

# Magnetic levitation pump



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# Introduction

- Magnetic levitation technology has shown a great deal of promise for micromanipulation tasks.
- Due to the lack of mechanical contact, magnetic levitation systems are free of problems caused by friction, wear, sealing and lubrication. This effect use in many applications.
- This pump drive with magnets and Its reciprocated or rotary. Its use in industry for small level to deliever the water. Its produce very low amount of voice and reduce the vibration. Its free from pollutants and no spoiled environment.

# Problem definition

- In the industry the lubrication is required for the pump and friction is more So efficiency of pump is decrease .
- This pump is noisily and More vibrate.

# Objectives

- To reduce the friction of the pump.
- To improve and increase the efficiency of pump.
- To reduce the noise and vibration.
- To implement the modern technology in pump.

# Magnets

- A magnet (from Greek “Magnesian stone”) is a material or object that produces a magnetic field.
- The magnet is made in the shape of a horseshoe to bring the two magnetic poles close to each other, to create a strong magnetic field there that can pick up heavy pieces of iron.



# What is levitation

- Magnetic levitation, maglev, or magnetic suspensions a method by which an object is suspended with no support other than magnetic fields. Magnetic pressure is used to counteract the effects of the gravitational and any other accelerations.
- All materials have diamagnetic properties, but the effect is very weak, and usually overcome by the object's paramagnetic or ferromagnetic properties, which act in the opposite manner.



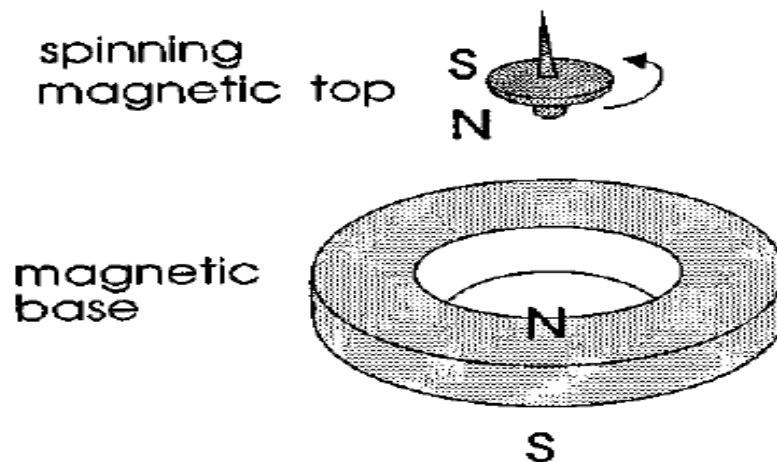
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- By surrounding a diamagnetic material with a magnetic field, it can be held in a stationary position (the magnetic force is strong enough to counteract gravity.)



# Principle of levitation

“The principle is that two similar poles (e.g., two north's) repel, and two different poles attract, with forces that are stronger when the poles are closer. There are four magnetic forces on the top: on its north pole, repulsion from the base's north and attraction from the base's south, and on its south pole, attraction from the base's north and repulsion from the base's south.

