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MAGNETICALLY LATCHED FLUID CONNECTORS

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The disclosed invention provides a magnetically latched fluid connector that allows for easy connecting and disconnecting of a tube set from a medical fluid delivery system.

SPECIFICATION

The magnetically latched fluid connector of the present invention includes two connector halves. A permanent magnet is secured to one half of a mating set of fluid connectors. The magnet may be part of a magnetic assembly including a ferromagnetic element (preferably a steel cup with a center hole) that appropriately directs and focuses the magnetic field. A ferromagnetic element (preferably a steel washer) is secured to the other half of the fluid connector. When the two halves of the connector set are brought into their mated position, a magnetically induced axial force draws the halves together. By appropriately sizing the magnetic components, the attractive force can be made sufficiently large to withstand hydraulic and mechanical separation forces.

To assist in decoupling the two halves held together by the attractive forces, mating cam teeth located on the connector bodies can induce axial separation of the connector halves when one half of the connector is rotated relative to the other. The axial force generated by the magnetic circuit drops precipitously as the connectors are axially separated, thus allowing the operator to separate the connectors with nominal axial manual force.

The magnetic elements can be secured to the connectors halves by overmolding (preferred), bonding or mechanical means.

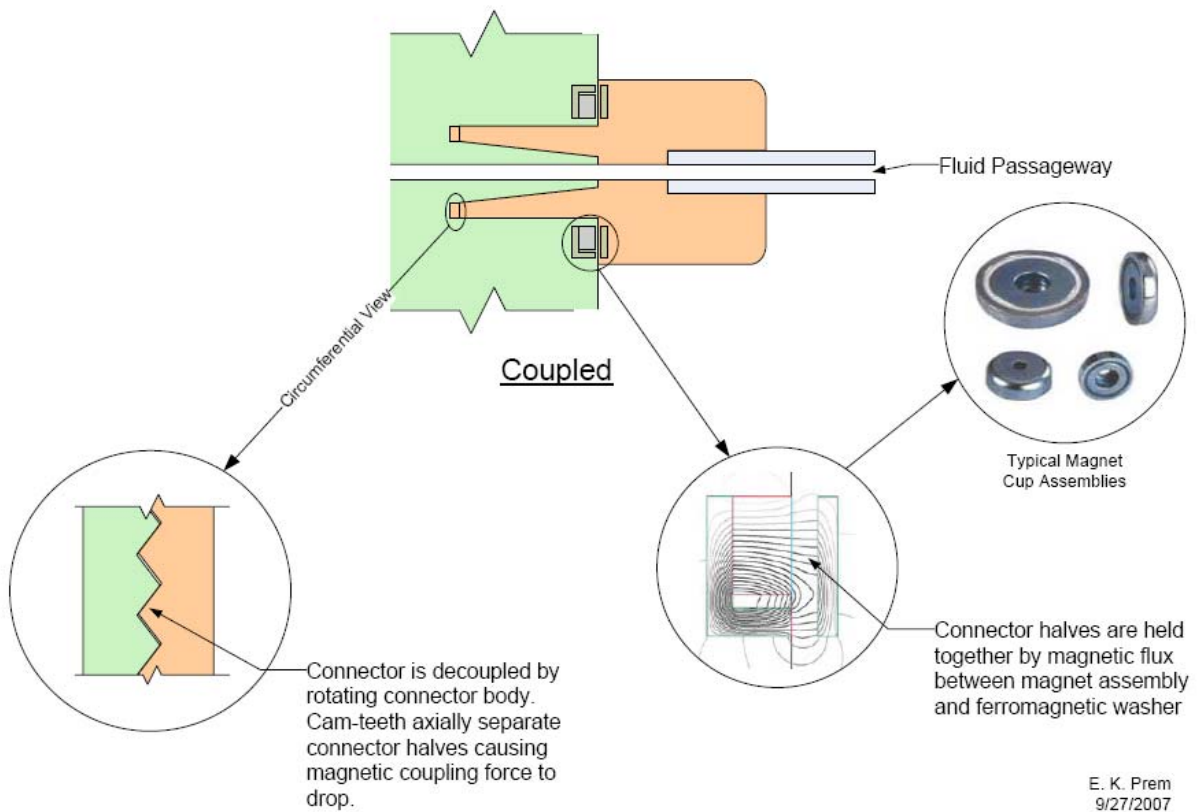
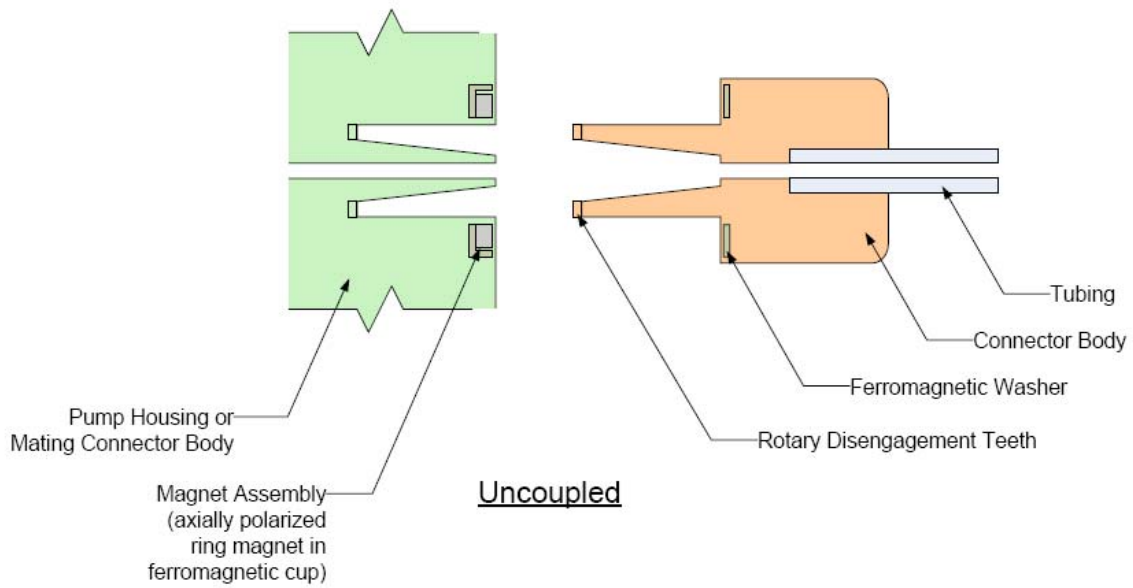
The connectors can include a variety of fluid sealing means such as tapered interference fits (Luer), O-rings, face seals or other means understood by those skilled in the art. Two examples of the magnetically latched fluid connectors include the Luer connector and O-rings seal, are illustrated in the Figures below.

The invention is an improvement over connectors having a simple Luer fit connector commonly used in the medical field. Fluid connectors currently in clinical use require the operator to turn the connectors, thereby screwing the halves together. Whereas, the connectors of the present invention will mate when brought close enough together because of the magnetic forces of attraction that are produced, thus "self-mating" of the connector halves occurs. Additionally, the connector of the present invention disconnects using a rotary motion to partially separate the magnetic halves, thereby allowing disconnection with nominal axial force or a "quick release."

"The "self-mating" and quick release" features of the connector simplifies the manual efforts by the operator, and therefore provides particular benefits to medical personnel that commonly make many such connections during the course of a work day. These benefits include:

- 1) reducing operator effort;
- 2) providing audible and tactile feedback when properly mated; and
- 3) eliminating the possibility of inadequately-tightened connections, thus reducing potential for fluid and air leaks.

Magnetically Latched Luer Connector



Magnetically Latched Fluid Connector with O-Ring Seals

