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## RUBBER FLASK CONNECTORS FOR HYPODERMOCLYSIS, INTRAVENOUS THERAPY AND OTHER USES

F. M. POTTENGER, JR., M.D.  
MONROVIA, CALIF.

Hypodermoclysis and intravenous therapy are at present administered by two general methods; namely, by means of the Kelly bottle and by the inverted flask as a reservoir with the necessary connections. Neither method gives complete satisfaction as used at present. Use of the Kelly bottle necessitates the transfer of sterile fluid from one container to another, offering an opportunity for contamination. To set up the inverted flask with the clamp and plate that are universally employed to maintain the stopper in position requires about five minutes. The metal connection corrodes under sterilization and use and the rubber ordinarily used soon deteriorates when subjected to repeated heat sterilizations.

In an effort to overcome these difficulties, two rubber connectors were developed. These connectors slip over the necks of flasks or bottles in the same manner as nursing nipples and are made in sizes to suit the various requirements. By using these, an ordinarily skilful nurse can complete a dozen hypodermoclysis outfits in the length of time required to set up a single plate and clamp.

A high grade, heat-resisting rubber is used in their manufacture. In addition to its chemical resisting qualities, this rubber has withstood without material damage thirty autoclavings at from 20 to 30 pounds pressure. A suction ring cast into the heavy rim provides additional security.

The first device is a single outlet connector with a valve for admitting air, as shown in figure 1.

Intravenous and hypodermoclysis therapy demand an air intake with a fluid outlet from a vessel into a circuit without the loss of fluid through the air inlet. This unit is made of rubber with a suction ring cast near the upper lip to insure a good hold on the neck of the flask or bottle. A second ring cast about an inch below the lip guards the connector from being forced down on the neck of the flask to a point at which the proper operation of the valve would be interfered with.

The outlet is made with three tapers so devised as to make it available for use with one-eighth inch, one-fourth inch and three-eighths inch or larger tubing. If one-eighth inch tubing is used, the connector may be used as it is. If one-fourth inch

tubing is used, the one-eighth inch connection is cut off, and for larger sizes both of the two smaller joints are removed.

The valve is placed in the side wall of the connector in such a position that no air bubbles will pass into the outlet tube even though the fluid is allowed to flow freely from the one-eighth inch outlet under a head of 6 feet of water. This is a rate of flow greatly in excess of any used in practice.

An important advantage of this valve lies in the fact that the attending nurse can tell at a glance, by observing the flow of air bubbles through the fluid, whether or not the apparatus is in operation.

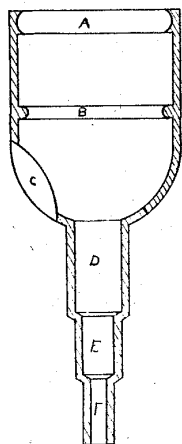


Fig. 1.—Cross-section of single-legged connector with the valve in the side wall: *A*, suction ring; *B*, guard to prevent connector from being pulled down too far; *C*, valve in side wall; *D*, three-eighths inch outlet; *E*, one-fourth inch outlet; *F*, one-eighth inch outlet.

The flask, solution and connector may be sterilized as a unit, thus eliminating changes of sterile fluid from one receptacle to another.

#### TWO-LEGGED CONNECTOR

In addition to the demand for a connector with a single outlet for hypodermoclysis and intravenous uses, there is considerable demand for a two-legged connector both in medicine and in chemistry. Such a connector is shown in figure 2.

This connector possesses the general advantages already described and the additional feature of a double outlet.

The upper portion of the connector contains a heavy suction ring for security under moderate pressures, which makes the connector so firm that the flask or rubber will break before the connector can be pushed off by internal pressure.

In intravenous therapy and hypodermoclysis when objection is raised to the passage of air bubbles through the fluid, the employment of this connector will obviate that objection. A glass tube can be inserted into one leg, or one leg may be manufactured so as to project inward to a point above the surface of the fluid.

This will serve admirably as an inexpensive suction apparatus by connecting a long tube to a floor bottle from one leg and by inserting a glass tube in the other which extends upward above the surface of the fluid.

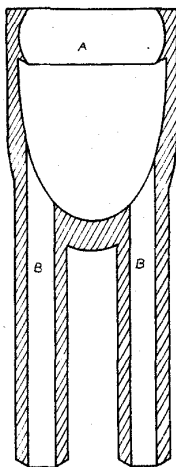


Fig. 2.—Cross-section of two-legged connector. *A*, suction ring; *B, B*, outlets.

Numerous other applications become immediately evident to the clinician.

These connectors were first used in the service of chest surgery at the Los Angeles County General Hospital.

I wish to thank Dr. H. E. Schiffbauer, Senior Attendant in the service, for encouragement and assistance in proving their clinical efficiency.