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DEVELOPMENTOF ROPE FREE, MOTORLESS ELEVATOR WHICH CAN MOVE IN VERTICAL AS WELL AS HORIZONTAL DIRECTION USING ELECTROMAGNETIC PRINCIPLE

ChaitaliMahale
ME Student
PadmDr.VBKCOE
pratikm.comp@gmail.com

Dr.V.G.Neve
Asst.Professor
Jagdamba COE
vijay_neve@rediffmail.com

AnkitaBorban
Asst.Professor
Padm Dr. VBKCOE
ankita.borban@gmail.com

ABSTRACT

Elevator is a moving platform or cage for carrying passengers from one level to another, as in the building or for raising any mechanical devices , objects or materials. Elevators are generally powered by electric motors that either drive traction cables or counterweight systems like a hoist. At present, elevator consists of cage and a counterweight attached to the ends of a cable that runs over a pulleyPresent concept of elevator has many disadvantages like use of counter- balancing system which occupy more space and it make use of 3 phase motors for elevation which consumes more power and also needs speed control devices and circuits. It requires machine room which stores large electric motors and controller cabinet, electronic microprocessor and mechanic relays. Use of rope and pulley adds more to the cost and Enormous amount of oil is used for lubricant purpose. This project concept gives rise to a new implementation that uses elevator which is rope free and motor less. This project is based on the electromagnetic principle of Faraday'slaw in which permanent magnet and electromagnet plays a vital role. By modifying the present concept, we can have the advantages that , it is more Energy efficient than the other elevators as it does not use much power which is consumed by the motors, it does not require lot of oil and the operating panel works smoothly. It requires less space as it does not use electric motors and control room for its operation. Also counter balancing weight is not used which reduces the overall cost. Machine room is also not needed.

Keywords: Lift car, Electromagnet ,Permanent magnet, Control circuit.

I.INTRODUCTION

In the conventional elevators, mechanical guiding systems such as slide-ways or rollers are used. However, compared with electromagnetic non-conducted solutions, the conventional lead frame has many disadvantages such as: low efficiency, more deterioration and requires frequent lubrication and regular maintenance, more car swaying and audible noise. Particularly, it is important to make the air gap of the linear motor constant, which affects the magnitude of the propulsion force. Therefore, magnetic levitation technologies with electromagnetic actuators are applied to elevators' guide shoes to restrain the car disturbance and vibration problems.

In this sense, conventional elevators with mechanical guiding systems come to their application limitations due to the very high requirements of these buildings. An improvement of the operational behavior of such high elevator systems can be achieved using wear and lubricant free electromagnetic guides instead of slide or roller guides. This work willsdeal with different proposals for the electromagnetic guiding of vertical transportation systems. It wills also respondse to the technique of rope-free elevators as an application example for active magnetic guide ways.

II .ELEVATOR TYPES

A. Hydraulic Elevators (Push Elevators)

Hydraulic elevators are supported by a piston at the bottom of the elevator that pushes the elevator up. They are used for low-rise applications of 2-8 stories and travel at a maximum speed of 200 feet per minute. The machine room for hydraulic elevators is located at the lowest level adjacent to the elevator shaft.

B Traction Elevators (Pull Elevators)

Traction elevators are lifted by ropes, which pass over a wheel attached to an electric motor above the elevator shaft. They are used for mid and high-rise applications and have much higher travel speeds than hydraulic elevators. A counter weight makes the elevators more efficient.

C Climbing Elevator

They hold their own power device on them, mostly electric or combustion engine. Climbing elevators are often used in work and construction areas.

D Pneumatic Elevators

Pneumatic elevators are raised and lowered by controlling air pressure in a chamber in which the elevator sits. By simple principles of physics; the difference in air pressure above and beneath the vacuum elevator cab literally transports cab by air. It is the vacuum pumps or turbines that pull cab up to the next Floor and the slow release of air pressure that floats cab down. They are especially ideal for existing homes due to their compact design because excavating a pit and hoist way is not required.

III.Construction and Working of Rope less Electromagnetic Type Elevator

A.Controlling Unit

PIC18F4480is an 8 bit microcontroller and has been implemented with Nano WATT technology hence it requires very low power for its operation. It also has 16 bit instruction Set Architecture (ISA) which provides a degree of freedom to programmers with various data types, registers, instructions, memory architecture, addressing modes, interrupt and IO operations.

