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A Review on Automatic Side Stand Retrieving System

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ABSTRACT: ***Automobiles, particularly two-wheelers (motorcycles and bikes), play a significant role in the contemporary developing world. Even if they are beneficial, there are occasional unfortunate occurrences, like as accidents caused by a negligent rider. Lifting side stands are often forgotten, resulting in serious accidents. Many proactive measures have been attempted to address this issue, but they have shown to be ineffective. As a result, it should be considered for use in all kinds of bicycles. The new technology, dubbed "AUTOMATIC SIDE-STAND RETRIEVE SYSTEM," would be based on the operation of bicycles. Because all motorcycles use chain drive to transfer power from the engine to the rear wheel. Because the design setup must be maintained between chain drives, the setup (Sprocket) rotates and the side stand automatically retrieves. When a two-wheeler is parked, the side stand supports the full weight of the vehicle. They're ideal for brief stops when you just need to exit the car for a few moments. To guarantee additional safety, they are equipped with a spring that pulls it back into place. The rider of a two-wheeler may forget to release the side stand at times. This will result in unnecessary risk and a loss of attention when driving. Sensors are now utilized to verify that the stand is in a released state or not, with tiny lights in the storage board indicating this. It is also possible to lose sight of the light. The goal of this project is to eliminate the possibility of riding a two-wheeler without releasing the side stand. This may be suitable for all types of two-wheelers that are driven in a low-cost gear system. In this project, we propose a concept to avoid one of the mishaps that occur due to the non-folding of the bike stand, which needs be folded manually in the case of traditional bikes.***

KEYWORDS: ***DC Motor, Side stand, Retrieving System.***

1. INTRODUCTION

Motorcycles [1] are utilized everywhere in the globe. When the car is in rest, the side stand is very important. However, there are certain drawbacks, such as the potential that the driver may forget to remove the side stand while starting the motorbike, resulting in undesirable problems. This is a novel kind of side stand that, thanks to a mechanical and electrical arrangement, automatically retracts the side stand. This system makes use of a microprocessor, a speed sensor, and a DC battery [2]. The speed sensor detects the rotation of the wheel and transmits a signal to the microcontroller [3], which activates the dc motor, causing the stand to detach from the road.

A motorcycle side stand [4] is a virtually ubiquitous way for a motorbike rider to comfortably park his vehicle. A significant danger arises if this stand is in the park position while the motorbike is being ridden into a left turn. To avoid such mishaps, a new kind of side stand with an automatically retractable side stand has been developed. Side stands are bolted on either gripping the chain stays or welded in place as an integrated component of the frame below the bottom bracket. Motor bikes are now utilized in almost every country

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on the planet. Every component of two-wheelers should be designed to be as safe as possible, and the product should be cost-effective. When riding a motorcycle, the side stand is very important when the vehicle is at rest. It's possible that the driver will forget to release the side stands while starting the motorcycle. Unwanted problems will arise as a result of this. To prevent this, the driver must make sure the side stand is unlocked.

Component of System

- Battery
- DC motor
- Push button
- Microcontroller
- Side stand
- Relay
- Speed sensor

Dry cell Battery:

A paste electrolyte is used in a dry cell [5], with just enough moisture to enable current to flow. Because it contains no free liquid, unlike a wet cell, a dry cell may function in any direction without spilling, making it ideal for portable equipment. The earliest wet cells, on the other hand, were usually fragile glass containers with lead rods dangling from the open top that needed to be handled with care to prevent leakage. Until the invention of the gel battery, lead–acid batteries could not match the dry cell's safety and mobility. The zinc–carbon battery, also known as the dry Leclanché cell, has a nominal voltage of 1.5 volts, the same as an alkaline battery (due to the zinc–manganese dioxide combination used in both). A typical dry cell has a zinc anode, which is generally in the shape of a cylindrical pot, and a carbon cathode, which is usually in the shape of a center rod. The electrolyte is ammonium chloride, which is applied to the zinc anode as a paste. A second paste made of ammonium chloride and manganese dioxide, which acts as a depolarizer, fills the gap between the electrolyte and the carbon cathode. Zinc chloride is used instead of ammonium chloride in certain designs.

D.C. Motor:

The DC motor [6]is intended to run at two speeds. There are three brushes in total: common, low speed, and high speed. Two brushes will be provided, one for each kind of operation. The DC motor, unlike most other motors, does not oscillate back and forth; instead, it spins constantly in one direction. A set of mechanical linkages translate the rotating action into back and forward wiper motion. This kind of motor, also known as a gear head or motor end, has the benefit of producing a lot of torque. The dc motor is powered by a 12v D.C. battery.

