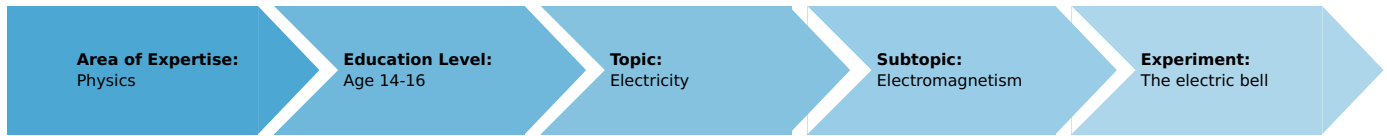


# The electric bell (Item No.: P1397900)

## Curricular Relevance



### Difficulty



Easy

### Preparation Time



10 Minutes

### Execution Time



10 Minutes

### Recommended Group Size



2 Students

**Additional Requirements:**

**Experiment Variations:**

**Keywords:**

## Principle and equipment

### Principle

An experimental model is to be used to demonstrate the construction and mode of action of an electric bell with a Wagner hammer.

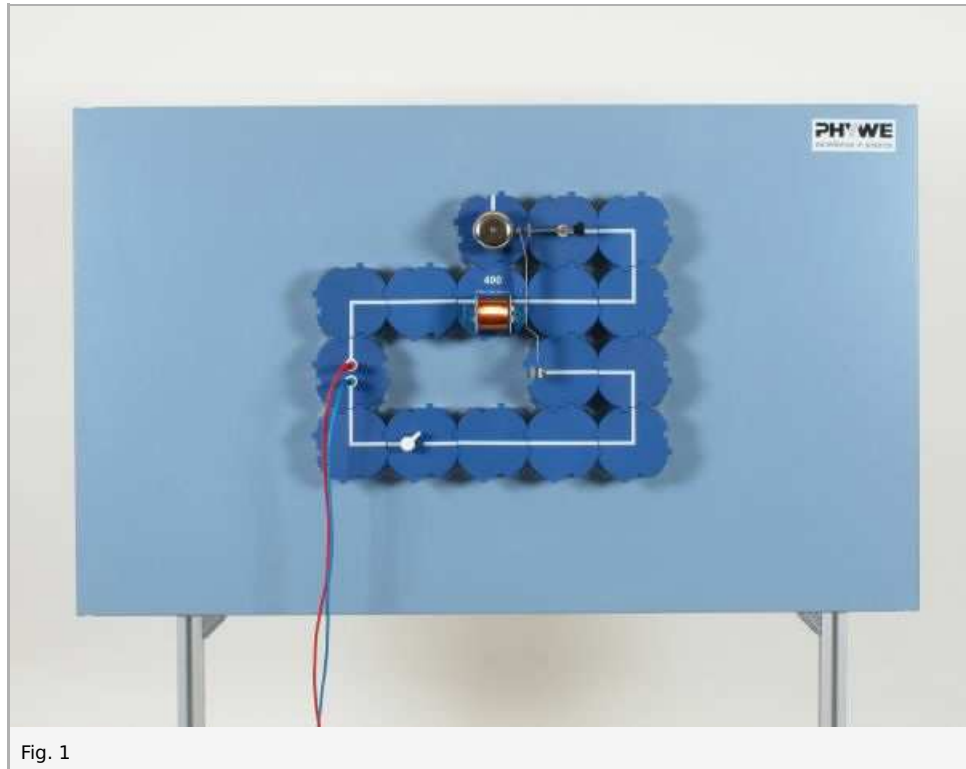


## Equipment

Position No.	Material	Order No.	Quantity
1	PHYWE power supply, universal DC: 0...18 V, 0...5 A / AC: 2/4/6/8/10/12/15 V, 5 A	13500-93	1
2	Demo Physics board with stand	02150-00	1
3	Coil 400 turns, module DB	09472-01	1
4	Switch on/off, module DB	09402-01	1
5	Connector interrupted, module DB	09401-04	1
6	Junction, module DB	09401-10	2
7	Universal holder, module DB	09403-00	1
8	Contact spring w. armature, mod.DB	09473-00	1
9	Yoke	07833-00	1
10	Connector, straight, module DB	09401-01	4
11	Connector, angled, module DB	09401-02	6
12	Bell gong on 4-mm-plug	05673-02	1
13	Contact element, module DB	09473-01	1
14	Connecting cord, 32 A, 1000 mm, red	07363-01	1
15	Connecting cord, 32 A, 1000 mm, blue	07363-04	1

## Set-up and procedure

- Set up the experiment as shown in Fig. 1; clamp the armature in the universal holder; attach the contact element and bell gong each to a junction building block
- Adjust the milled screw on the contact element so that good contact is made to the leaf spring; shift the yoke in the coil until it is at a distance of about 2 mm from the armature
- With the switch open, set a direct voltage of approx. 8 V
- Repeatedly close and open the switch; if necessary, re-adjust the distance of the yoke from the leaf spring
- Note your observations (1)
- With the switch open, apply an alternating voltage of from 8 V to 10 V
- Repeatedly close and open the switch
- Note your observations (2)



## Observation and evaluation

### Observation

1. As long as the switch is closed, the armature moves back and forth and the dapper hits against the bell gong each time
2. The electric bell also works with alternating current

### Evaluation

When the circuit is closed, the armature is drawn by the coil and the clapper hits against the bell gong. The circuit is thereby interrupted. The coil then no longer works as a magnet and so releases the armature, which returns to its original position and so again closes the circuit. This procedure is repeated until the circuit is opened by the switch.

The device that automatically opens and closes the circuit is called a Wagner hammer. When alternating current is applied, the poles of the electromagnet are reversed according to the frequency of the alternating current. The direction of the current is of no importance to the functioning of the electric bell, however.

### Remarks

Although the permanent load on the coil used is rated at maximally 1 A, the recommended voltage is not critical, because the current is repeatedly interrupted. Despite this, the bell should not be rung for longer than necessary, so that the area of contact of the contact screw with the leaf spring (rapid contact spring on the armature) does not scale too much.

The last part of the experiment is not of importance for the understanding of the function of an electric bell. It is simply recommended because in practice most bells are operated by alternating current.