Nov. 26, 1935. D. CURTIS 2,022,369

HYPODERMIC SYRINGE CARTRIDGE

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Fig. 1.

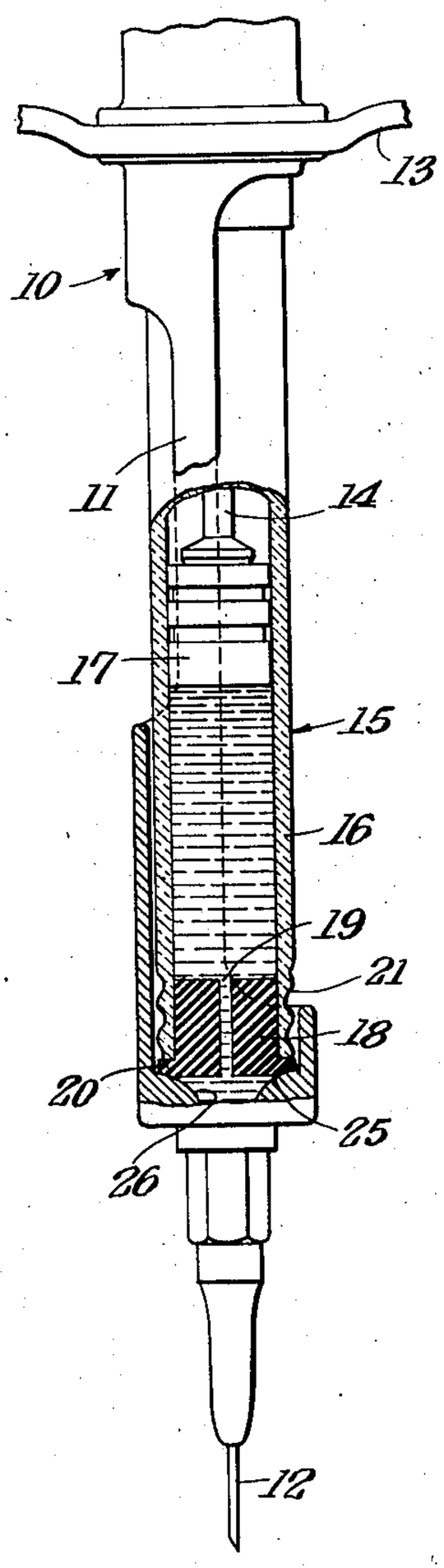

Fig. 2.

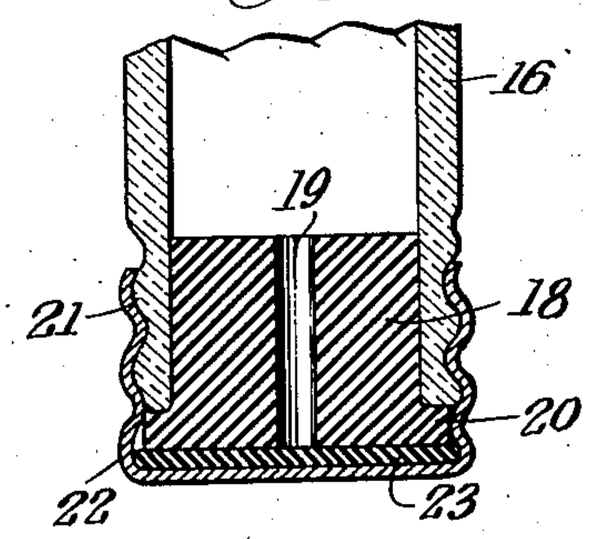

Fig. 3.

