Task

To connect up a model of an electric bell and use it to examine how such a bell works.

Equipment

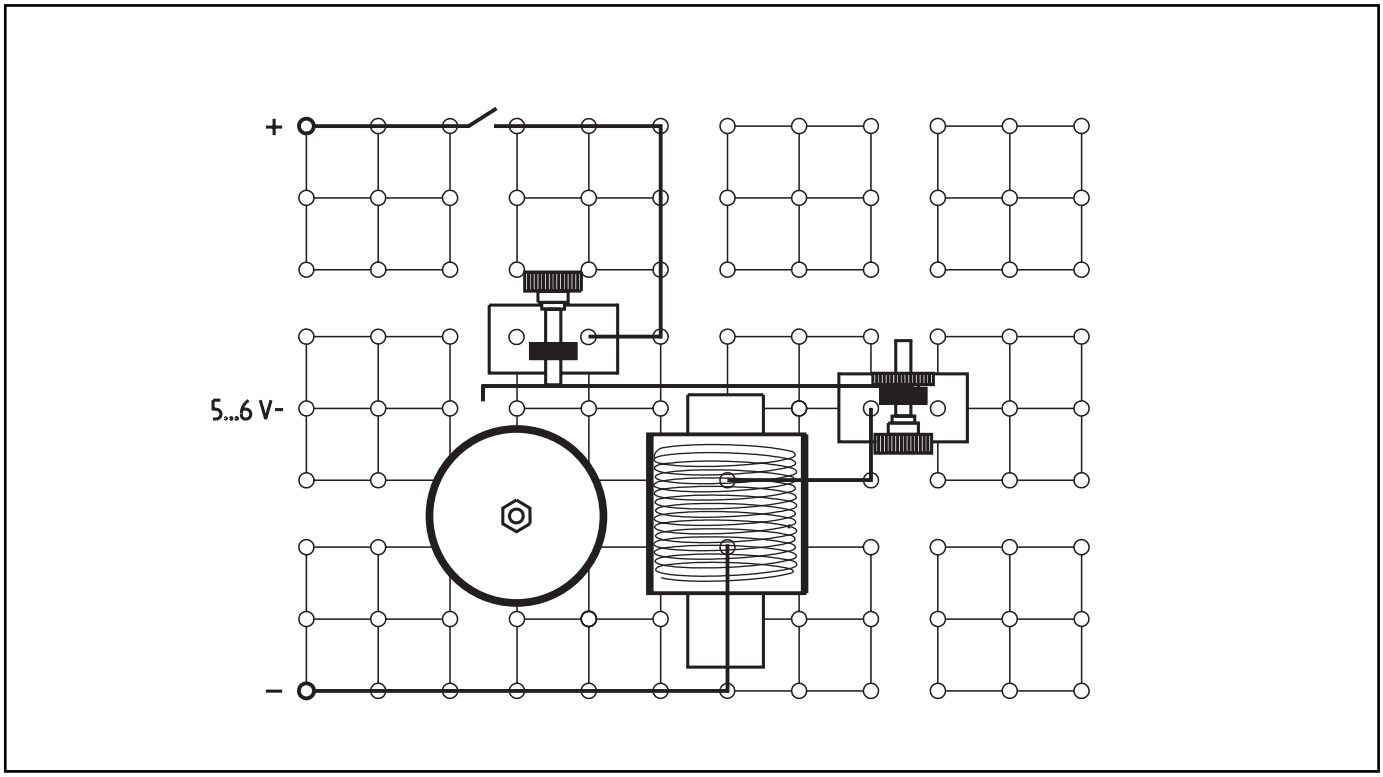
Plug-in board	06033.00	1
On/off switch	39139.00	1
Universal holder	39115.02	2
Bell gong	39116.00	1
Bell striker / contact knife R / S	13024.12	1
Coil, 400 turns	07829.01	1
Yoke	07833.00	1
Wire building block	39120.00	3
Connecting plug, 2 pcs	07278.05	1
Connecting cable, 25 cm, red	07313.01	1
Connecting cable, 25 cm, blue	07313.04	1
Power supply, 0...12 V-,6 V~, 12 V~	13505.93	1

Set-Up and Procedure

— Connect up the circuit as shown in Fig. 1; use the two connecting plugs to fit the coil on the board and slide in the iron core (yoke); the switch is first open.
— Screw the universal holder on the left so tightly that it makes good contact with the armature spring (bell striker), if appropriate, remove the milled screw.
— Set the power supply to 5 V and switch it on.
— Close the switch and position the bell gong so that it is hit by the bell striker, if necessary, optimize the distance of the iron core from the armature spring.
— Close and open the circuit several times and observe what occurs; note your observation.
— Set the power supply to 0 V and switch it off.

Observations

Fig. 1



Evaluation

1. Describe the way in which an electric bell works.

2. In practice, electric bells are mostly driven by alternating current. Why is this possible?

(How does an electric bell function?)

In this experiment, the students become acquainted with a widely used application of electromagnets, which they have already repeatedly used. An understanding of Wagner's hammer is important for the understanding of the working principle of the electric bell, whereby the term itself need not be introduced.

Notes on Set-Up and Procedure

As the circuit is repeatedly re-opened after closing the on/off switch, the current strength at 5 to 6 V is no cause for concern with regard to the load on the coil (max. 1 A), particularly as it is anyway held within the required limits by self-induction. Despite this, the bell should not be rung for longer than necessary, so that there is not too much burn out at the point at which the contact screw contacts the lag contact spring of the armature.

Observations

As soon as the circuit is closed, the bell striker swings backwards and forwards, hitting the bell gong each time. It rings until the switch is again opened.

Evaluation

1. As soon as the circuit is closed, the armature spring is attracted to the coil (electromagnet) and the striker hits the gong. The circuit is now open, the coil no longer acts as a magnet and releases the armature spring, which returns to its initial position and can again close the circuit. This process repeats itself until the switch is again opened.
2. When alternating current is used, it only results in a reversal of polarity in rapid succession. The direction of the current is, however, has no effect on the working of the electromagnet.

Remarks

The experiment can be extended by finally picking up 6 V alternating voltage instead of 6 V direct voltage from the power supply (see point 2 of the Evaluation).

The students should understand that in practice a press on a bell-button is used instead of the operation of a switch.

T	EEP 6.3	Electric bells	PHYWE

(How does an electric bell function?)

Room for notes