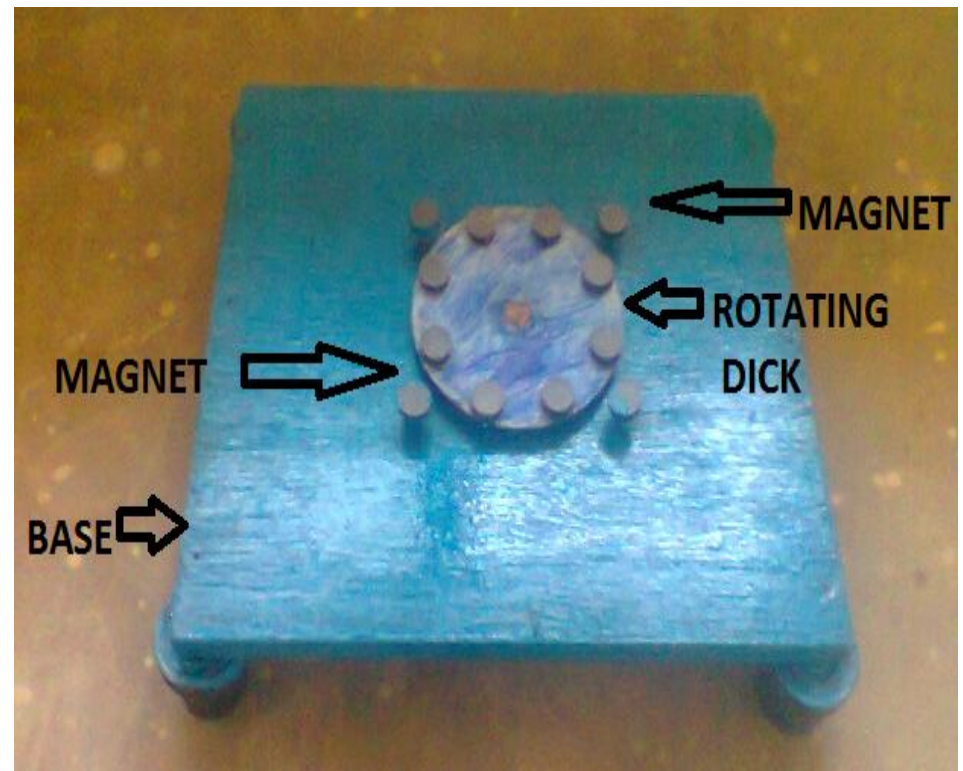
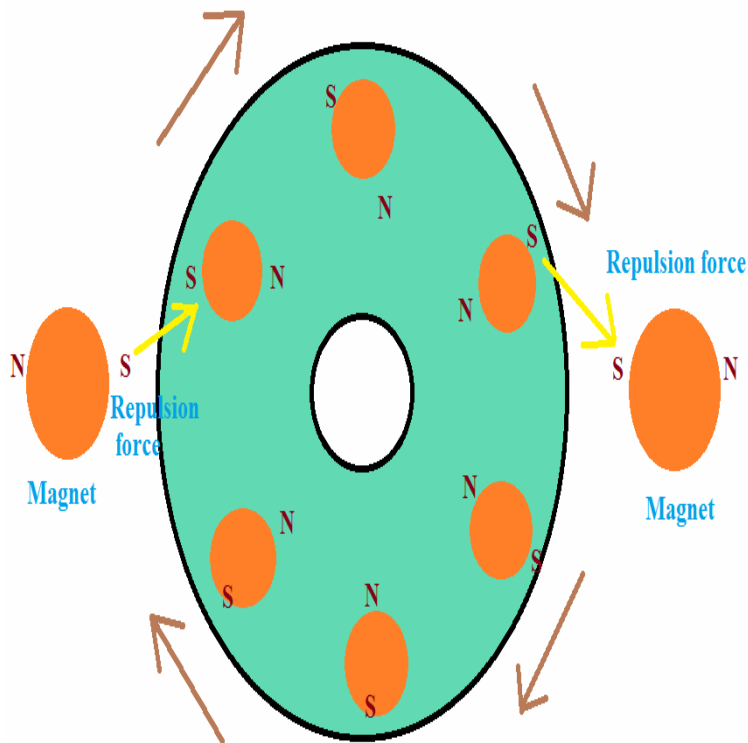