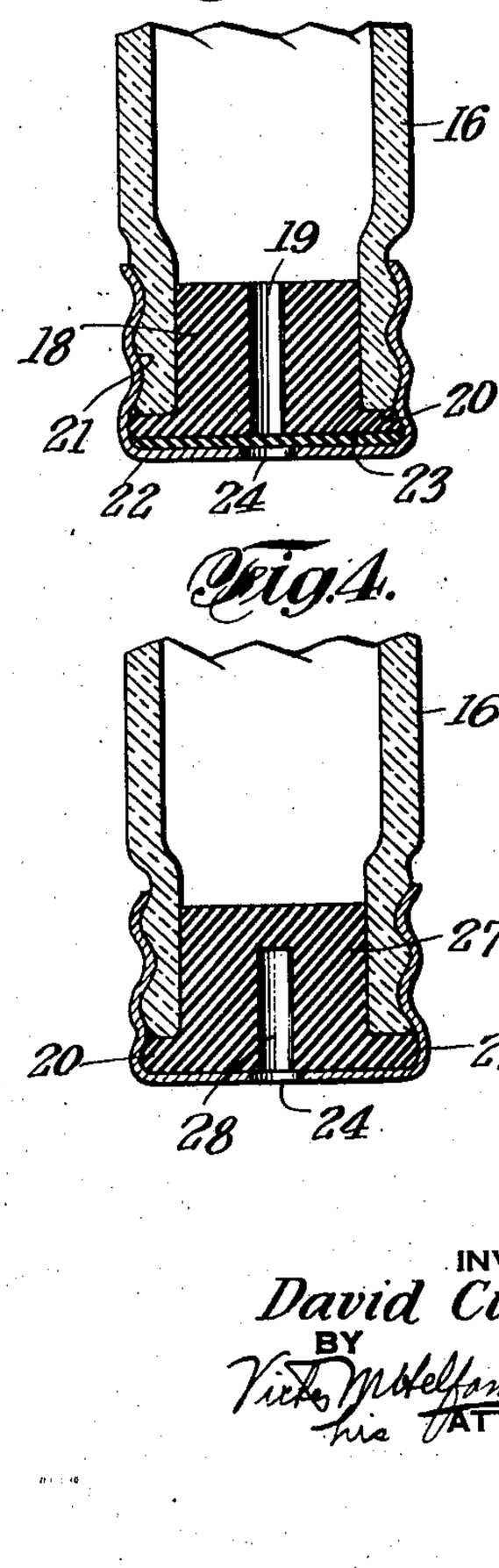

Fig. 4.

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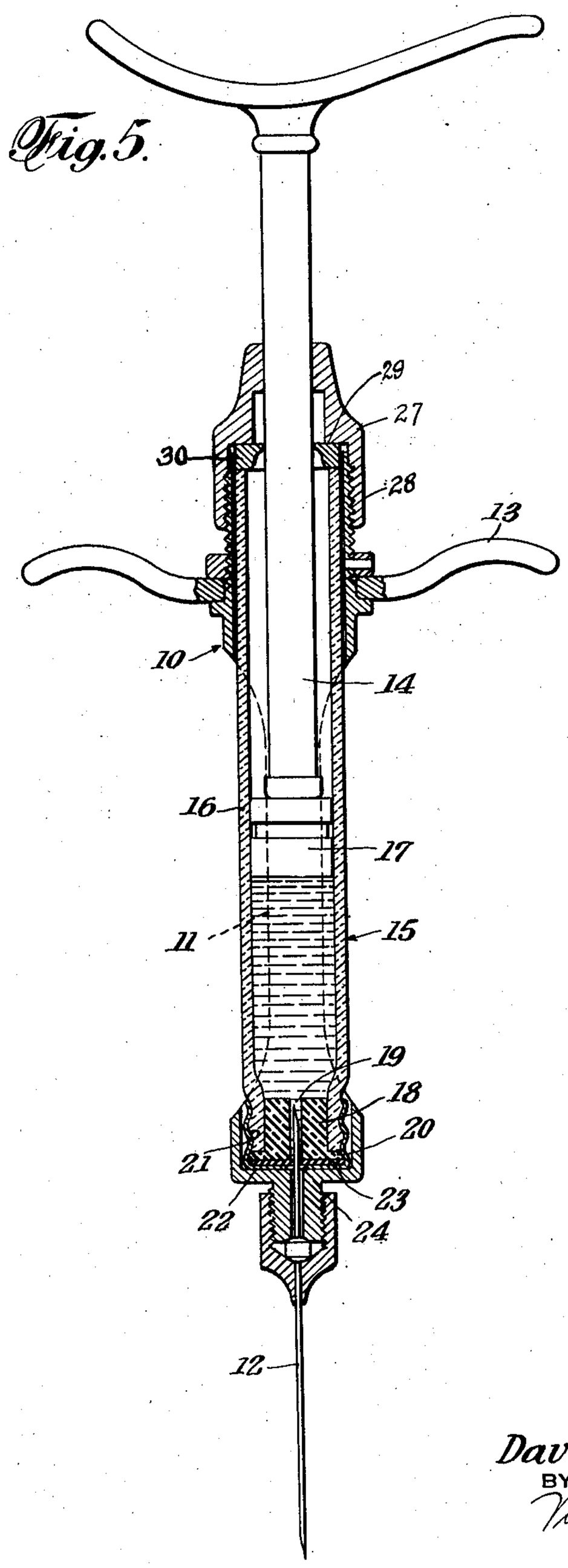
Fig. 5.



