Dec. 9, 1969 R. GROSCLAUDE ET AL 3,482,572

APPARATUS FOR THE INFUSION OF LIQUIDS INTO A BODY

Filed May 11, 1965

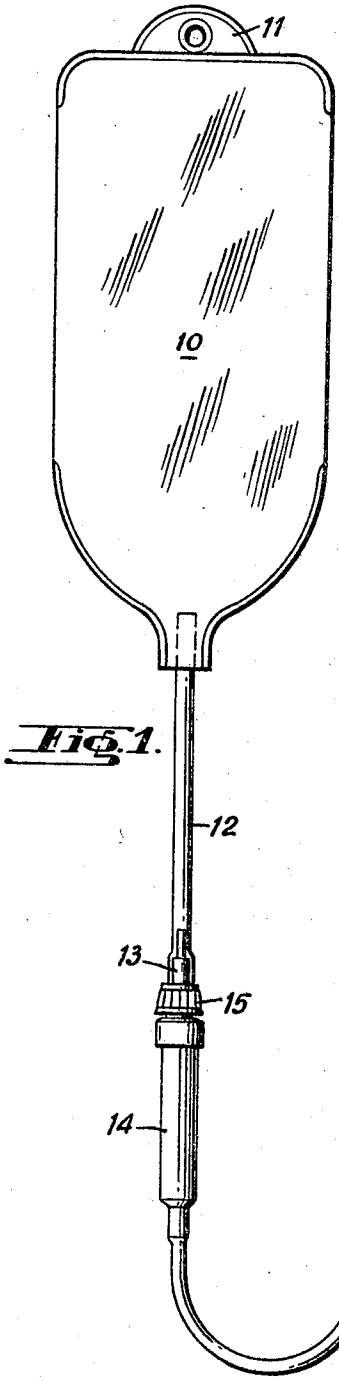

Fig. 1.

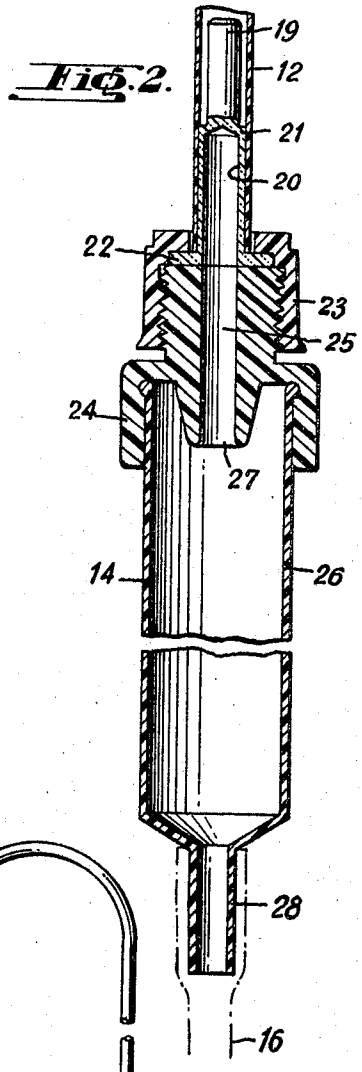

Fig. 2.

René Grosclaude and
Pierre Audrey, Inventors
By Wenderoth, Lind & Ponack, attys

United States Patent Office 3,482,572
Patented Dec. 9, 1969

3,482,572

APPARATUS FOR THE INFUSION OF LIQUIDS INTO A BODY

René Grosclaude and Pierre Andrey, Geneva, Switzerland, assignors to Laboratoires Vifor S.A., Geneva, Switzerland, a Swiss corporation

Filed May 11, 1965, Ser. No. 454,860
Claims priority, application Switzerland, May 13, 1964, 6,248/64
Int. Cl. A61m 5/00
U.S. Cl. 128—214 2 Claims

ABSTRACT OF THE DISCLOSURE

An apparatus for injecting liquids into a living body having a reservoir for the liquid to be injected. A conduit is connected at one end of the reservoir and a closing device is connected to the other end of such conduit. A joining device connects a pipette to the closing device and a second conduit connects the pipette to an injection member. The closing device is of glass and has a breakable portion at a point adjacent the arriving liquid to the pipette. The joining device is releasably connected to the second conduit whereby a plurality of reservoirs may be attached to the injection device without disturbing the injection needle.

