



Tomsk Polytechnic University

DESCRIPTIVE GEOMETRY
ENGINEERING GRAPHICS

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Lecture 9

REPRESENTATIONS - Views , Sectional View , Section



Sectional View



Sectional View - is a representation of an object with imaginary cut by one or several planes (the imaginary cutting corresponds only to a given section but none of the other views are affected).



Sectional View

- Horizontal*
- Vertical*
- Oblique*
- Simple*
- Complex*
- Lengthwise*
- Transverse*

Frontal

Profile

Step-type

Polygonal





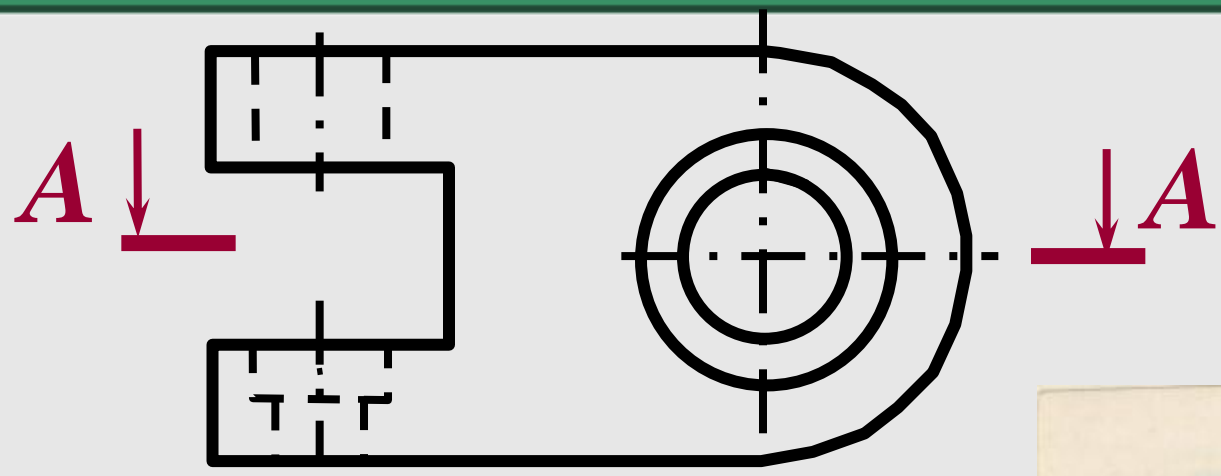
Simpel – one cutting plane

Horizontal – a cutting plane is parallel to the horizontal projection plane;