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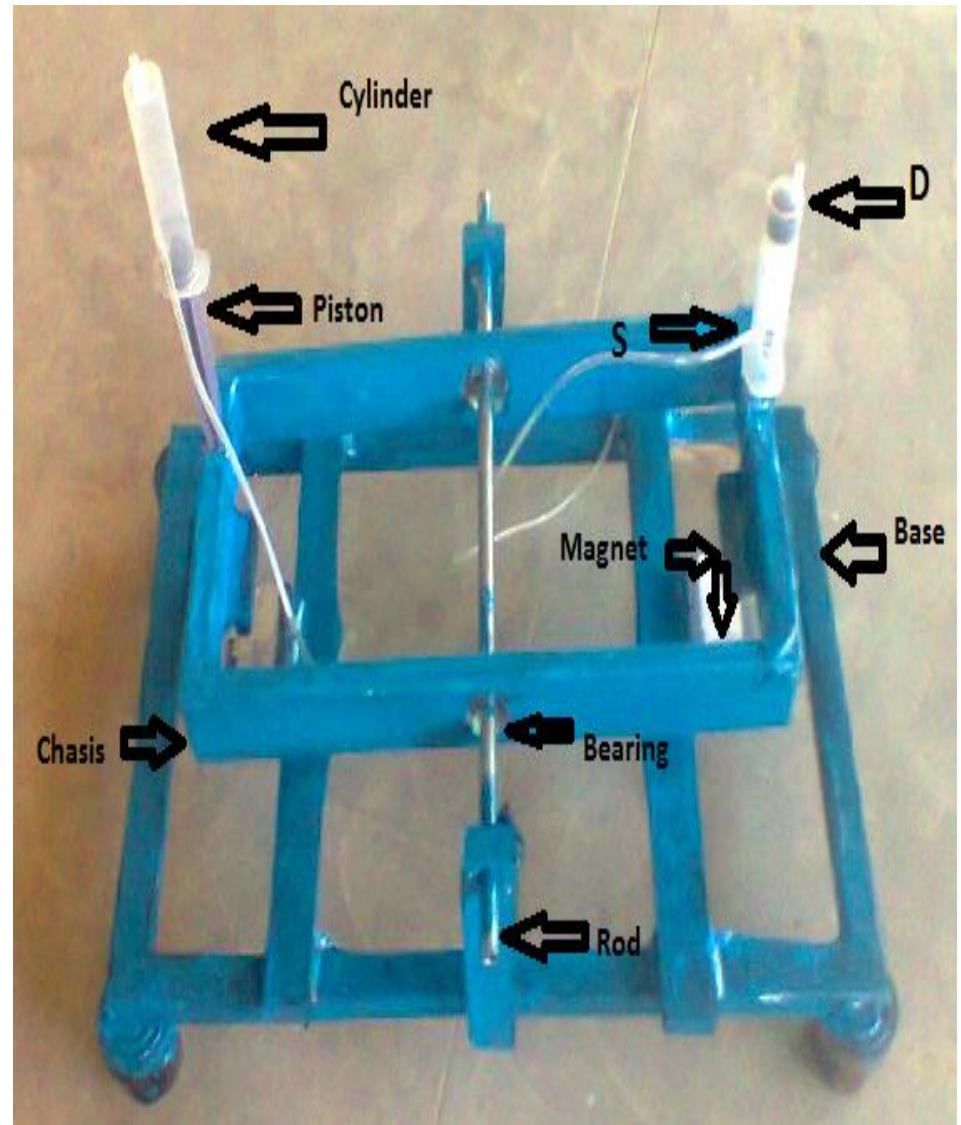
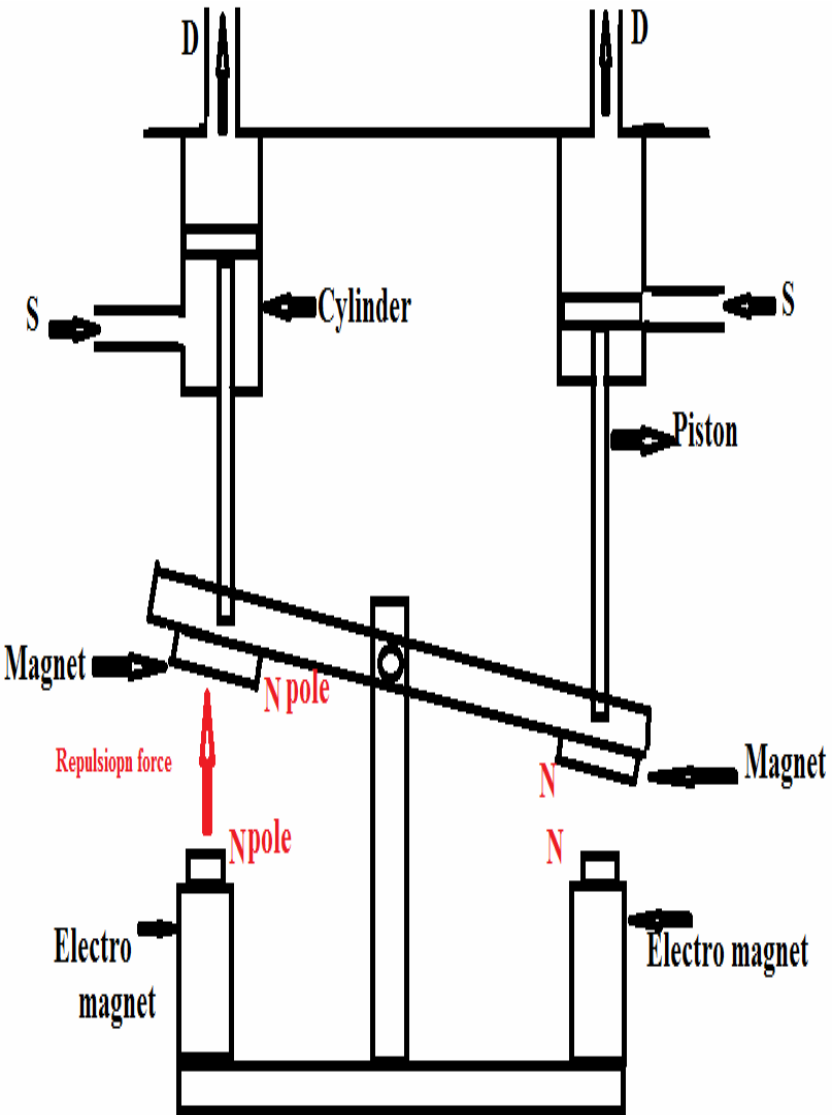
Because of the way the forces depend on distance, the north-north repulsion dominates, and the top is magnetically repelled. It hangs where this upward repulsion balances the downward force of gravity, that is, at the point of equilibrium where the total force is zero.”

