tube **18** along its length. FIG. **1** depicts a hybrid embodiment of a typical section of the peristaltic pump of the present invention in its static state with no current being applied to the conducting loops. The operation of the pump can be more clearly understood with the aid of FIGS. **2** and **3**.

FIG. **2** shows an expanded view of the group of conducting loops **30** of FIG. **1** in a dynamic state. The group of conducting loops **30** is for simplicity shown to consist of five individual loops **30A**, **30B**, **30C**, **30D**, and **30E**. It is noted that this particular group of loops are located immediately adjacent to inner wall **22** of chamber **12**. Each individual conducting loop is energized by an external current source (not shown). When current is passed through a loop, a magnetic field $\bar{H}$ is created according to well known physical principles. This magnetic field $\bar{H}$ induces a magnetic moment per unit volume $\bar{M}$ in the ferromagnetic fluid according to the well known equation $\bar{M}=x\bar{H}$ where x is the magnetic susceptibility of the ferromagnetic fluid. As mentioned above, a body force is developed within the ferromagnetic fluid as a result of the magnetic field $\bar{H}$. The force per unit volume $\bar{F}$ on the ferromagnetic fluid is given by $\bar{F}=(\bar{M}\cdot\bar{V})\,\bar{H}$. As applied to the situation depicted in FIG. **2**, the force created by the passing of current through conducting loop **30C**, for example, will tend to attract the ferromagnetic fluid within conduit **26** towards conducting loop **30C** such that flexible tube **18** is pulled in towards conducting loop **30C** in an attempt to equalize the force. Energizing the group of conducting loops in FIG. **2** such that the current is increasing towards the left and decreasing towards the right causes flexible tube **18** to expand creating a bulge **42** that moves to the left, which acts as a motive force for the fluid within region **16**. It is understood that one need not be limited to a small group of loops as shown in FIG. **2**; in fact, the conducting loops can extend along the entire length of inner wall **22** which would make possible a continuous motive force along the entire length of flexible tube **18**.

FIG. **3** shows an enlarged portion of the group of loops **34** of FIG. **1** which are located immediately adjacent to flexible tube **18**. The individual loops **34A**, **34B**, **34C**, **34D** and **34E** are similarly energized by individual current sources. The effect of passing a current through one of the loops is similar to that described above. Passing current through loop **34C**, for example, will set up body forces in the ferromagnetic fluid located within conduit **26** and causes the ferromagnetic fluid to circulate around the coils according to the magnitude of current therein. The forces created thereby tend to compress the portion of flexible tube **18** in the vicinity of the energized loop **34C** as shown in FIG. **3**. Once again, if one sequentially energizes the conducting loops from left to right in FIG. **3**, it will result in a moving pinch **46** in flexible tube **18** that will move to the left to act as a motive force for the fluid within region **16**. It is understood that one need not be limited to the small group of loops as shown in FIG. **3**; in fact, efficient operation of the peristaltic pump can be achieved by locating similar loops along the entire length of flexible tube **18** to achieve a continuous motive force for the fluid within region **16**. It is also obvious that various combinations of the specific constructions shown in FIG. **2** and FIG. **3** can be devised to provide the desired effect in accordance with the present invention. Since the ferromagnetic fluid is completely contained within conduit **26** and is considered incompressible, the contractions and expansions of flexible tube **18** can be duly compensated for by making a portion of the outer wall **28** of chamber **12** of a flexible material.

It is seen that I have provided a simple peristaltic pump that requires no mechanical valves or rollers so as to minimize the wear and tear on the fluid to be pumped. It is clear that the pump can be made in a number of different embodiments to suit any particularized need. Since the device is completely controlled ky external electrical current sources, the expansions and/or constrictions of the flexible tube can be synchronized both in magnitude and velocity to match some external environmental conditions. For example, as a heart pump the unit can be synchronized to the patient's normal heartbeat and the amplitude set to match the normal blood flow. The device can also be converted to act as a monitor of a pulsed flow of fluid if alternating current loops are connected to voltage detectors with the remaining loops carrying a DC current. In this way, the flow of fluid through the flexible tube would effectively change the current output of the loops which can be read by the voltage detectors. Such a monitor could be used in conjunction with a peristaltic pump as presented herein to provide the synchronizing means for the system.

I wish to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim as my invention:

1. A peristaltic pump, comprising:

a. a continuous flexible tube defining a main fluid path;

b. a chamber containing a ferromagnetic fluid that surrounds said flexible tube; and

c. a plurality of electrically conducting wires positioned at selected intervals along the length of said flexible tube, each of said wires comprising a loop circumferentially located immediately adjacent to said flexible tube and within said chamber, the sequential energization of said loops causing the portion of said flexible tube adjacent to said energized loop to collapse to provide a motive force for said fluid within said tube.

2. The invention according to claim **1** wherein a portion of said loops are circumferentially located adjacent to said chamber at a distance from said flexible tube, the sequential energization of said portion of loops causing the portion of said flexible tube nearest thereto to expand to provide a motive force for said fluid within said tube.

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