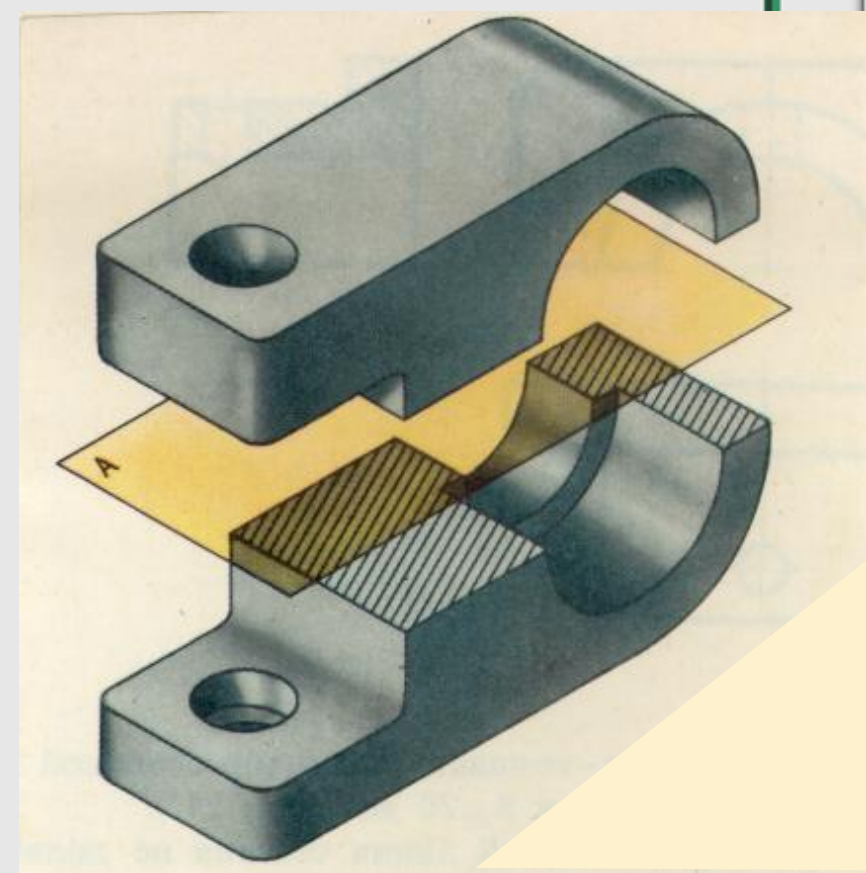
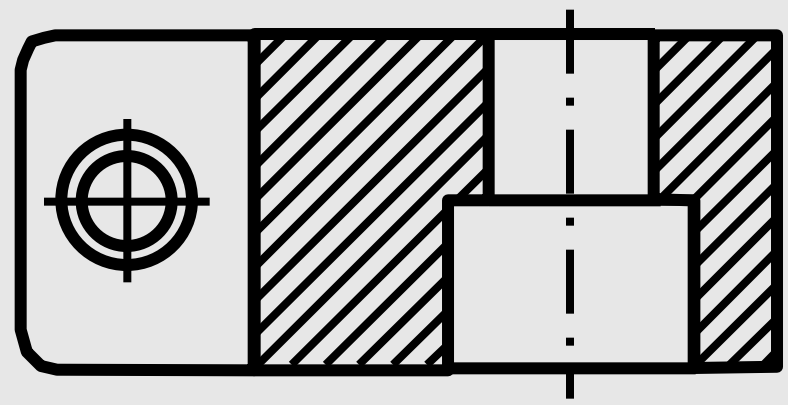
Vertical – a cutting plane is perpendicular to the horizontal projection plane;

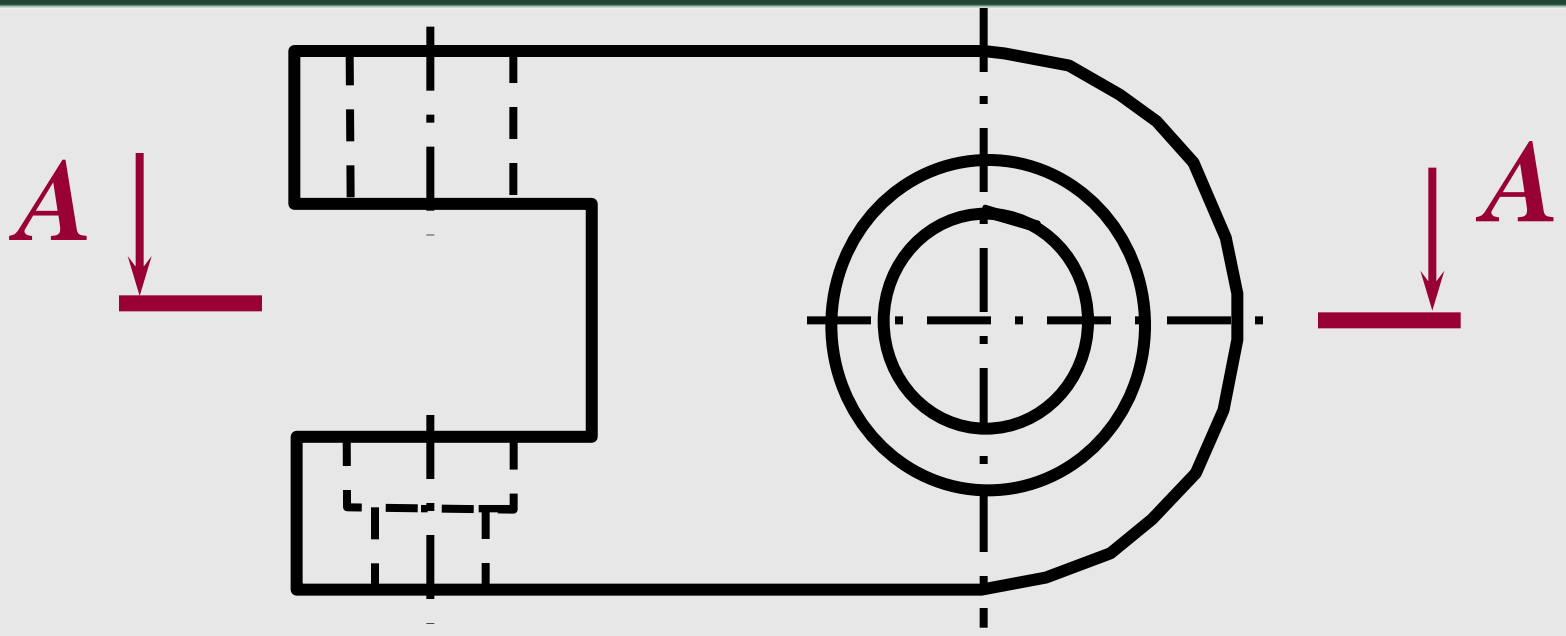
A vertical sectional view is called a *frontal* one if a cutting plane is **parallel to the frontal projection plane**, or it is called a *profile* one if a cutting plane is **parallel to the profile projection plane**;

