

## Fabrication of Automatic Car Parking Mechanism

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**Abstract:** This paper gives the information about the fabrication of circular automatic car parking mechanism. It is very difficult for the cars to park in such places which are very congested but with enough space to park the car. This is going to increase day by day with the increase in number of vehicles on road. This circular automatic car parking mechanism can be taken as a remedy over this issue. The project is based on electronic system which is used to lift the vehicle with the mechanism and transverse movement of the vehicle for parking will be possible with the help of this mechanism. The main advantages are that it will cover a small space to provide parking for large number of vehicles. It will go to be controlled by switches in a position which will minimize the effort of the user/driver

### 1. Introduction

In ancient times after the discovery of wheels by man, it has been used extensively for various purpose and it is a vital part of human life for ages. These wheels runs human life faster and faster with new technologies on board in the form of cars. After the discovery of cars in this world, it plays an important role in the society from being a status symbol to the need to cross distances within a short span of time. With such various advantages, it becomes a need and the number of cars is increased very rapidly and still on increasing. With this increased and increasing number of cars, a new problem took birth (mostly in urban areas). That problem we all are aware of is PARKING problem. Measures are being taken and various solutions are also provided on this problem, but the problem is still unsolved. And we all are affected with the chaos created with such improperly parked cars. Various solution are can be listed as transverse lane

car parking, parking alleys, parking plazas and many more. Various advancements are also done in the car s to solve this but are still with unsolved problems.

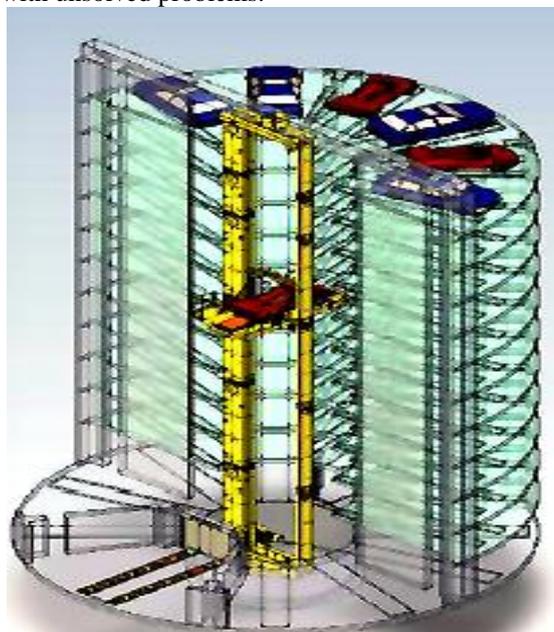


Fig 1 3d view of automatic car parking system

This project is made by studying various such parking problems and ideas to solve them. The project is named as “FABRICATION OF AUTOMATIC CAR PARKING MECHANISM “and will seriously help in reducing the parking problem very efficiently as per the calculations. Just imagine a situation as there are two cars parked one behind the other but with a space of a car in between them. The space in between is very congested as per the drive of the car is in only one direction i.e. forward drive. Steering also cannot help in this condition



## 2. Mechanism

The pedal powered air compressor set up, has a simple mechanism operate with the chain and sprocket arrangement. The chain is place on the teeth of the wheel and pinion. Pedal and connecting rod are interconnected to each other with bolts.

The power is transmitted from the connecting shaft to the gear 1. Gear 1 is connecting from the gear 2 with 4:1 gear ratio. It produced 4 times more torque from the pedaling effort. Another shaft connects gear 2 to gear 3 each having same axis. The difference is only in the size. The gear 3 again connects from gear 4 with 4:1 gear ratio. So it produced  $4 \times 4 = 16$  times more torque from the pedaling effort. [Fig. 5] This rotational power is used for the rotary air compressor and barrel pump. The main criterion for the compressor is that it supplies enough pressure (approximately 25 psi). An inlet air filter is used to prevent contaminants in the air from being pumped through the compressor. The barrel pump is used for producing cooling effect around the pressurized air tank. [Fig. 4] The seat has mounted on a position that can slide along the frame for varying user heights. The most difficult challenge was transferring the manual power to the compressor without exhausting the user too quickly. The gear ratios required for attainable pedaling speeds are determined by the specific well conditions. The last part of the design is the water retrieval system. This is the storage tank that the water drop pipe feeds around it.

## 3. Parts and Components

### Micro Controller -89s51

T89C51 is an 8-bit microcontroller and belongs to Atmel's 8051 family. ATMEL 89C51 has 4KB of Flash programmable and erasable read only memory (PEROM) and 128 bytes of RAM. It can be erased and program to a maximum of 1000 times. In 40 pin AT89C51, there are four ports designated as P1, P2, P3 and P0. All these ports are 8-bit bi-directional ports, i.e., they can be used as both input and output ports. Except P0 which needs external pull-ups, rest of the ports have internal pull-ups. When 1s are written to these port pins, they are pulled high by the internal pull-ups and can be used as inputs. These ports are also bit addressable and so their bits can also be accessed individually.



