending from the bottom of the plug

to the top thereof, integral diaphragms extending across the upper portion of each of said passages to close the same, the lower surface of each of said diaphragms being substantially flat and being disposed below the top of the plug, and an upwardly-extending flexible projection on at least one of said diaphragms providing means for the removal of the diaphragm, the periphery of the diaphragm carrying the projection being thin and frangible at the junction of the diaphragm with the body of the plug whereby the exertion of tension on said projection causes said diaphragm to be torn about the periphery thereof and within the passage.

3. In a closure of the character set forth, a resilient plug adapted to be received within the neck of a container and equipped with a plurality of passages extending from the bottom of the plug to the top thereof, integral diaphragms extending across the upper portion of each of said passages to close the same, the lower surface of each of said diaphragms being substantially flat and being disposed below the top of the plug, and an integral resilient projection extending across the central portion of the upper surface of at least one of said diaphragms and extending upwardly from the diaphragm, said projection being flexible and foldable against the top of the plug and providing means for the removal of said diaphragm, said diaphragm and the projection thereon being thin and frangible about the periphery of the diaphragm whereby the exertion of tension on the projection causes said diaphragm to be torn about the periphery thereof and within the passage.

EDWARD J. NAWOJ.
JOHN STORNER.