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FLUID INFUSION DEVICE WITH RETRACTABLE NEEDLE

CROSS REFERENCE TO RELATED APPLICATION

Priority is claimed herein to U.S. Appl. No. 60/098,280, filed Aug. 28, 1998, which is incorporated by reference herein.

FIELD OF THE INVENTION

The present invention relates to an apparatus for the transmission of fluids. In particular, the invention relates to a retractable needle apparatus for penetrating the seal of an intravenous port and for providing a flow of fluid to or from the port.

BACKGROUND OF THE INVENTION

Intravenous therapy is widely used in medical practice to administer hydration fluids, nutritional fluids, medical fluids, or blood products directly to the circulatory system of a patient. Various types of catheters, such as peripheral catheters, central catheters or surgically implanted catheters, may be inserted into a patient to provide a route for administration of such fluids. During intravenous therapy, it is often desirable to connect to the catheter an intravenous fluid supply system that includes one or more injection ports for intermittent or continuous supply of desired fluids or combination of fluids to the patient.

A peripheral catheter, for example, may be connected by intravenous tubing with a supply of a hydrating solution, such as a saline solution, to provide a flow of such fluid to the patient. In order to provide for supplementing or replacing the flow of saline solution with another fluid, a so-called "Y-site" having a releasable injection port may be connected along the intravenous tubing. When administration of a second fluid is desired, the injection port may be punctured by a hollow needle that is connected with an external supply of the second fluid. After the desired quantity of second fluid has been administered, the needle is then removed from the injection port. The intravenous therapist must then safely discard the contaminated needle associated with the exhausted supply of fluid. Due to concerns about the handling and disposal of medical devices having contaminated needles, it is desirable to provide a device that can be utilized to infuse a secondary supply of medicinal fluid, and can be rendered safe after use.

DESCRIPTION OF THE DRAWINGS

All of the objects of the present invention are more fully set forth hereinafter with reference to the accompanying drawings, wherein:

FIG. 1 is a cross-sectional view of a retractable needle apparatus according to the present invention;

FIG. 2 is a cross-sectional view of the device illustrated in FIG. 1, illustrating the needle in a retracted position;

FIG. 3 is a diagramic view illustrating use of the apparatus

FIG. 4 is a sectional view of a Y-port catheter and an insertion device therefor shown in an initial assembled configuration;

FIG. 5 is a sectional view of the catheter and insertion device of FIG. 4 shown in a second configuration where the insertion device is being withdrawn from the catheter; and

FIG. 6 is a sectional view of the catheter and insertion device of FIG. 4 shown in a final de-coupled configuration of FIG. 1.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings in general and to FIG. 3 specifically, an infusion device **10** is illustrated in connection with an intravenous supply for supplying medicinal fluid to a patient. A catheter **90** is inserted intravenously into a patient. A fluid line connects the catheter **90** with a Y-site **92**. The Y-site **92** in turn is connected to a primary line **93** that feeds fluid from a primary reservoir **94** to the catheter **90**. In addition, the Y-site **92** has a port for connecting a secondary supply line. The port is covered by a piercable septum **95**. The infusion device **10** has a needle **70** for piercing the septum **95** of the Y-site. The infusion device **10** is connected to a secondary supply line **96**, which is in turn connected to a secondary reservoir **97** containing medicinal fluid. In this way, medicinal fluid can be fed to the catheter from both the primary reservoir **94** and the secondary reservoir **97**. After use, the infusion device **10** can be removed from the Y-site and the sharpened end of the needle **70** can be retracted into the device to prevent inadvertent contact with the used needle.

The infusion device **10** includes a housing **20** and a Y-port **40** slidably displaceable within the housing. A needle **70** attached to the Y-port **40** projects forwardly from the forward end of the housing **20**. A spring **80** biases the needle **70** rearwardly into a retracted position within the housing **20**. An actuator button **45** is connected to the Y-port **40**. The button **45** engages an aperture **22** in the housing **20** to retain the needle **70** in the extended position projecting forwardly from the housing **20**. The needle **70** is retracted into the housing by depressing the button **45**.

The housing **20** includes a generally cylindrical barrel having an open rearward end and a generally closed forward end. The forward end of the housing tapers inwardly forming a reduced diameter tip having an opening for receiving the needle **70**. The aperture **22** formed in the side of the housing **20** engages the button **45** as is discussed further below.

Additionally, a generally bell-shaped connector **28** flares radially outwardly from the forward end of the housing **20**, circumscribing the nose of the housing. The connector **28** is removably connectable with the Y-site **92**. To connect the device **10** to the Y-site **92**, the connector **28** snaps over the septum **95** forming a snap-fit with the Y-site.

The Y-port **40** is slidably displaceable within the housing **20**. The Y-port includes a generally cylindrical hollow body **42** disposed within the housing **20**. A central conduit **50** extends rearwardly from the body **42** substantially parallel to the longitudinal axis of the body. A Y-tube **60** extends transverse the central conduit **50** intersecting the central conduit so that the Y-tube and the central conduit are in fluid communication.

The rearward end of the central conduit **50** is generally opened. A piercable septum **55** encloses the open end of the central conduit **50** forming a fluid-tight seal. In addition, the rearward end of the central conduit is configured to cooperate with the connector **28** of the housing so that a second infusion device can be connected to the end of the central conduit. In this way, a plurality of infusion devices **10** can be interconnected so that fluid from a plurality of fluid supplies can be fed to the catheter. Specifically, the rearward end of the central conduit is configured so that a circumferential flange flares radially outwardly from the rearward end of the central conduit **50**. In this way, the rearward end of the central conduit forms a releasable snap-fit with the connector **28** of a similar infusion device.