# Magnetic levitation pump

- This pump working on levitation effects called magnetic levitation.
- It's drive by magnets. In this use of repulsion force of the magnet of same pole (N-N pole or S-S pole).



# Conti...



# Conti...

- The piston is moves in cylinder throw the movement of the lever by magnet. So the piston force is deliever to water and by this force water is deliever to high level.
- This pump is used for small applications in industry.
- This work is required some calculation of magnetic force. So,

$$F = \frac{\mu q_{m1} q_{m2}}{4\pi r^2}$$

Where, F = Force

qm1 & qm2 = Magnitude of magnetic poles

r = Distance

$\mu$  = Permeability

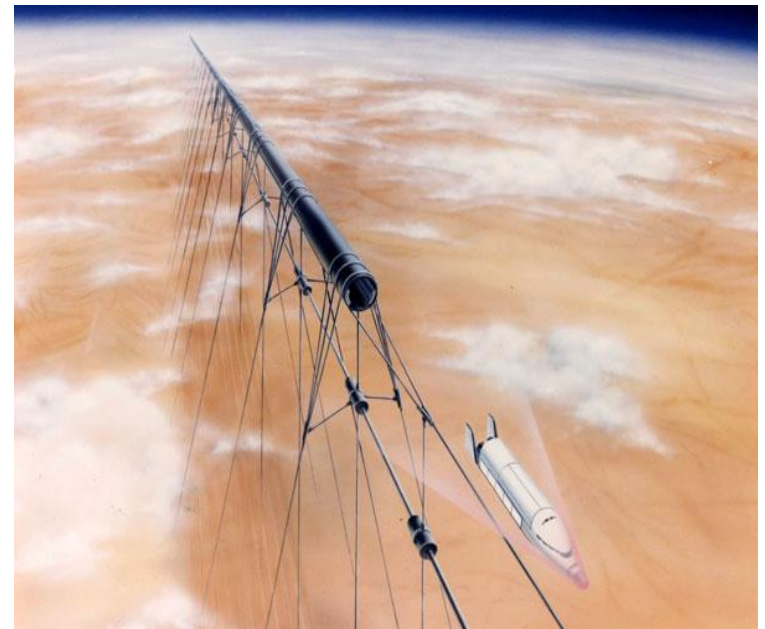
# Applications

- Maglev Trains- The magnetized coil running along the track, repels the large magnets on the train's undercarriage, allowing the train to levitate.
- Biomagnetism- in MRI and SQUID (measures slight magnetic fields).
- Electric generators- made with superconducting wire: They have a 99% efficiency and have about half the size of conventional generators.
- Really fast computers- In "petaflop" computers. A petaflop is a thousand-trillion floating point operations per second. Today's fastest computing operations have only reached "teraflop" speeds.

# Scope of future

Magnetic levitation (maglev) can create frictionless, efficient, far-out-sounding technologies. It used in future such way that.....

(1) Super-High-Speed Rail (2) Space Launch System

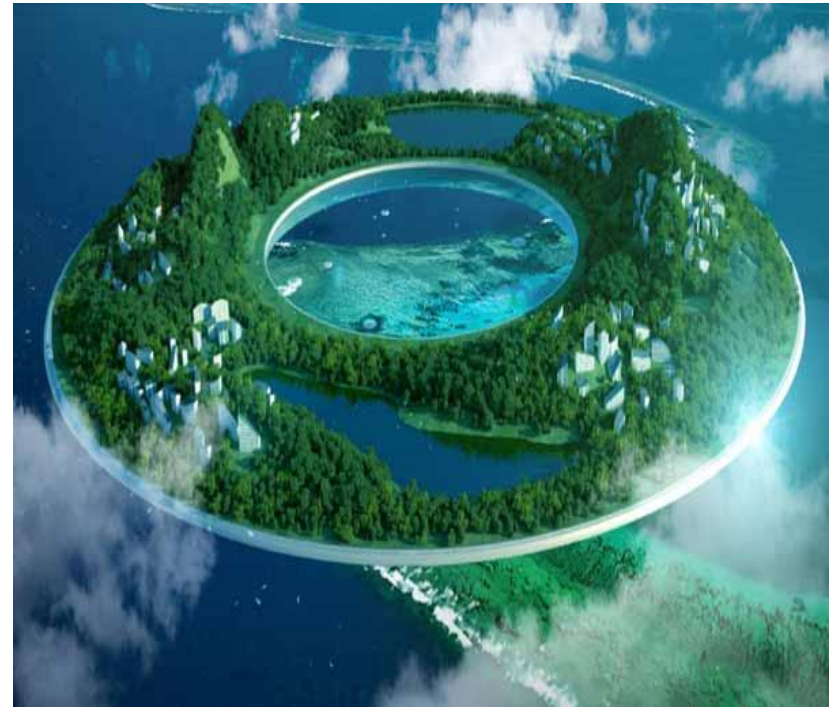


# Conti...

## (3) Flying Cars



## (4) Floating city





# Conclusion

Magnetic levitation isn't just for far-out technologies; it's already being used in down-to-earth applications. Industrial equipment such as pumps, generators, motors, and compressors use levitation to support moving machinery without physical contact. The levitation pump can be made up on this concept and its use in various small industry and I will try to success my model for the industry and I will work on levitation effects which is far technologies and its use in every field.

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***Thank you***