CLAIMS

What is claimed is:

1. An electric submersible pump, comprising:

a stator having stacks of stator laminations having slots for receiving magnet wire to form a stator coil, the stacks of stator laminations separated by stator winding spacers;

a tube disposed along an interior of stator to define a passage extending longitudinally through the stator, the tube being sealed with respect to the stacks of stator laminations to prevent contact between the stator laminations and a fluid moving along the passage; and

a plurality of impellers disposed within the passage to pump the fluid along the passage when rotated, each impeller comprising:

an impeller body; and

a magnet aligned with a respective stack of stator laminations and coupled with the impeller body for interaction with a magnetic field created by the stator to power rotation of the impeller.

2. The electric submersible pump according to claim 1, wherein each impeller further comprises a fluid conduit for transporting a fluid from a first side of the impeller to a second side of the impeller.

3. The electric submersible pump according to claim 1, further comprising a non-magnetic diffuser associated with each impeller.

4. The electric submersible pump according to claim 3, wherein each diffuser comprises a fluid conduit for transporting a fluid from a first side of the diffuser to a second side of the diffuser.

5. The electric submersible pump according to claim 1, wherein the magnet comprises a magnetic component and a permanent magnet.

6. The electric submersible pump according to claim 5, wherein the magnetic component comprises magnetic steel and has an annular shape.

7. The electric submersible pump according to claim 1, further comprising a hollow shaft extending longitudinally through the center of the electric submersible pump and through the impeller.

8. The electric submersible pump according to claim 1, wherein the plurality of impellers are connected by a plurality of pins.

9. The electric submersible pump according to claim 1, wherein the impeller body comprises a magnetic material.

10. The electric submersible pump according to claim 5, wherein the permanent magnet has an annular shape.

11. The electric submersible pump according to claim 1, wherein the tube is formed as a single cylindrical section.

12. The electric submersible pump according to claim 1, further comprising a shaft extending through the impeller, wherein the impeller rotates about the shaft.

13. The electric submersible pump according to claim 1, wherein the impeller rotates in response to a flow of electricity through the magnet wire.

14. A system, comprising:

an electric submersible pumping system having a fluid intake and a fluid discharge, the electric submersible pumping system comprising:

a housing;

a stator disposed within the housing and comprising stacks of stator laminations having slots for receiving magnet wire to form a stator coil, the stacks of stator laminations separated by stator winding spacers;

a plurality of non-magnetic diffusers disposed within the housing in a locked position with respect to the stator;

a plurality of magnetic impellers disposed within the housing in cooperation with the plurality of non-magnetic diffusers such that application of electric power to the stator causes rotation of the plurality of magnetic impellers, wherein each magnetic impeller is aligned with a respective stack of stator laminations; and

a tube disposed between the plurality of magnetic impellers and the stator to isolate the stator from fluid pumped via the plurality of magnetic impellers.

15. The system according to claim 14, wherein each magnetic impeller of the plurality of magnetic impellers comprises a body, a magnetic component disposed about the body, and a permanent magnet.

16. The system according to claim 14, wherein the plurality of magnetic impellers is mounted along a shaft.

17. A method, comprising:

providing an electric submersible pumping system comprising an outer housing containing an integrated pump and motor comprising a plurality of non-magnetic diffusers mounted within the stator comprising stacks of stator laminations having slots for receiving magnet wire to form a stator coil, the stacks of stator laminations separated by stator winding spacers and a plurality of magnetic impellers rotatably mounted within the stator in cooperation with the plurality of non-magnetic diffusers, wherein each magnetic impeller is aligned with a respective stack of stator laminations;

conveying the electric submersible pumping system downhole into a borehole;

using a tubing to sealingly isolate a stator of a motor of the integrated pump and motor;

applying electrical power to the motor of the integrated pump and motor to establish a fluid pumping motion; and

pumping a fluid through the integrated pump and motor within the outer housing without exposing the stator to the fluid.

18. The method as recited in claim 17, further comprising mounting the plurality of magnetic impellers along a shaft.