

CarboTech Protectable Adaptive Equipment

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ABSTRACT

The present invention discloses a CarboTech protectable adaptive equipment to prevent head injury caused due to fall among subjects with neurodegenerative disorders and also elderly individuals and cerebral palsy children with fall risk. The equipment of the present invention comprises a collar with center front closure and on/off button housed with an airbag and a control igniter valve with inflate chamber of either compressed gas (CO₂/atm gases) cartridge or mini endothermic gas reaction to produce gas instantaneously (NaN₂), sensors, battery, mini microprocessor board, gas exhaust control valves, piezoelectric alert buzzer, and global system for mobile (GSM)-enabled global positioning system (GPS) tracker.

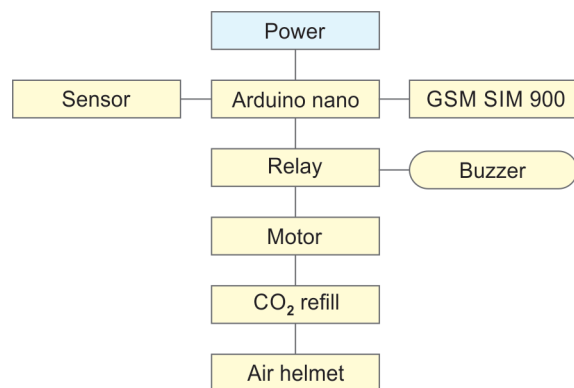
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INTRODUCTION

CarboTech protectable adaptive equipment for supporting a person's head at various angular positions when they are about to fall. The carbotech is a collar that could be worn around the neck while walking or traveling. The airbag is shaped like a hood, surrounding and protecting the client's head. The trigger mechanism is controlled by sensors which pick up the abnormal movements of a client when he or she is about to fall.

BLOCK DIAGRAM: CARBOTECH PROTECTABLE ADAPTIVE EQUIPMENT



PRIOR ART

Hovding is an airbag for a cyclist that is worn around the neck like a collar. In the event of an accident, the airbag inflates and forms around the head and neck like a protective hood. In the event of an accident, the airbag inflates in 0.1 second.

DESCRIPTION OF THE PRESENT INVENTION

The present invention is CarboTech protectable adaptive equipment for falls among elderly clients and peoples with improper gait. The device has an inflatable airbag which is made up of synthetic rexine bag which is attached and folded with collar that is invisible. The collar is worn around the neck. When power

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is on, it monitors the client movement. When they tend to fall, the four-way mercury sensors get activated based on the position they fall, and the ultrasonic buzzer produces a sharp sound which gives a notification that they are in trouble. At the same time, the GSM network sends an encoded message to the caretaker. Whereas the GPS tracks the location of the client and it provides the information of the latitude and longitude of the location.

METHOD OF USE

Airbag

The airbag inflates and surrounds the head in case of falls. The illustration shows the airbag coverage area around the head. The way the hood is designed and folded into the collar ensures that it will inflate quickly and safely. It protects nearly all of the head while leaving the field of vision open. The airbag provides soft and effective absorption and maintains constant pressure for several seconds, enabling to withstand several impacts to the head in case of fall. After that the airbag slowly starts to deflate.

Control Knob

The tire valve adaptor that inflates the airbag is placed in a holder in the collar. The tire valve adaptor uses carbon dioxide gas.

Sensors

The airbag is deployed by sensors i.e., four-way mercury sensors that pick up a client's abnormal movements in the event of a fall. The sensors then send a signal to the control knob of tire valve adaptor to inflate the airbag. When the carbotech is switched on, the sensors are constantly monitoring the wearer's movement.