Oblique – the cutting plane is inclined to the horizontal projection plane at an angle different from a right one;

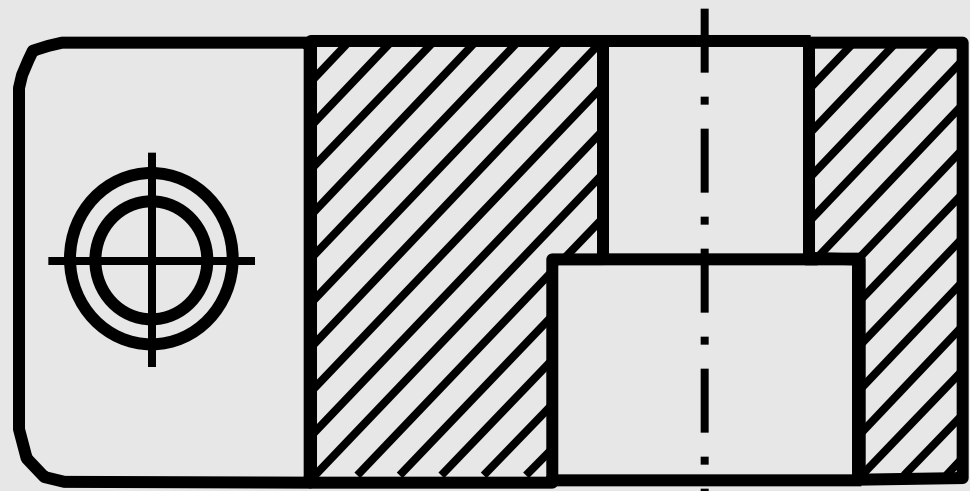


A-A





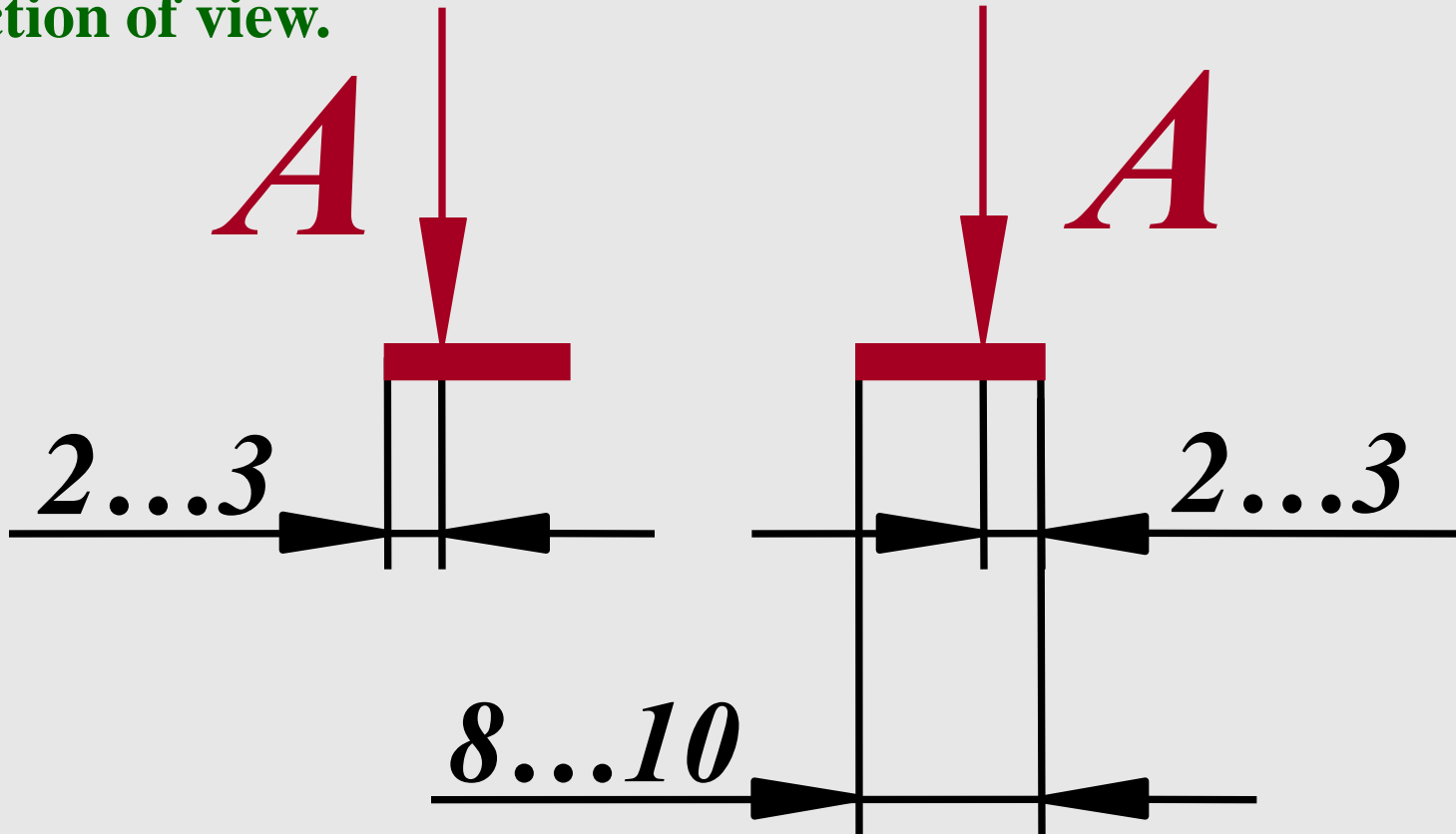
A-A





The position of the cutting plane is denoted by the section line. It is thick at the ends and at changes of direction.

The ends of the line are marked with arrows showing the direction of view.



