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(54) FLUID TRANSFER DEVICES FOR USE WITH MEDICAMENT CONTAINERS

(71) We, IMS LIMITED, a Corporation organized under the Laws of the State of Delaware, United States of America, of 1886 Santa Anita Avenue, South El Monte, California 91733, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to fluid transfer devices for use with medicament containers.

The present invention comprises a fluid transfer device and a medicament container for use with the fluid transfer device, the medicament container having an open end, and an imperforate rubber stopper at said open end which seals said container, and the fluid transfer device comprising two parallel fluid passages within a single elongated rigid member having cutting ends, said rigid member having a generally disk-like flange disposed substantially midway between the ends of said rigid member and generally perpendicular to said passages, said two fluid passages being substantially of equal length and coterminous, and the openings of adjacent fluid passages at each end of said rigid member being directed away from each other and a common cover for one end of each of said fluid passages, said cover abutting said flange and forming a fluid tight seal with said flange, said cover being provided at the end thereof opposite said flange with an imperforate removable resilient cap which can be pierced by a needle and an adjacent airway provided with air filtration means, the arrangement being such that said stopper of the medicament container can be pierced by the other end of the rigid member and the rigid member can be advanced until the flange abuts the exterior of said stopper, said cover sealing the interior of said container against contamination.

A device for transferring fluid to or from a medicament container, constructed in accordance with the invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a sectional view of the transfer device;

Figure 2 is a perspective view of the device of Figure 1;

Figure 3 is a side sectional view showing the operation of the transfer device of Figures 1 and 2 wherein liquid medication is being added to a diluent bottle or vial through the transfer device;

Figure 4 is a top plan view of the device of Figures 1 and 2 with the cover removed; and

Figure 5 is a perspective view of the transfer device of Figures 1 and 2 with the cover removed.

Turning to the drawings in greater detail, the fluid transfer device of Figures 1 to 5 comprises parallel fluid passages 10 and 12 within a single elongated rigid member, and a flange 14. The fluid passages are approximately equal in length and co-terminous with bias-cut ends or openings 16 and 18, and 20 and 22, which are directed away from each other. We have found that if the ends of the fluid passages are directed away from each other, the downcoming diluent or liquid cannot form a block or slug in the air riser passage. If, however, the ends or openings of the fluid passages are directed towards each other, an air block can develop which prevents or stops the fluid transfer. Accordingly, the disposition of the ends of the fluid passages is a significant feature of this invention. One end of the device is covered with a cap (or cover) 54, which includes a flange portion 56 at its open end. The inside of the cap 54 has an interference or press fit with the exterior surface of the flange 14 of the transfer device to form a fluid-tight seal, and the cap abuts the flange 14 when the cap is fully advanced over the fluid transfer device.

Referring to Figures 1 and 2, the cap 54

has a tubular projection 58 provided with an opening 60 at the end opposite flange 56. The projection 58 is covered by an imperforate resilient cap 62 which is held in projection 58 with a snap or interference fit. The centre of cap 62 is dished and has a central diaphragm 64 for piercing with a needle 66 of a syringe or vial injector. The cap 54 also has an airway 68 provided with a filter 70.

Figure 3 illustrates the use of the transfer device with a medicament container (which may be a diluent bottle or vial which contains for example intravenous solutions) 34. The transfer device is forced downwardly through a stopper (usually of rubber) 36 provided at the neck of the diluent container 34 until the flange 14 abuts the stopper 36. The needle 66 of a syringe or vial injector is then made to pierce the central diaphragm 64 of the imperforate cap 62. Medication can then be withdrawn into the syringe, filtered air entering the cap 54 as the medication is withdrawn. One of the parallel fluid passages (for example, the passage 10) acts as diluent or liquid downcomer and the other as a path or riser for the displacement of air upwardly from the cap into the container 34. The flow of air is of course reversed in the case of addition of medication from the syringe or vial injector to the diluent bottle or vial.

If desired, the cap 54 may then be removed and the end of the fluid transfer device can pierce the stopper of a further medicament container (for example, containing dry or lyophilized material) arranged beneath the container 34 until the flange abuts the stopper of the further medicament container. This procedure can be employed for reconstituting medicament while ensuring it remains sterile. The contents may for example be administered using a conventional intravenous solution set.

When the fluid transfer device is small, it may be found desirable to provide pressure-relieving openings in the passages 10 and 12 to prevent a fluid slug from forming and shutting off the transfer of liquid and air. For example, a pair of openings may be formed midway along the part of the passage 12 that is above the flange 14 and midway along the part of the passage that is below the flange 14, the openings communicating with the interior of the cap 54.

WHAT WE CLAIM IS:—

1. A fluid transfer device and a medicament container for use with the fluid transfer device, the medicament container having an open end, and an imperforate rubber stopper at said open end which seals said container, and the fluid transfer device comprising two parallel fluid passages within a single elongated rigid member having cutting ends, said rigid member having a generally disk-like flange disposed substantially midway between the ends of said rigid member and generally perpendicular to said passages, said two fluid passages being substantially of equal length and coterminous, and the openings of adjacent fluid passages at each end at said rigid member being directed away from each other, and a common cover for one end of each of said fluid passages, said cover abutting said flange and forming a fluid tight seal with said flange, said cover being provided at the end thereof opposite said flange with an imperforate removable resilient cap which can be pierced by a needle and an adjacent airway provided with air filtration means, the arrangement being such that said stopper of the medicament container can be pierced by the other end of the rigid member and the rigid member can be advanced until the flange abuts the exterior of said stopper, said cover sealing the interior of said container against contamination.

2. A combination as claimed in claim 1, in which there is an interference or press fit between the interior of the cover and the flange.

3. A combination of a fluid transfer device and a medicament container for use with the fluid transfer device substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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