

# Automatic Hand Brake Lock and Release Mechanism for Cars

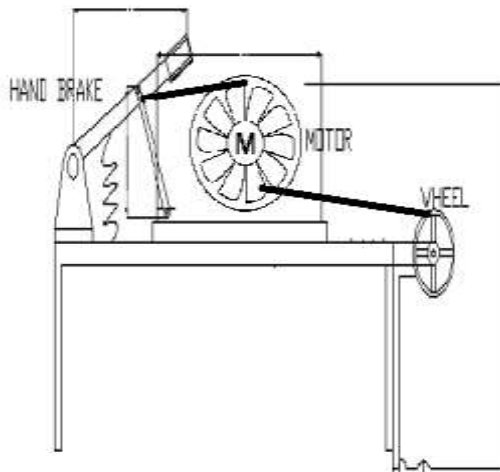
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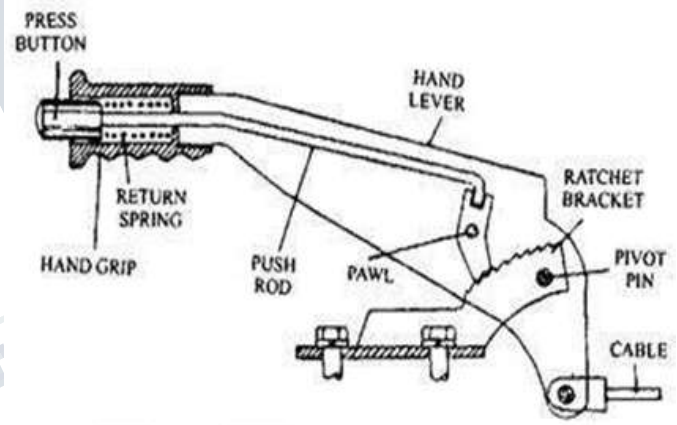
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**Abstract:** -- Hand brake is one of the most important components in vehicles. In general the hand brake is operated manually. We are developing Automatic Hand Brake System for safety. The hand brake engagement and disengagement is done with the help of rack & pinion. In cars the hand brake is a latching brake usually used to keep the car stationary. Automobiles e-brakes usually consist of a cable directly connected to a brake mechanism on one end and to some type of mechanism that can be actuated by the driver on the other end .the mechanisms is often a hand –operated lever, on the floor on either side of the driver, a pull handle located below and near the steering wheel column, or a pedal located far apart from the other pedals.The Hand brake lever is coupled with motor. A motor used to apply and release the hand brake through Rack. Motor is driven by the control unit (Micro controller). When ignition is given then a signal is sent to control unit to release the hand brake. When the vehicles is in rest stage i.e when the vehicle is not moving the Hand brake is applied.

## I. INTRODUCTION

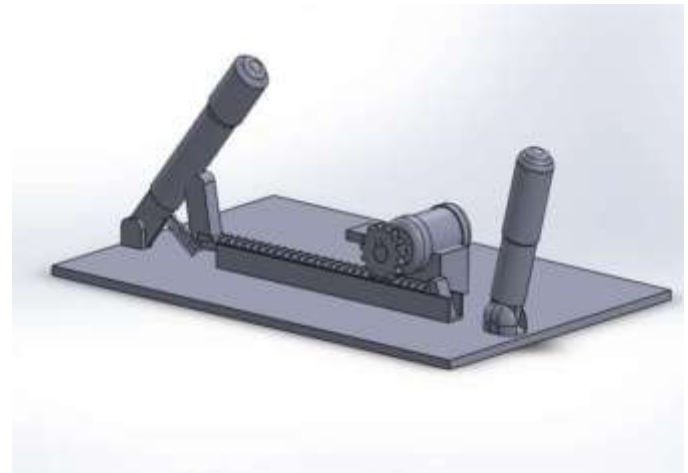
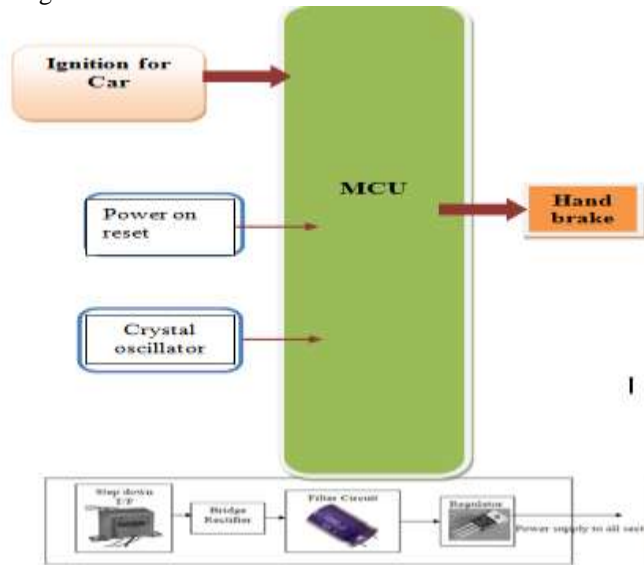


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Although sometimes known as an emergency brake, using it in any emergency where the footbrake is still operational is likely to badly upset the brake balance of the car and increase the likelihood of loss of control of a vehicle for example by initiating the rear – wheel skid. Additionally, the stopping force provided using the hand brake or in addition to the footbrake is usually small and would not significantly aid in stopping the vehicle, again because it usually operates on rear wheel while braking .the emergency brake is instead intended for use in case of mechanical failure where the regular footbrake is inoperable or compromised, hopefully with opportunity to apply the brake in a controlled manner to bring the vehicle to a safe. If gentle half before seeking service assistance The most common use for an automobile emergency brake is to keep the vehicle motionless when it is parked, thus the alternative name, parking brake .car emergency brake have a ratchet locking mechanism that will keep them engaged until a release button is pressed . on

vehicles with automatic transmission, this is usually used in concert with parking pawl in the transmission. automotive safety experts recommended the use of both system is required by laws in some jurisdictions. yet many individuals use only the park position on the automatic transmission and not the parking brake.