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UNITED STATES PATENT OFFICE

2,022,369

HYPODERMIC SYRINGE CARTRIDGE

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Application July 30, 1932, Serial No. 626,257

1 Claim. (Cl. 128—218)

The present invention relates to cartridges for hypodermic syringes, particularly to cartridges which may be advantageously used with the type of syringe frame which takes a canula or needle having only one end and in which the cartridge contents must pass through a chamber in the syringe frame before it passes into the canula.

The cartridges heretofore used with syringes of the type described consisted of a glass tube, open at one end, such end being closed with a movable plug, the other end of the tube being drawn out to a point and sealed at the end. In order to use such cartridges, the end of the tube had to be broken off before being inserted and locked in the syringe frame. The syringe frame was provided with a rubber washer fixed to the frame as its discharge end against which the broken off end of the tube was locked.

It is evident that such cartridges and syringe frames have many disadvantages and drawbacks to their use. First and foremost, the edge of the tube must be evenly broken in order to form a satisfactory closure with the washer. An even break is not always possible, and this failure to obtain it results in a great deal of waste. There is also present the danger that particles of broken glass might get into the tube contents and result in the clogging of the canula opening, or worse than that, of getting into the tissues, if they are small enough. The washer forming part of the syringe is also unsatisfactory. It is difficult to sterilize. Furthermore, a number of sterilization treatment cause such washers to disintegrate. Even without this disintegration, the sharp raw edge of the broken tubes cut and lacerate its surface on repeated use, making the washer difficult to sterilize and dropping particles of rubber into the tube contents, frequently causing the canula passage to be obstructed and clogged. The syringe frame, must, therefore, be very frequently repaired by replacing the washer.

The cartridges at present in use have also the ever present danger to the hands and other exposed parts of the operator's body of their being cut, either by the raw sharp edge of the tube or by the broken off portion thereof.

The cartridges of the present invention are free from the necessity of breaking any glass portions thereof, and are, consequently, free from any of the evils resulting from the breaking of the tube, such as are described above. The syringe frames that may be used with the cartridges of the present invention may also be without any washers, thus eliminating the disadvantages following from the use of washers with the syringe frame.

It is also an object of the present invention to provide syringe cartridges which may be readily used with syringe frames that are provided with double ended canula as well as with those having a single ended canula, without any change or alteration in the make up of the cartridge.

It is a further object of the present invention to provide cartridges of the character described which may be readily refilled in a sanitary manner, and readily sterilized, by its users, any number of times, without the necessity of replacing any of its parts.

It is also an object of the present invention to provide an improved type of cartridge for use with syringe frames of the double ended canula type, in which the cartridge remains sealed at all times during its use, and is emptied by means of the inner end of the canula which punctures a diaphragm sealing the cartridge.

In the accompanying drawings illustrating preferred embodiments of the cartridges of the present invention,

Fig. 1 is a view in side elevation of a cartridge of the present invention in use with a syringe frame of the single ended canula type, partly broken away to illustrate the method of its operation;

Fig. 2 is a fragmentary view in vertical section of the discharge end of the cartridge shown in Fig. 1;

Fig. 3 is a fragmentary view in vertical section of the discharge end of another cartridge of the present invention which is adapted for use with either type of syringe frame;

Fig. 4 is a fragmentary vertical sectional view of the discharge end of the improved cartridge for use with syringes of the double ended canula type; and

Fig. 5 is a vertical sectional view of the cartridge as shown in Fig. 3, as used in a syringe frame having cartridge locking means and a double ended canula.

Referring in detail to the accompanying drawings, the numeral 10 designates generally a syringe frame having the cartridge housing portion, 11, a discharge needle or canula, 12, which has one end, a finger grip, 13, a plunger, 14, and means, at the plunger end, for locking the cartridge within the cartridge housing portion of the syringe frame, which locking means may be of any desirable type, such as the cartridge locking means shown in Fig. 5, of the drawings which may comprise a sleeve, 27, fitting over the plunger, 14, and being provided with a threaded lip, 28, adapted to engage the threaded plunger end of the cartridge

housing portion 11 and having the shoulders, 29, which are adapted to press directly upon the edges of the cartridge, or upon an interposed washer, 30, resting upon the cartridge edges when such sleeve is threaded upon the syringe frame.

Situated and locked within the cartridge housing portion 11, is a cartridge, generally designated as 15, and comprising a substantially straight walled tube, 16, having one end closed by a piston, 17, which is slidable within the tube, 16, and adapted to coact with the plunger, 14, of the syringe frame, 10. The other, or discharge end of the tube, 16, is partially closed by a plug, 18, inserted therein, which plug may be of any material, but preferably of a resilient material, such as rubber, and which has the perforation, 19, extending along its vertical axis. The plug, 18, may either be provided with a portion extending beyond the edge of the tube, to act as a buffer, but may, preferably, be provided, for that purpose, with a radially extending flange, 20, on its outer surface, which flange rests on and covers the edge of the discharge end of the tube, 16.

