Real images in a concave mirror

Principle and equipment

Principle

Using parallel and focal point beams, demonstrate the formation of real images by a concave mirror. At the same time show the properties of the images.

Equipment

Position No.	Material	Order No.	Quantity
1	Demo Physics board with stand	02150-00	1
2	PHYWE Multitap transformer, DC: 2/4/6/8/10/12 V, 5 A / AC: 2/4/6/8/10/12/14 V, 5 A	13533-93	1
3	Lamp,halogen,mag.held,12V/50W	08270-20	1
4	Light box 12V/20W,w.magn.base	09804-00	1
5	Concave/convex mirror,magnet held	08270-12	1
Additional material:			
	Circular template (see master) or a drawing compass		
	Ruler		
	Water-soluble white board pen		

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Set-up and procedure

- Draw the optical axis.
- Using the circular template or a drawing compass, draw a circle with radius r= 200 mm.
- Place the mirror on the circular arc.
- Mark the centre of curvature and the focal point (r = 200 mm; f = 1 00 mm).
- Draw equally large object arrows at 300, 200 and 150 mm from the vertex of the concave mirror.
- Place the light box with a one-slit diaphragm so that it produces a parallel beam which passes through all the arrow heads.
- Place the magnet-held lamp with a one-slit diaphragm so that it produces focal point beams which successively pass through the individual arrow heads (Fig. 1 shows an example).
- Draw the light beams as completely as possible during the experiment.
- Remove the lamps and the concave mirror and complete all light beams. Draw the image arrows.

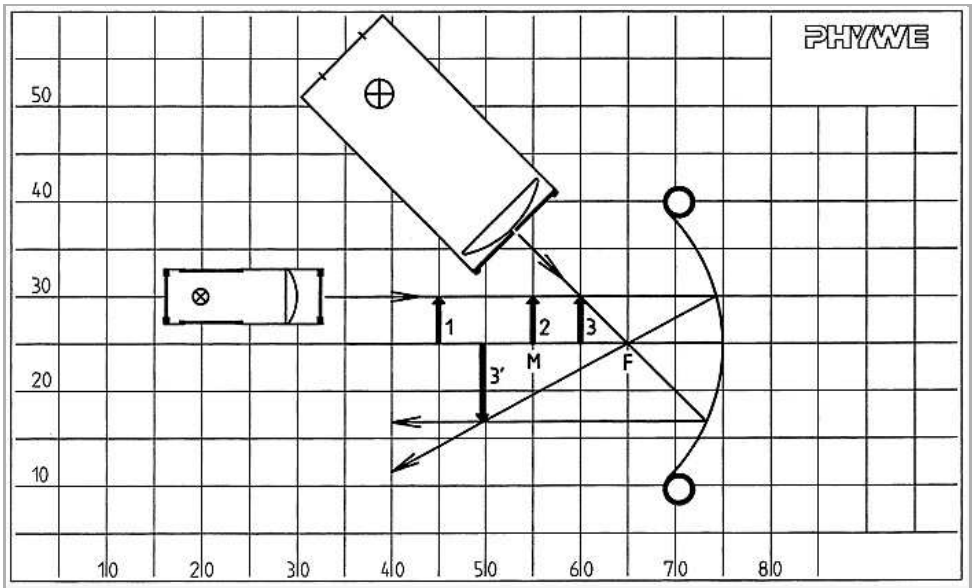

Fig. 1

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Observation and evaluation

A concave mirror generates inverted, reduced images of objects which lie outside the twofold focal length. They lie between the single and twofold focal length. Inverted, equally sized images are produced of objects which lie at the twofold focal length. They are located at the twofold focal length.
Inverted enlarge images are produced of object which lie between the single and twofold focal length. They lie outside the twofold focal length. All these images are real.

Remark
It is advisable not do draw the arrows larger than 50 mm, as otherwise the condition that the parallel rays are close to the axis is not even nearly fulfilled. To make a circular template the master copy (see Fig. 1 in the Foreword) can be copied, pasted on thin cardboard and cut to size.

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