When infusing liquids, such as physiological solutions, into a living body, by means of an injection needle connected to a reservoir containing the liquid to be infused, it is frequently necessary to be able to replace the reservoir by another. This operation should be possible without withdrawing the needle from the body in which it is fixed, in order to avoid injuring the vein utilized for the infusion, by repeated punctures or having to puncture the patient successively in several places.

Apparatus are known for the infusion of liquids into a body, of which the reservoir, the pipette device and the injection needle form a single unit, which are sterilized during their manufacture, and which are, without further ado, ready for use. They are further equipped with a closing device, liable to be broken from the outside, to allow a passage for the liquid. These apparatus offer the advantage that it is not necessary to expose their contents or their interior to outer contact in order to cause them to operate since the release of the flow of liquid is effected by breakage of the closing device from their outside.

When the different parts (reservoir, pipette, closing device and needle) of these apparatus are inseparable one from the other, they do not permit the replacement of their reservoir by another without withdrawing the injection needle from the body in which it is fixed.

The present invention permits this replacement.

It has for object an apparatus for the infusion of liquids into a body, comprising a reservoir for the liquid to be infused, a duct connecting this reservoir to a pipette device, a closing device breakable at a definite point, closing said duct and a joint removably connecting the duct to the pipette device.

This apparatus is characterized in that the said closing device is secured in the end of the duct connected to the pipette device, and in that the portion of said closing device releasable by the break is upstream of that remaining fixed to the duct.

In this apparatus, the portion of the closing device released by the break is held in said duct by the portion of the closing device remaining fixed to the duct. Thus, after use, the reservoir, the duct and all the broken closing device may be removed from the rest of the apparatus and replaced by another reservoir associated with a duct closed by a closing device still intact.

The breaking of the closing device may be effected from the outside, once the reservoir and its duct are connected to the pipette device. The interchangeable reservoir with its duct and the closing device form a single unit during their manufacture.

One embodiment of the apparatus according to the invention is shown in the accompanying drawing, in which:

FIGURE 1 is a view in elevation of the complete apparatus and

FIGURE 2 is a section on a larger scale of the portion of the apparatus constituted by the closing device, the pipette device and the joint connecting the end of the duct to the pipette device.

With reference to FIG. 1, the apparatus shown comprises a reservoir **10**, of flexible plastic material, adapted to contain the liquid to be infused, for example a physiological solution of sodium chloride. This reservoir has an attachment member **11** of one piece therewith, permitting of suspending the same. It is welded opposite the attachment member to a duct **12**, also of plastic material.

This duct **12** encloses, at its end opposite to the reservoir **10**, a closing device **13**; it is connected in a removable manner to a pipette device **14** by a joint **15**.

A flexible duct **16** connects the pipette device **14** to the injection member **17** the essential part of which is an injection needle (not visible in FIG. 1) and protected, before use, by an elastic cap **18**.

With reference to FIG. 2, the closing device **13** is secured by friction in the end of the tube **12**. This closing device is in glass; it comprises a full portion **19** and a recessed portion **20**. This latter, of larger diameter than the portion **19**, is forced into the end of the tube **12** and is secured therein. The recess of the portion **20** is conical adjacent to the full portion **19**, so that the closing device has a weak part at **21**, which is the breaking part. The closing device has, at its portion adjacent to the pipette device **14**, a shoulder **22**. This latter is capped by an inwardly tapped collet **23**. This collet is screwed on a downstream element **24** and forms, with the latter and with the closing device **13** and its shoulder **22**, the joint between the duct **12** and the pipette device **14**.