The arrows are drawn at a distance of 2-3 mm from the ends

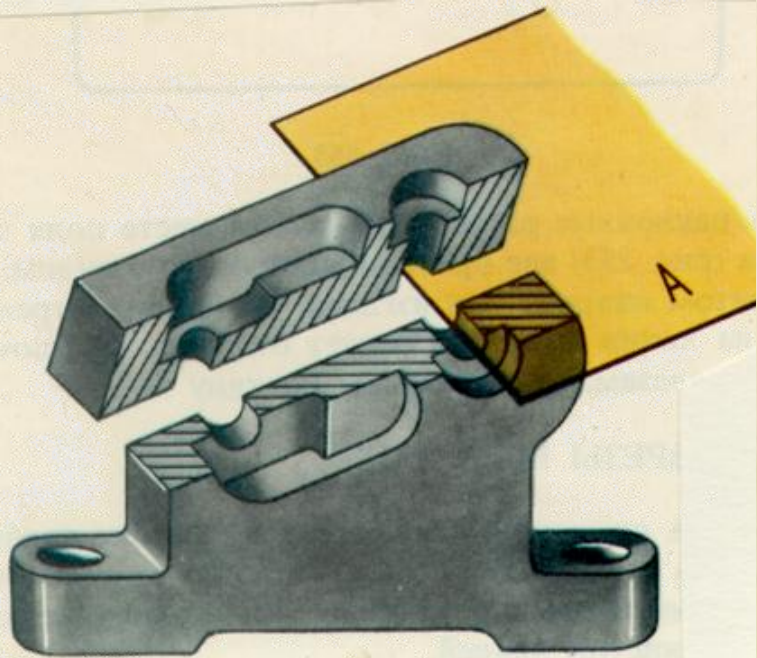


Are not designated:

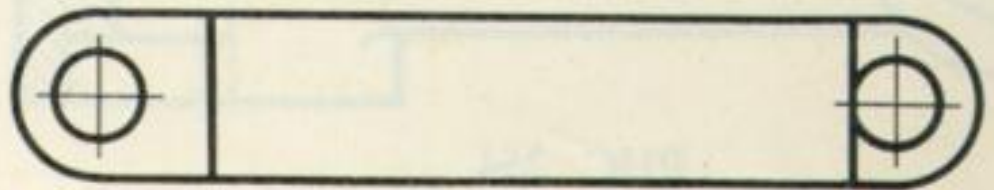
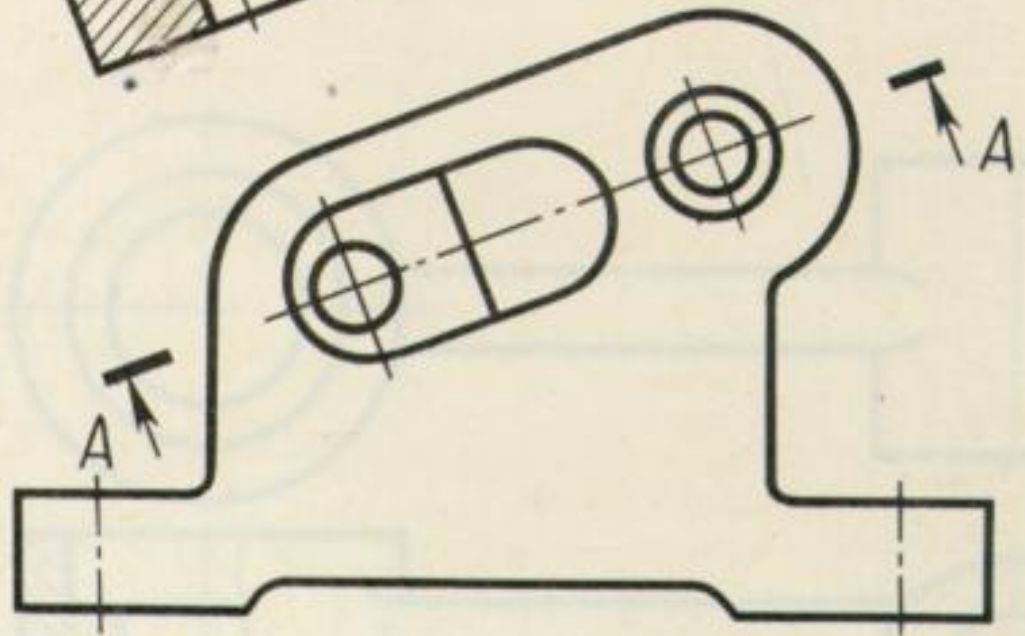
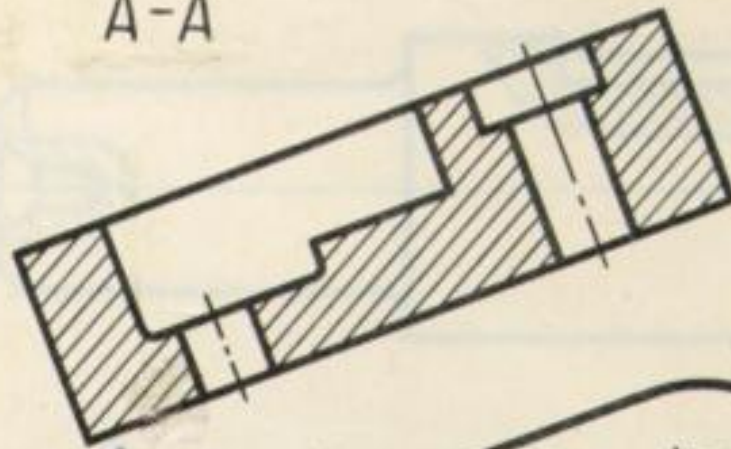
- the simple *Sectional View*