The outer surface of the discharge end of the tube, 16, is threaded, as at 21, or may be otherwise treated in any suitable manner to receive and hold tightly in position and in tight closure over the plug, 18, a cap, 22, which may be threaded, or otherwise provided with means to cooperate with the engaging means on the outer surface of the discharge end of the tube, 16. The cap, 22, may be of metal or of any other suitable material, such as celluloid, hard rubber, or the like.

The cartridge described above may be very readily filled, without resort to suction, either before or after insertion of the plug, 18, and it may be easily sealed by screwing on, or otherwise attaching the cap, 22, which in order to make a more perfect closure and to prevent any chemical reaction between it and the cartridge contents, may have within it a washer, 23, which may be of any suitable material, such as cork, or rubber. The cartridge will then be airtight and leakproof in the most satisfactory manner.

With very slight modification, the above described cartridge may be made usable with either type of syringe frame. All that is necessary to make it also usable with the type of syringe frame having a double ended canula is to provide the cap, 22, with an opening, 24, in line with the perforation, 19, of the plug, 18, and making the washer, 23, of a resilient material, such as rubber, which will close tightly against the canula which will perforate it.

In order to use the cartridge above described with the syringe frame illustrated in the drawings, all that is necessary is to remove the cap, 22, leaving the perforation, 19, open to the air. The open cartridge is then inserted into the cartridge housing portion, 11, while holding the open end up, and locking the cartridge in place, the flange, 20, resting against the seat, 25, provided in the cartridge housing portion, 11, pressing the two tightly together, and forming the chamber, 26, into which the tube contents pass before going into the canula, 12, when the piston, 17, is pressed inwardly.

In order to use the cartridge with the syringe frame having a two ended canula, all that is necessary is to take the cartridge, without removing its perforated cap, and place the exposed part of the washer, or diaphragm, 23, against the end of the canula which extends inwardly into the cartridge housing portion of the syringe frame, pierce the diaphragm with the canula end, and push the cartridge in position in the housing portion therefor. It may here be stated that the cap, 22, may be made of material that may itself be perforable and resilient, so that the washer or diaphragm, 23, may be eliminated, and the cap need not, in that case, have any opening therein.

Another modification of the cartridge of the present invention for use with double ended canula syringes is shown in Fig. 4 of the drawings, where the cap, 22, has an opening, 24, leading to a recess, 26, in an imperforate plug, 27, the imperforate portion of the plug, 27, forming the diaphragm which is to be pierced by the inner end of the canula. The plug, 27, is provided with a flange, 20, so that an airtight and leakproof closure may be formed between it and the cap, 22.

This completes the description of the preferred embodiments of the syringe cartridges of the present invention. Many of their advantages have already been set forth and many more will be apparent to those skilled in the art to which the present invention relates. So it will be apparent that the cartridges described in Figs. 2 and 3 may be repeatedly refilled without any trouble, thus proving of great value as a very economical type of cartridge, particularly to hospitals and clinics, where great numbers of them are used.

It may here be stated that the treatment of the discharge end of the tube, which requires the use of a tool, automatically makes the discharge ends of all cartridges of uniform diameter, thus eliminating the necessity to grade the tubes as well as the requirement of plugs of different sizes. This is of great economical value in the assembly of the cartridge, and makes it possible to use parts of the cartridge over again where it is not possible to use it over again in its entirety.

While the foregoing is descriptive of the preferred embodiments of the present invention, it is to be understood that I do not wish to be limited to such embodiments, as, obviously, others may be made, without the exercise of the inventive faculties and within the scope and spirit of the present invention and the claim hereto appended.

What I claim is:

A medicament cartridge for use with a hypodermic syringe frame comprising a tube having both ends open, the outer surface of the said tube being threaded at one end to receive a cooperating threaded cap, the plain end of the said tube being closed by a plug movable within it, the threaded end of the tube being partially closed by a substantially cylindrical plug having a freely open passage along its axis for the intake and expulsion of medicament fluid, the said cylindrical plug having a substantially flat upper surface with a radial flange extending therefrom adapted to cover the edge of the tube and to form a liquid tight closure with the discharge end of the cartridge chamber of a syringe frame when the cartridge is positioned within it, a rigid cap having a perforation in line with the axial passage in the plug and a resilient diaphragm within its recess covering the said perforation and the said axial opening fitting over the said threaded end of the tube and forming an air tight closure between the enclosed diaphragm, the said flanged plug and tube.

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