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Powering the Motor:

The motor's standard voltage is 12 volts direct current (DC). The electrical system in a running car typically produces between 13 and 13.5 volts, therefore the motor should be able to take up to 13.5 volts without issue. Any voltages greater than that are not recommended.

Current

The motor's minimum needed current [7] is 1.6 amps at 70 rpm and 0.9 amps at 41 rpm. These current ratings apply to a motor that is rotating without a load. When you add mechanical stress, these values may skyrocket, doubling or even tripling under extreme conditions. When choosing a power source, this aspect must be considered. Because the motor will only consume as much current as it requires, it's better to provide a source with a greater current rating than you believe you'll need.

Switch Button:

A switch is an electrical component that can break an electrical circuit, interrupt the current, or divert it from one conductor to another in electrical engineering. A manually controlled electromechanical device having one or more sets of electrical contacts that are linked to external circuits is the most common kind of switch. Each set of contacts can be in one of two states: "closed," which means the contacts are close together and electricity can flow between them, or "open," which means the contacts are separated and the switch is not conducting. The "toggle" (flip switch for continuous "on" or "off") or "momentary" (push-for "on" or push-for "off") mechanism that actuates the transition between these two states (open or closed) can be either a "toggle" (flip switch for continuous "on" or "off") type. A switch can be used by a human to send a control signal to a system, such as a computer keyboard button, or to control the flow of power in a circuit, such as a light switch. Automatically operated switches [8] can be used to control the motions of machines, such as indicating when a garage door has fully opened or when a machine tool is ready to accept another work piece. Process variables such as pressure, temperature, flow, current, voltage, and force can operate switches, which act as sensors in a process and can be used to automatically control a system. A thermostat, for example, is a temperature-controlled switch that regulates the heating process. A relay is a switch that is controlled by another electrical circuit. A motor driving mechanism may be used to control large switches from a distance. Some switches are used to disconnect electric power from a system, providing a visible point of isolation that can be padlocked if necessary to prevent accidental machine operation or electric shock during maintenance.

When closed, an ideal switch would have no voltage drop and no voltage or current rating limitations. During state changes, it would have no rise or fall time, and it would change state without "bouncing" between on and off positions. Practical switches fall short of this ideal because they have resistance, current and voltage limits, and a finite switching time, among other things. The ideal switch is frequently used in circuit analysis because it greatly simplifies the system of equations to be solved, but it can result in a less accurate result.

2. DISCUSSION

Microcontroller:

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A microcontroller [9] (abbreviated C, uC, or MCU) is a tiny computer with a processing core, memory, and programmable input/output peripherals on a single integrated circuit. A tiny amount of RAM, as well as program memory in the form of NOR flash or OTP ROM, is often placed on the chip. Microcontrollers, as opposed to microprocessors used in personal computers or other general-purpose applications, are intended for embedded applications. Remote controls, office equipment, appliances, power tools, toys, and other embedded devices all utilize microcontrollers. Microcontrollers enable it cost-effective to digitally control even more devices and processes by lowering the size and cost of a system that utilizes a discrete microprocessor, memory, and input/output devices. Mixed signal microcontrollers are often used to operate non-digital electronic systems by incorporating analog components.

Side Stand:

A side stand [10]is a device that enables a bicycle or motorbike to be maintained upright without the need of another item or the assistance of a person. Joseph Paul Treen, the father of former Louisiana Governor Dave Treen, designed a "smaller, more practical" kickstand. A kickstand is often a piece of metal that extends from the frame and contacts the ground. It's usually found in the center or towards the back of the bike. There are two on certain touring bikes: one in the back and one in the front (Figure 1).

