The Use of a Spin - Electric Power Drone

148. St. Joseph Kolping

Angelus Albinus and Adolph Tabaro

Introduction:

The aim of this project is to make a device, a drone, which is able to take aerial photographs and video recordings while flying. As the name of this project which says, "The Use of a Flying Drone in Spying, Research and providing Optimal Security". The purpose of the drone is to take video recordings and pictures when spying researching and thus providing security to different areas.

The purpose of making a drone was thought after seeing the security problems in different areas like in factories, prisons and schools. The aim was to make a device that can provide security to our school and the surrounding residents. The possible way we thought to maintain security by looking all over the school was by getting a camera that can view all the school surroundings at once. This is not possible for a free camera. Therefore, we decided to make a device that could keep security all over the school by taking video recordings and sending them to a laptop. The device is what we call a drone.

Method:

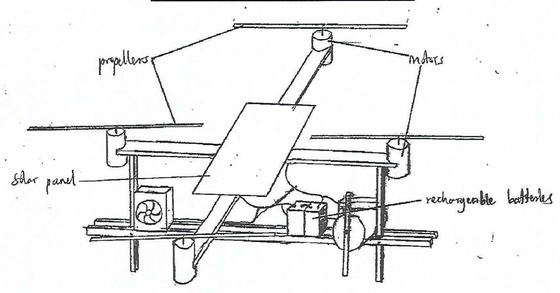
The drone is made by plastic limbs, motors, a camera, wires, a rechargeable battery, diodes, SPDT relay, and solar panels together with RF modules and Arduino microcontrollers. Before starting to make a drone, we divided it into flying section and power section.

The flying section includes making a drone's structure by binding plastic tubes with glue, binding motors with their propellers on the plastic tubes with glue and binding the plastic stands on the plastic tubes.

Materials Used In The Project.

Construction of a drone requires one to have the following materials; 6 motors, 4 for uplifting and 2 for direction and controlling the spinning of the drone. 2 solar panels for charging the batteries and automatic switching of the LEDs, 28 Light Emitting Diodes (LEDs) for providing light for the camera during the night and 2 SPDT relays(Single Pole Double Throw), one for the automatic switching on and off of the LEDs and one for converting DC (Direct Current) to AC (Alternating Current).
3.6 meters of wire for connection motors, batteries, solar panels, SPDT relays and the camera, plastic tubes for the frame & propellers to be propelled by the motors, 4 capacitors for controlling the voltage drop in the drone, 16 diodes for rectifying AC to DC and 6 rechargeable batteries, pur Adhesive glue for binding of the frame parts, motors, camera, and solar panels. 2.5 meters of soldering wire and a soldering gun for soldering of electrical parts.

STRUCTURE OF A DRONE .



NB: This structure of arrangement of the powering and flying section was used to just test the flight of the drone.

- In order for a drone to fly high and stay longer it needed more power.
- The inverter which includes the changing of DC current to AC current is also used to increase the power of the drone.
- The inverter is physically replaced by the SPDT relay.

Results:

The powering section is made up of:-solar panels that recharge the batteries, rechargeable batteries for powering the drone, and diodes for proper charging of the batteries and avoiding the back flow of current.
The solar panels can be used to drive the drone during the day and charging the battery while during the night, the drone will depend on the batteries only.
The solar panels give the total voltage of 14.5 volts.
The voltage of the rechargeable batteries is stepped up by the inverter, whereby the current is changed from DC to AC and divided and then rectified and joined to give a total voltage of 48v.
The power from the powering system is then divided to be used in the flying of the drone and in the micro controllers which control the moving of a drone.

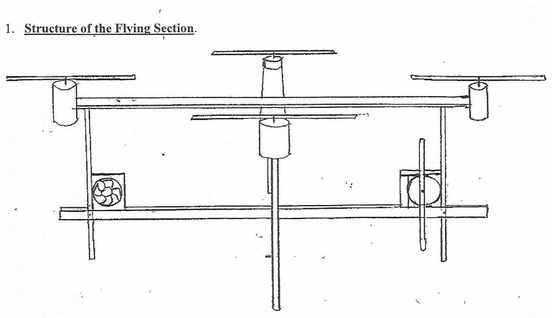
4. The Control System.

The control system is working by the use of arduino microcontrollers and RF receivers and transmitters whereby the arduino micro-controller will be sending the videos and photographs from a camera fixed on the drone to the arduino micro-controller that is connected with a laptop together with RF receivers and transmitters.

The drone will be controlled by sending information using a laptop. The information is transmitted to the drone using RF transmitters and receivers and the drone will start working.

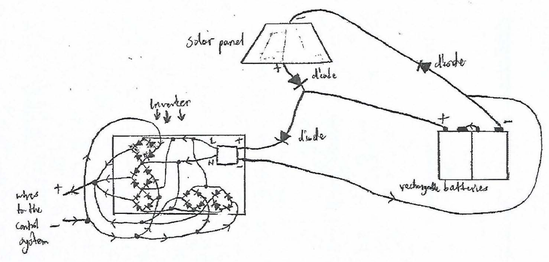
The controlling the drone's movement will be done by a laptop and automatically using the arduino micro-controller in the drone.

1. **Structure of the Flying Section.**



- The flying section is made up of 6 motors for flight and moving in air, plastic tubes as limbs to hold motors, and propellers that enable it to fly.

2. **Structures of the power section.**
(a) Structure of the powering system.



The drone applies the principles of four forces applying on flying bodies which are lift, weight, thrust and drag. Also, the drone is made aero dynamic to reduce air resistance.

CONCLUSION.

The working of the drone depends much on the principles of four forces applying on flying bodies which are lift, weight, thrust and drag. The aerodynamic shape of the drone is important to reduce air resistance.

The higher the drone flies from the ground, the wider area can be monitored and viewed by the camera.
Solar panels do not only charge batteries but also can be used in automatic switching on and off of LEDs by the help of SPDT relay.

RECOMMENDATIONS.

1. There should be means of sending video recordings at longer distances so as to increase the distance the drone can operated from the user.
2. The project can be improved by putting a night vision camera that does not depend on additional light.
3. To prevent someone's attention being taken due to the sound produced by the spinning motors, the drone should use silent motors as its engines.
4. The plastic body gives the drone a great resistance to water and an aerodynamic shape for proper flight.
5. To increase light sensitivity, the drone should be fixed with the SPDT relay that needs less voltage to switch an electromagnet.

REFERENCES.

1. Bernard Grob and Mitchel E Schultz;
Basic Electronics, (9th Ed), Mc Graw – Hill, Western Wisconsin Technical College.
2. Anderson, John D. (2007); *Fundamentals of Aerodynamics*, (4th Ed), Mc Graw – Hill 1SBN 0 -07 – 125408 -0.
3. *"Science of Everything"* National Geographic.
4. *"Myth Busters"* Discovery Science Channel.
5. Da Vinci Learning.
6. DC to AC conversion – www.wikihow.com
7. Download: Cyberlink YouCam – www.dreamytricks.com

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