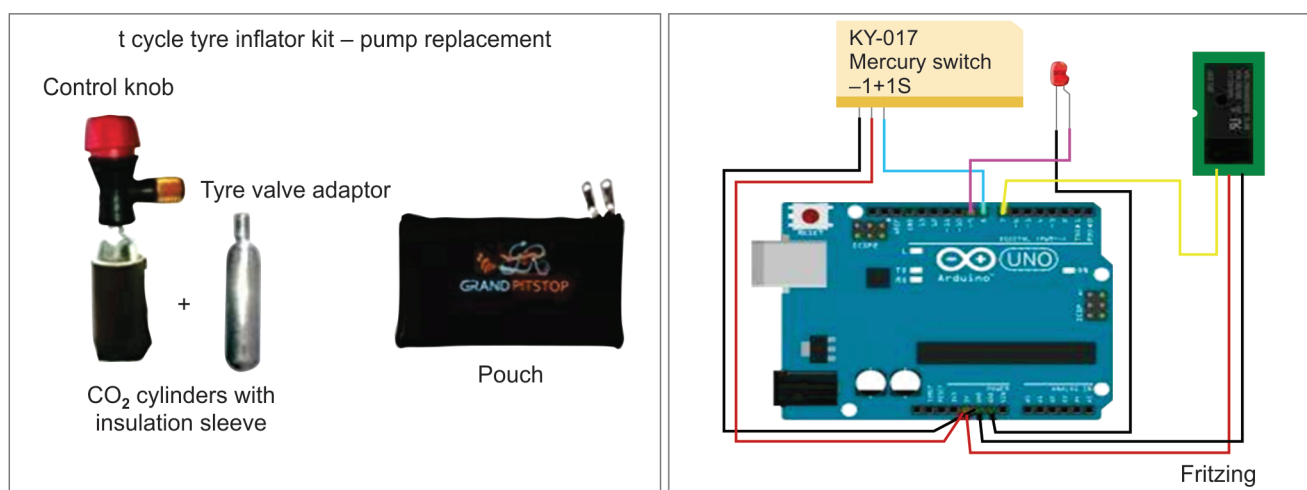


Fig. 1: Carbon dioxide cylinder with cycle tyre inflator kit and pouch. Four-way mercury sensors

Collar

The collar with the shell is a visible part of the carbotech, which encloses the whole airbag system? All the components are located inside the collar for optimum ergonomics and performance. The instant it is triggered, the pressure from the airbag splits open the ziplock, and the hood inflates around head.

Center Front Zip

To wear the CarboTech protectable adaptive equipment around the neck and pull the zip at the front up under the chin. Zip needs to be completely closed for carbotech to work correctly. Carbotech on/off button is on the zip tag (Fig. 1).

ON/OFF Button

Carbotech is switched on and off using the zip at the front of the collar. There is an on/off switch on the zip tag.

MANUFACTURING OR PROCESS OF THE PRESENT INVENTION

- CarboTech protectable adaptive equipment uses 12 volts lithium polymer battery for its functionality.
- Arduino Nano board serves as a master brain for effective function of carbotech. For input purpose, 5 V of current have been transferred to the board through the voltage step-down converter.
- Thereby Arduino gives command to the four-way mercury sensors either + or – continuity.
- Whereas in the meantime, the relay gets command from Arduino, thus simultaneously activating both the ultrasonic

buzzer and the GSM for notification, and the SOS messages and location through to the relay switch.

- Arduino gives command to DC motor by splitting 5 V for its function. Once the motor is on, the carbon dioxide control nozzle gets activated through its mechanism of on/off.
- Thus, the airbag gets inflated from the ziplock of the collar and surrounds and protects the head.

ADVANTAGES OF THE PRESENT INVENTION

- Its ergonomics with multilevel function.
- Carbon dioxide gas is refillable, which is cheap and can be done with hand pump alone.
- Ultrasonic buzzer is used, and it gives sharp notification when the client is in emergency.
- GSM SIM 900 enables the option of SOS messages and tracks the location of the client.
- Four-way mercury sensors deployed for its effective sensing in all the ways.

LIMITATIONS

- CarboTech protectable adaptive equipment is restricted to elderly, cerebral palsy children, and those with neurodegenerative disorders.
- It is restricted only to protect head.
- It is not made for riding purpose, but only to protect head in case of an emergency.