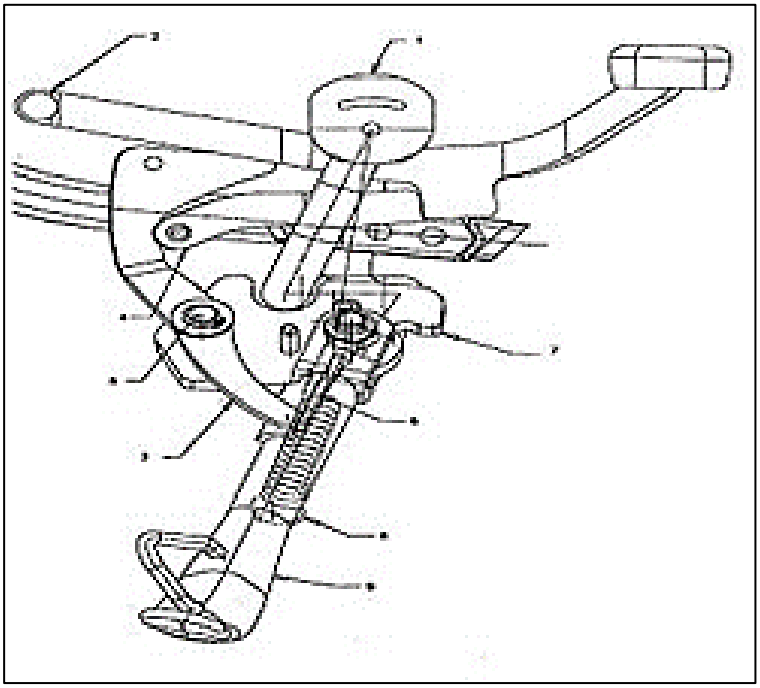

Figure 1 : Side stand

A single leg of a side stand kickstand simply swings out to one side, typically the non-drive side, and the bike rests against it. Side stands may be attached to the chain stays below the bottom bracket or to a chain and seat stay near the back hub. Side stands placed directly below the bottom bracket may be bolted on or welded into place as an integrated part of the frame, gripping the chain stays or the bracket between them.

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Speed sensor:

The KMI 15/X and KMI 16/x are magneto resistive sensor modules with an integrated signal conditioning electronics to provide a simple and cost-effective solution for rotational speed measurements. Due to their compact design, they are simple to design-in and therefore time-to-market is significantly reduced. The KMI sensor modules consist of the magneto resistive sensor element, a permanent magnet fixed to this sensor and the integrated signal conditioning circuit designed in bipolar technology. Compared with other sensing techniques, the magneto resistive technology has a number of practical advantages such as:

- Wide air gap due to high basic sensitivity of the magneto resistive effect
- Wide operating frequency range, including zero speed detection
- Insensitive to vibration
- Wide operating temperature range

Relay:

A relay[11] is a switch that is controlled by electricity. Many relays utilize an electromagnet to physically activate a switch, although solid-state relays and other working principles are also used. Relays are employed when a low-power signal is required to control a circuit (with full electrical isolation between the control and controlled circuits), or when many circuits must be controlled by a single signal. The earliest relays were employed as amplifiers in long-distance telegraph circuits, repeating the signal from one circuit and re-transmitting it on another. Relays were widely employed to conduct logical operations in telephone exchanges and early computers. A contactor is a kind of relay that can manage the high power needed to operate an electric motor or other loads directly. Solid-state relays use a semiconductor device to execute switching instead of moving components to regulate power circuits.

Analysis Making Automatic Side Stand for Two-Wheeler:

Step1 - Construction of Frame

Firstly, we are made a general layout of side stand frame according to dimension given in present time of two-wheeler. for making frame, we are used mild steel rod and with the help of manufacturing process be prepare a rectangular frame the manufacturing process include for making side stand frame are cutting, welding, grinding, and super finishing. this figure shows the mild steel rod for making side steel frame.

Step 2 - Making Plate for Pivoted Side Stand from Frame

In this stage we are made plate on which side stands are pivoted. The dimension of this plate is given according to motorcycle specification. The plate consists of hole for bolted the side stand and an upper hook are welded to connect the one end of the spring. This plate is welded with the frame inclined to the frame axis.

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Step 3 – Making a Tension Spring

In this step we take a spring wire and with the help of lathe machine we form a tension spring. The material of the tensile spring is stainless steel. After lab test, we found the stiffness of spring. 1.732 N/mm.

Step 4 – Making a Mechanical Bush

In this step we make we make a mechanical bush from a solid rod of stainless steel with the help of of the lathe machine. Firstly, we have done turning operation for finding the desire dimension and after that we have made a hole with the help of drill bit. The main function of mechanical bush is to connect the motor shaft to the pivoted bolt of side stand.

Step 5-Final Assembly

In this step all the component of side stand are assembled in proper manner. They presented mechanism consist of a D.C motor powered by motorcycle's battery, connected to the side stand through a worm and worm gear mechanism to gain speed reduction of motor and multiply the torque . The motor is actuated by the sensor mounted on the front wheel through the microcontroller. A presser switch is also mounted on the stand bracket to sense full disengagement of stand. When the vehicle starts moving the sensor on front wheel sends a signal to the microcontroller to actuate the motor causing them to move disengaged position. When the stand is fully

3. CONCLUSION:

Because the power is derived from the gear lever, the "Automatic Side Stand Lifting System" will certainly be an excellent retrieval system because the setup is small and does not impair the vehicle's performance. Definitely, this system may be used only on gear bikes to retrieve the side stand, but it will be a significant method for preventing accidents caused by side stand problems and protecting irresponsible riders. When compared to other systems, this "AUTOMATIC SIDE STAND RETRIEVE SYSTEM" can be used in all kinds of motorcycles by altering minor variations in size. The cost of this system is also extremely cheap, so it will not impact the economic level.

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