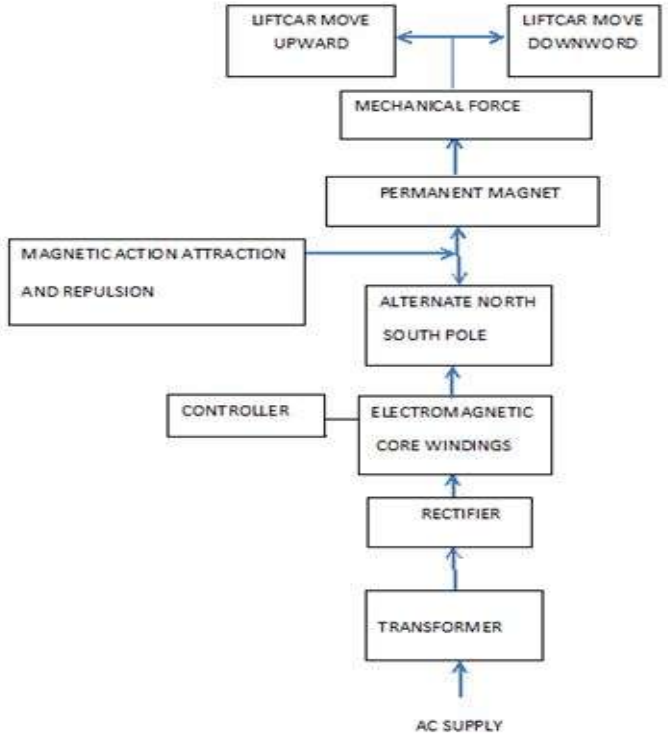
Memory specifications and Endurance:A PIC18F4480 has 256 bytes of EEPROM (Electrically Erasable and Programmable Read Only Memory), 2KB of SRAM (static RAM) and 32KB of flash memory which in return proves another degree of freedom to programmers.

Self-Programmability:

These devices can write to their own program memory spaces under internal software control. By using a boot loader routine located in the protected Boot Block at the top of program memory, it becomes possible to create an application that can update itself in the field.

Extended Instruction Set:

The PIC18F4480 family introduces an optional extension to the PIC18 instruction set, which adds 8 new instructions and an Indexed Addressing mode. This extension, enabled as a device configuration option, has been specifically designed to optimize re-entrant.



Application code originally developed in high-level languages, such as C.

Enhanced CCP Module:

In PWM mode, thismodule provides 1, 2 or 4 modulated outputs for controlling half-bridge and full-bridge drivers. Other features include auto-shutdown, for disabling PWM outputs on interrupt or other select conditions and auto-restart, to reactivate outputs once the condition has cleared.

Enhanced Addressable USART:

This serial communication module is capable of standard RS-232 operation and provides support for the LIN/J2602 bus protocol. Other enhancements include automatic baud rate detection and a 16-bit Baud Rate Generator for improved resolution. When the microcontroller is using the internal oscillator block, the EUSART provides stable operation for applications that talk to the outside world without using an external crystal (or its accompanying power requirement).

10-Bit A/D Converter:

This module incorporates programmable acquisition time, allowing for a channel to be selected and a conversion to be initiated without waiting for a sampling period and thus, reduce code overhead.Extended Watchdog Timer (WDT):

This enhanced version incorporates a 16-bit pre scalar, allowing a time-out range from 4 ms to over 131 seconds, that is stable across operatingEnhanced flash program and the 1KB Dual Access RAM for USB are used for buffering.

PIC18F4480 consist of upto13 channels for analog to digital converter. The converter accuracy amounts to 10-bit to convert analog to digital signal relatively.

B.Permenent Magnet

Neodymium Iron Boron (NdFeB) is another type of rare earth magnetic material. This material has similar properties as the Samarium Cobalt except that it is more easily oxidized and generally doesn't have the same temperature resistance. NdFeB magnets also have the highest energy products approaching 50MGOe. Thesematerials are costly and are generally used in very selective applications due to the cost. Cost is also driven by existing intellectual property rights of the developers of this type of magnet. Their high energy products lend themselves to compact designs that result in innovative applications and lower manufacturing costs. NdFeB magnets are highly corrosive. Surface treatments have been developed that allow them to be used in most applications. These treatments include gold, nickel, zinc and tin plating and epoxy resin coating.

IV. CONCLUSION

The goal of our project is to provide rope-free electromagnetic elevatorwithout using high power motor, rope and counterweight.we can achieved the rope free elevator using electromagnetic principle and there is a large scope for this type of elevator.

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