3D DIAGRAM OF AUTOMATIC HAND BRAKE

**MAJOR COMPONENTS:**

- Microcontroller
- 12V DC motor

**ATMEGA 328 Microcontroller**

**II. LITERATURE SURVEY**

A traditional handbrake is very simple by pulling the lever up; you are pulling two cables which run to each of the rear brakes. By adding tension to these cables, this in turn causes the pads (or 'shoes' for cars with drum brakes) to squeeze against the discs (or drums) to hold the rear wheels firmly in place. Some cars with disc brakes have separate handbrake drum-brake shoes or even a separate disc-brake caliper for the handbrake.

Later electronic parking brake replaces this mechanical system with an electrical one. By pressing the switch, motors on each brake caliper squeeze the pads into the disc.

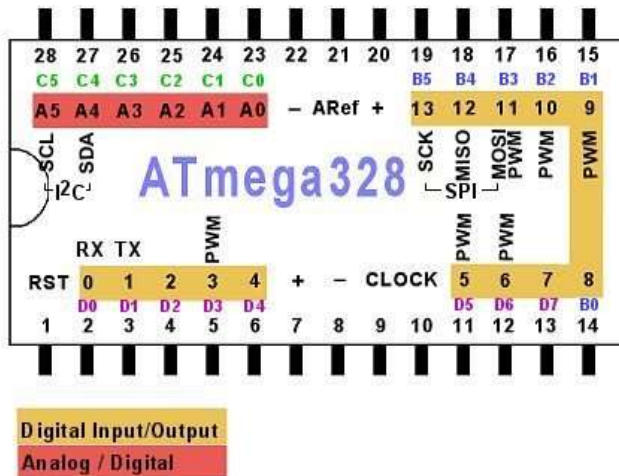
**BRAKING CONDITIONS:**

IGNITION	HAND BRAKE
ON	DISENGAGE
OFF	ENGAGE

The ATmega88 through ATmega328 microcontrollers are said by Atmel to be the upgrades from the very popular ATmega8. They are pin compatible, but not functionally compatible. The ATmega328 has 32kB of flash, where the ATmega8 has 8kB. Other differences are in the timers, additional SRAM and EEPROM, the addition of pin change interrupts, and a divide by 8 prescale for the system clock.

The schematic below shows the Atmel ATmega328 circuit as it was built on the test board. The power supply is common and is shared between all of the microcontrollers on the board. The ATmega328 is in a minimal circuit. It is using its internal 8 MHz RC oscillator (divided by 8). With the ATmega328 I needed to both burn a boot loader and download Arduino sketches. The boot loader is programmed using the ISP programming connector, and the Arduino sketches are uploaded via the 6-pin header. Be aware that programming the Arduino boot loader into the ATmega88, ATmega168, or ATmega328 microcontroller will change the clock fuses, requiring the addition of an external crystal.

The crystal shown on the schematic is only required when the ATmega328 is going to be used as an Arduino, although it may be desired in any real world application. I typically run them at 16 MHz, but they will run as high as 20 MHz



### ***Geared DC Motor***

DC motors and gear motors with permanent magnets are also known as Brushed Electrical Motors. The rotor, wound in a copper wire connected to a collector, constitutes the rotating part which transmits the mechanical power. The stator, external and fixed part, constitutes the seat of the permanent magnets and brushes. The main material of the magnets is ferrite, whereas for the brushes it is graphite. The permanent magnets present in DC motors constitute the magnetic field, which, in opposition to the magnetic field generated inside the rotor, permits the transmission of the mechanical power. The tension in DC motors is transmitted to the rotor through the sliding contact between brushes and collector. The brushes are connected through power cables to the external supply tension, which are at low voltage DC motors, usually used are 12V, 24V, 36V, 42V or 48V, or, it would be nonetheless included within these values. DC motors and gear motors with permanent magnets have a high degree of efficiency.

The motor (without gearbox) can in fact reach efficiency levels up to 80-85%. The gear motor can go up to 40-45%. N DC gear motors, then, the efficiency level depends upon the gear ratio. The electrical losses present in DC motors are therefore contained and are of mainly 3 kinds:

- Losses due to Joule's effect in the copper wire of the winding and in the brushes

- Losses due to parasitic currents which generated in the lamination pack of the rotor

-Losses due to attrition

The losses due to the Joule's effect are integral to the DC motors and gear motors and cannot be eliminated. The losses due to parasitic currents depend upon the thickness and the material of the laminations used in the rotor. These can also be minimized but not eliminated. The losses due to attrition are tightly connected to the building quality of D motors and gear motors with permanent magnets. The advantage of DC motors is therefore the possibility of supplying high specific powers and, moreover, they are very easily managed from an electrical perspective. The possibility of managing them electrically has actually increased the application potential of DC motors and gear motors. In fact, thanks to a correct electronic management, it is possible to both increase the duration features and to maximize the supplied power values.

### **ADVANTAGES:**

- Lowcost.
- Improves parking experience inhills.
- Verycompact.
- Emergency stop and start ispossible.
- Sensing can be easily done usingsensors.
- Reduces the manualinteraction.

### **III. CONCLUSION**

In our project, hand brake is actuated with the help of rack and pinion and based on some conditions. The rack and pinion gets activated and lifts the hand and disengages with the help of push lock and spring tension. The automatic hand brake will be used in all types of automobiles at low cost