

FERRIS WHEEL

(NO SOLDER KIT)

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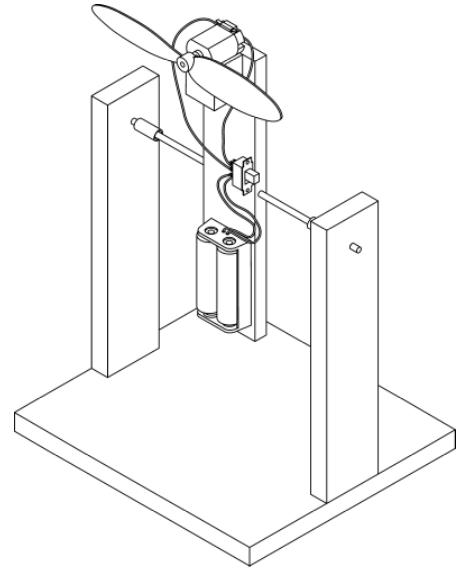
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DESCRIPTION

This model represents a *FERRIS WHEEL* in its most simple form, consisting of a single rotating beam. This beam has an electric motor with a propeller, mounted at one end. A battery holder is on the other end of the beam and counter-balances them. The beam is mounted on an "axle" (shaft) at the beams' centre of gravity.

When the *FERRIS WHEEL* is switched on, the motor spins the propeller, thus rotating the beam around its axle.



SECTION 1:

GENERAL AND PLANNING INFORMATION

1.1 THE PROJECT

The major aspects of this project are the planning, design, construction and assembly stages of the device.

1.2 DESIGN

The drawing in this unit shows the basic construction of the *FERRIS WHEEL*.

NOTE: the designer should look at the design of the *FERRIS WHEEL* as a complete unit – not just a collection of components.

1.3 THE ROTATING BEAM

- The rotating beam can be made from wood, balsa or plastic.
- The weight of the beam will affect the acceleration.
- The beam needs to be large enough not to flex.
- The width of the beam needs to be sufficient for all components to be securely mounted.
- The beam should be assembled and balanced before making the stand's side supports.

1.4 OTHER POINTS TO CONSIDER:

- The two side supports need to be long enough and far enough apart to allow the beam to rotate, and the propeller to spin, without hitting anything.
- The base and two side supports can be made from any kind of (scrap) timber.
- The base should be large enough so that the *FERRIS WHEEL* doesn't fall over when the beam rotates.
- The beam is located centrally, along the axle, by the use of two tubes.
- An on/off switch is located on the beam (in the middle for ease of operation).

SECTION 2: COMPONENTS & MATERIAL REQUIRED

Note: it is suggested that, before you commence construction, you check the components supplied in your kit, and ensure that you have everything else required.



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Issued: 19 March 2011

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2.1 COMPONENTS SUPPLIED: The following components are supplied in a plastic bag:
 1x Electric Motor 3.0V (white with wires) 1x Propeller 74 mm long
 1x Sliding switch (small with 2 wires) 1x Steel shaft 2.5mm dia x 200mm long
 1x 2x AA Battery holder 1x20 mm Rubber tubing (orange)

2.2 ADDITIONAL REQUIREMENTS

2.2.1 Available from us are AA batteries, single-sided tape and double-sided tape: these need to be ordered separately.
 2.2.2 The additional requirements are: Material for the stand and beam, a 3.0mm drill bit and fine electric wire (we suggest red and black).

SECTION 3: ASSEMBLING THE *FERRIS WHEEL*

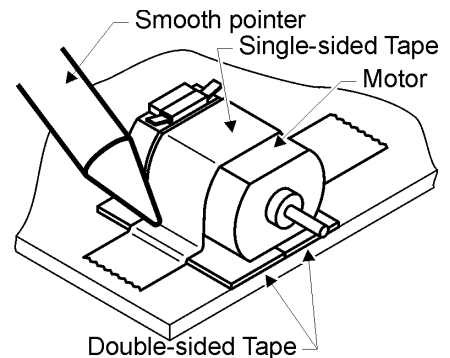
3.1 ASSEMBLING THE COMPONENTS TO THE BEAM

- Press the propeller on to the motor’s shaft.

HINT: Place the end of the shaft (where it exits the motor) on a hard surface, and push the propeller down.
WARNING: Don’t just push the motor down by hand as this can push the motor armature out of its bearings and jam the motor.

- Attach the motor/propeller, the switch and battery holder to the beam using double sided foam tape or hot glue (roughen the surfaces to be glued with sandpaper to improve adhesion).

WARNING: if using Hot glue, be very careful, as it can burn you, if you get it on yourself.



- Determine the assembled beam’s equilibrium point (centre of balance). The centre of balance is not at the geometric centre, because of the different weights at each end.

NOTE: This needs to be carried out with the batteries fitted.

- The simplest way to determine the centre of balance is by balancing the fully assembled beam on a “knife edge”, rule or something similar.
- Drill a 3.0 mm diameter hole through the beam at this equilibrium point.
- Double check that the beam balances at that point.
- If after drilling the hole the beam does not balance, place some blue tack or plasticene on the beam’s light end until it balances.

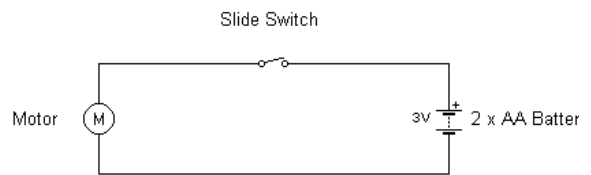
3.2 FINAL ASSEMBLY OF THE *FERRIS WHEEL*

- The two sides of the stand can be made from any timber – dowelling or square.
 - If dowelling is used, appropriate holes may be drilled in the base.
- 3 mm diameter holes are drilled in the side supports for the pivot shaft (regardless of what type of timber is used).
- Assemble the rotating beam, stand and pivot shaft.
- The rubber tube is cut to size and installed on the pivot shaft, on each side of the beam.

SECTION 4: WIRING UP THE *FERRIS WHEEL*

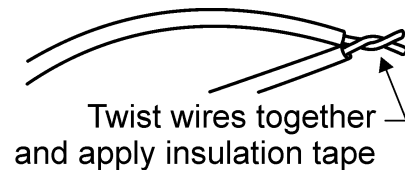
The Switch should be wired as shown in the "Circuit diagram"

- Connect the battery holder's red wire to one of the red wires from the. Twist them firmly together.
- Connect the switch's other red wire, to the motor's red wire. Twist them firmly together.
- Twist the black wires from the motor and battery holder together.



CIRCUIT DIAGRAM

- Insert the batteries, and turn the switch on:
 - when connected correctly the propeller will spin and blow air back over the motor.
- If the propeller spins in the correct direction, your wiring is correct - apply insulation tape over all the joined wires
- If the propeller spins in the wrong direction, you will need to swap the motor's wires:
 - remove the motor's red wire from the switch and untwist the black wires from the motor and battery holder.
 - twist the red wire from the motor to the black wire from the battery holder .
 - connect the motor's black wire to the remaining red wire on the switch.
 - twist them firmly together.
 - apply insulation tape to all the joined wires.



Note: this kit has components that allow this to be assembled without soldering. However, the connections will be more effective and permanent if they are soldered.

CONGRATULATIONS! YOU HAVE BUILT YOUR OWN *FERRIS WHEEL!*