Fig 2 Microcontroller

### Motor Driver IC L293d

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. Dual H-bridge Motor Driver integrated circuit (IC).

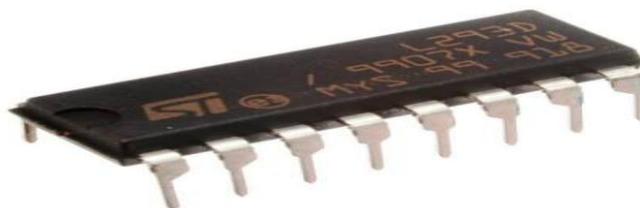


Fig 3 Motor Driver Ic

### Dc Geared Motor

DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.



Fig 4 Dc Motor

### Regulator Ic7805 for Power Supply

805 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The voltage regulator IC maintains the output voltage at a constant value. The xx in 78xx indicates the fixed output voltage it is designed to provide. 7805 provides +5V regulated power supply. Capacitors of suitable values can be connected at input and output pins depending upon the respective voltage levels.

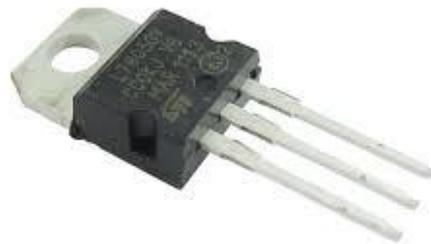


Fig 5Relay

### Gear

Spur gears are simple, easily manufactured gears and are usually the first choice when exploring gear options. Transmitting power between parallel axes the teeth project radially on the disc



Fig 6Gear

### Relay

A solid-state relay (SSR) is an electronic switching device that switches on or off when a small external voltage is applied across its control terminals. SSRs consist of a sensor which responds to an appropriate input (control signal), a solid-state electronic switching device which switches power to the load circuitry, and a coupling mechanism to enable the control signal to activate this switch without mechanical parts. The relay may be designed to switch either AC or DC to the load. It serves the same function as an electromechanical relay, but has no moving parts



Fig 7Relay

#### 4. Calculation and Formulae

Total space available for parking:- Length = 14210 mm Width = 7450 mm Height = 20612 mm  
 Selection of gear box and selection of motor:- Motor for this required application = 5.5 kw Factor of safety =  
 Selected motor power required power = 5.5 4.52 = 1.22 From gear box and motor catalogue following gearbox  
 and motor is Design of driving system: Selection of gear box and selection of motor:- Motor for this required  
 application = 45 kw Factor of safety = Selected motor power requiredpower = 45 37 = 1.22 From gear box and  
 motor catalogue following gearbox and motor is selected. Geared motor designation: GFL14-2M HAR 180C32  
 Design of counter weight: Mass of counter weight (M<sub>cwt</sub>) = P+ Q 2 = 6900 kg Where P = Masses of the empty  
 car and components supported by the car Q = rated load

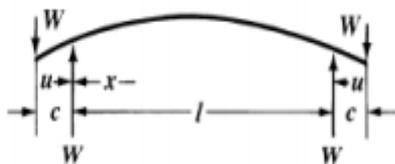


Fig 8 loading condition

#### Design of lift cart frame:-

It is a part of lift on which turn table mechanism and push pull mechanism are mounted. On turntable frame pallet along with car is placed.

The load (W) acting on cantilever portion of cart on which on turntable will be mounted on it is given by;

$$W = \frac{\text{Car Wt}}{3} + \frac{\text{Wt of (Pallet + Push pull + turntable mechanism)}}{4} + \text{Self weight of cantilever portion} = 18638 \text{ N}$$

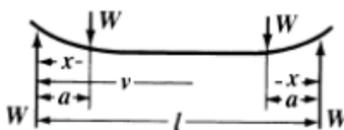


Fig.:9- Loading condition for lift cart frame.

#### Application

- Airports.
- Rail stations.
- Hotels, Malls
- Office buildings.
- Colleges.
- Apartments



- Big industries
- Car industries to stored ready cars
- Carpools areas.

#### **Advantages**

- 1] Implementation is easy.
- 2] Not effects regular system of automobile vehicle.
- 3] Not disturb any mechanism of vehicle like steering mechanism engine power functioning.
- 4] Provide safety because mechanism is used in steady condition.
- 5] At slow speed it gives rotary movement to vehicle, this helps for easier parking.

#### **5. Conclusion**

So, we can conclude by using multistoried car parking system we can reduce the traffic problem. We can park more cars in small space. We also reduce time and cost required for conventional parking system with high degree of security.

#### **References**

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