

Electrical energy from wind energy

Task and equipment

Information for teachers

Notes on the Setup and Procedure

The distance between the fan and the generator is only estimated. It should not be more than 10 cm, because otherwise the bulb will not light up. The knob for the current should be turned all the way to the right, so that a supply current of 12 V can be reached for the fan.

Attention:

One must make sure that the pupils always stand behind the fan, and that they do not reach into the space between fan and windmill when there is a voltage present and the windmill is turning.

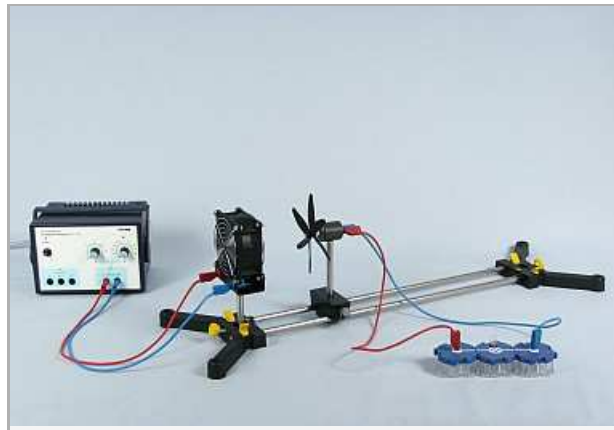
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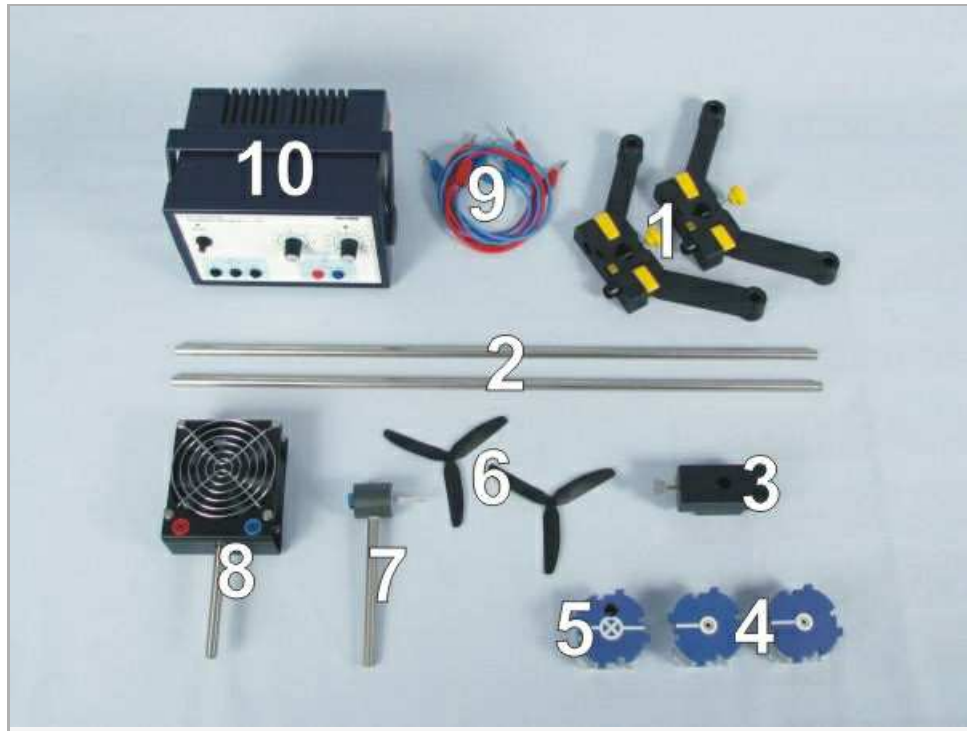
Task

Can wind make a light bulb glow?

A fan is used in this experiment to generate wind of different strengths. The windmill is made up of a rotor (several blades) and a generator. Observe a small light bulb which is connected to the windmill as the fan generates wind.



Equipment



| Position No. | Material | Order No. | Quantity |
|--------------|---|-----------|----------|
| 1 | Support base, variable | 02001-00 | 1 |
| 2 | Support rod, stainless steel, l = 600 mm, d = 10 mm | 02037-00 | 2 |
| 3 | Slide mount for optical bench | 09822-00 | 1 |
| 4 | Junction module, SB | 05601-10 | 2 |
| 5 | Socket module for incandescent lamp E10, SB | 05604-00 | 1 |
| 6 | Rotor, 2 pieces | 05752-01 | 1 |
| 7 | Generator with metrical thread axis and nut | 05751-01 | 1 |
| 8 | Blower, 12V | 05750-00 | 1 |
| 9 | Connecting cord, 32 A, 500 mm, red | 07361-01 | 2 |
| 9 | Connecting cord, 32 A, 500 mm, blue | 07361-04 | 2 |
| 10 | PHYWE power supply DC: 0...12 V, 2 A / AC: 6 V, 12 V, 5 A | 13506-93 | 1 |
| | Filament lamps 1.5V/0.15A,E10,10 pieces | 06150-03 | (1) |

Set-up and procedure

Set-up

Using the adjustable base and the two rods, build a rail support (Figs. 1 and 2).



Fig. 1



Fig. 2

Affix the fan to the left foot of the support so that the side with the sockets is facing away from the support (Fig. 3).



Fig. 3

Mount both rotors in succession onto the generator shaft (Fig. 4).
The 6 blades should be equidistant from one another (Fig. 5).



Fig. 4



Fig. 5

Attach the generator to the rider and place this on the rails (Fig. 6).



Fig. 6

Screw the 4 V light bulb into its socket, join it to the connection modules and connect them to the generator as shown in Fig. 7.

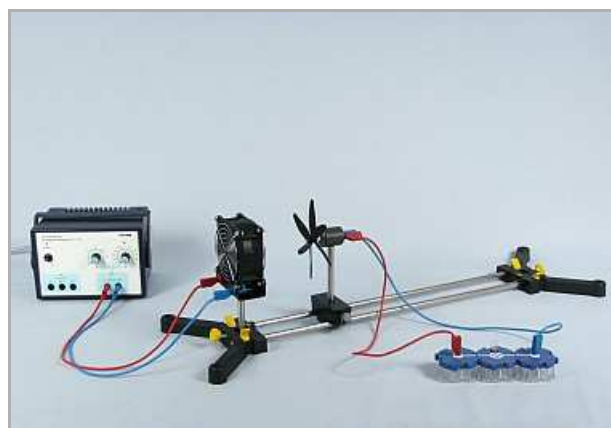


Fig. 7

Connect the fan to the DC output on the power supply (Fig. 8).
The power supply is off.



Fig. 8

Procedure

1st Experiment

Slide the generator along the rails so that the distance between the front of the fan and the tip of the shaft of the generator is about 5 cm (Fig. 1).



Fig. 9

Switch on the power supply and turn the current regulator knob completely to the right.

Turn the voltage regulator knob slowly to the right (Fig. 2) and observe the bulb.



Fig. 10

Describe your observations under Result - Observations 1 in the report.

Attention:

Always stand behind the fan when there is a voltage present and the windmill is turning. Never reach into the space between the fan and the windmill.

2nd Experiment

Switch off the power supply and remove the windmill from the rails.

Switch the power supply back on.

Place your hand in front of the fan and turn the voltage knob to the right.

Describe your observations under Result - Observations 2 in the report.

Report: Electrical energy from wind energy

Result - Observations 1

Note your observations on the 1st experiment.

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Result - Observations 2

Note your observations on the 2nd experiment.

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Evaluation - Question 1

Explain your observations.

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