The shoulder **22** form a washer; the downstream element **24** has an axial duct **25** as an extension of the recess of the portion **20** of the closing device.

The down-stream element **24** is secured to the chamber **26** of the pipette device; it is provided, of one piece therewith, with a pipette tube **27** extending into the chamber **26**. This latter, which is of rigid transparent material, has an extension **28** at its lower end, on which is secured the duct **16**.

The operation of the apparatus which has been described in the following:

The reservoir **10** being suspended by the attachment member **11**, the glass closing member **13** is broken at **21** by a bending effort exerted from the outside of the duct **12**. From this moment, the liquid contained in the reservoir **10** flows to the pipette tube **27**, where drops are formed which fall into the chamber **26**. From there, the liquid flows to the injection member **17** the needle of which has been exposed by removal of the cap **18**. The liquid reaching the needle, the latter may be inserted in a vein of the patient.

It will be noted that the portion **19** of the closing device, which has been released by the break, is up-stream of the portion **20** remaining secured to the duct **12**. Thus, this portion **19** remains held in the duct **12**, without hindering the flow of the liquid and without the risk of falling into the pipette device.

Once the reservoir **10** is empty, it may be replaced by another reservoir by unscrewing the collet **23** to free

it from the down-stream element **24**. In fact, the reservoir **10**, the duct **12**, the broken closing device **13** and the collet **23** form a unit which may be discarded and replaced by a similar unit, of which the closing device is still intact and the reservoir filled with liquid. This replacement is very rapid because it is sufficient to screw the collet **23** of the new unit on the threaded portion of the element **24**. This latter, together with the chamber **26** of the pipette device, the duct **16** and the injection member **17** have remained in communication with the body of the patient, the injection needle not having been withdrawn from the spot where it had been inserted.

The replacement of a reservoir by another may be effected as many times as required, while leaving the injection needle in the same place in the body of the patient.

What we claim is:

1. Apparatus for the infusion of liquids in a living body, comprising a reservoir for the liquid to be infused, a first conduit connected at one end to said reservoir for drawing off liquid from said resrevoir, a closing device connected to the other end of said conduit, a pipette, a joining device connecting said closing device and said pipette, a second conduit connected to said pipette for drawing off said liquid from said pipette, an injection member connected to said second conduit, said closing device having a breakable portion at a joint adjacent the arriving liquid to said pipette for permitting a free flow of said liquid, said closing device comprising a glass tube secured to the end of said first conduit having said breakable portion which is solid and of smaller diameter than that portion of said glass tube secured to said conduit, and said glass tube having a conical recess adjacent said breakable portion.

2. Apparatus for the infusion of liquids in a living body, comprising a reservoir for the liquid to be infused, a first conduit connected at one end to said reservoir for drawing off liquid from siad reservoir, a closing device connected to the other end of said conduit, a pipette, a joining device connecting said closing device and said pipette, a second conduit connected to said pipette for drawing off said liquid from said pipette, an injection member connected to said second conduit, said closing device having a breakable portion at a point adjacent the arriving liquid to said pipette for permitting a free flow of said liquid, said closing device comprising a glass tube secured in the end of said first conduit having said breakable portion, said glass tube having an annular shoulder situated outside said first conduit adjacent said pipette, and said pipette comprising a cylindrical chamber having a cap with an axial duct, said cap being rigidly secured to the inlet end of said chamber and adapted to be releasably secured to said joining device, said axial duct having a drop counting opening extending inside said chamber, the end of said first conduit having a collet for urging said end against said cap.

References Cited

FOREIGN PATENTS

1,129,284	9/1956	France.
882,381	11/1961	Great Britain.
402,286	5/1966	Switzerland.

DALTON L. TRULUCK, Primary Examiner

U.S. Cl. X.R.

222—541