executed on an axis of symmetry of a detail and located in projective communication with other images;

- *A detail view*



A-A





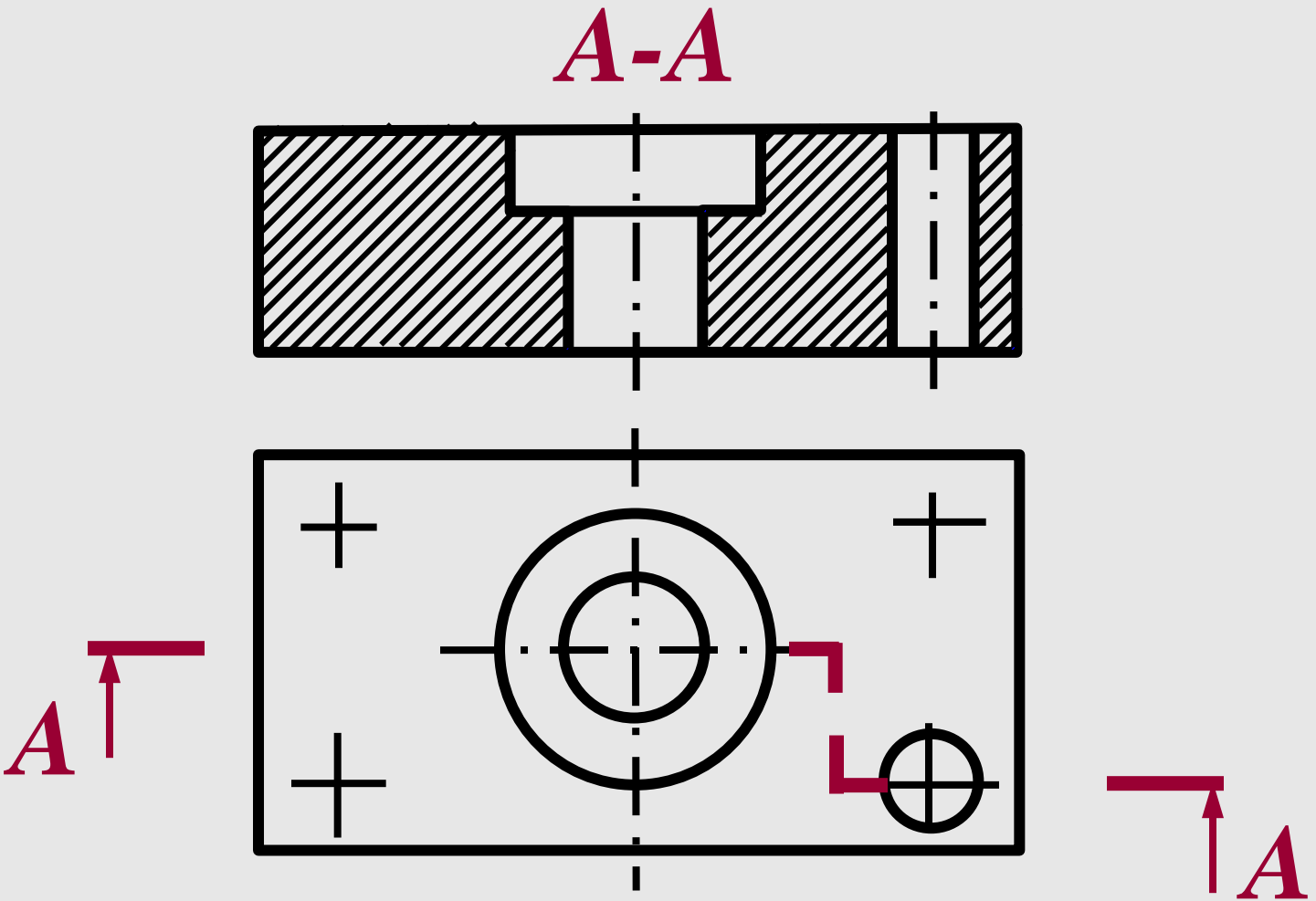
Complex – several cutting planes

When a complex sectional view is drawn, a change of cutting planes is conventionally not shown.

Every sectional view should be marked with two letters written with a dash, e.g. “A-A”.



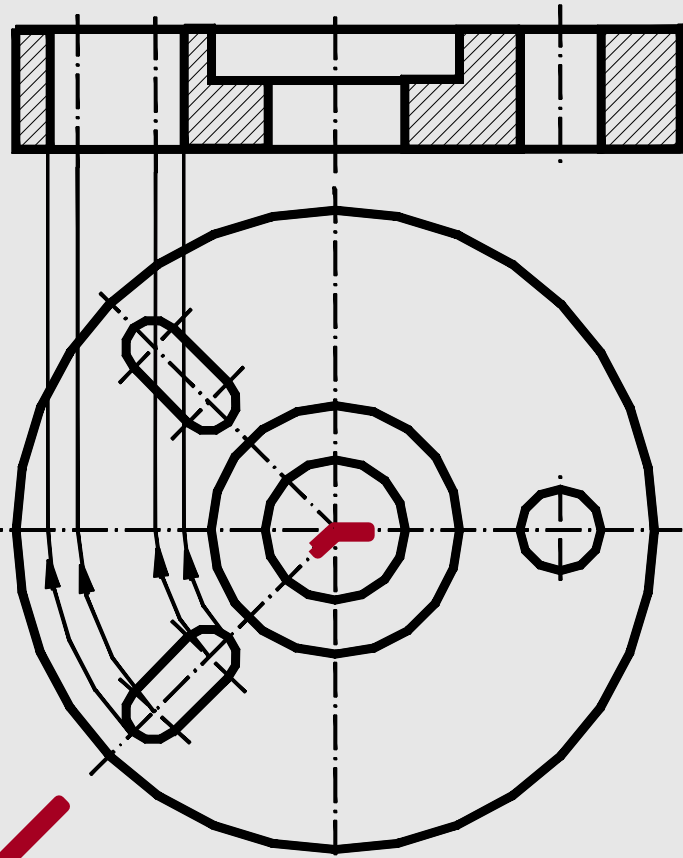
The complex sectional views may be step-type when the cutting planes are parallel





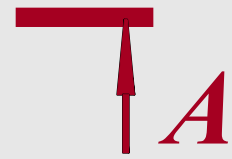
The complex sectional views may be polygonal when the cutting planes intersect

A-A



Then the revolved section is obtained by revolving the section in the position and breaking the outline to accommodate the section

It is often necessary to show a small section showing the true shape across an object (polygonal sectional view).





Section

Section - is a figure representation obtained by imaginary cutting of an object by one or several planes.

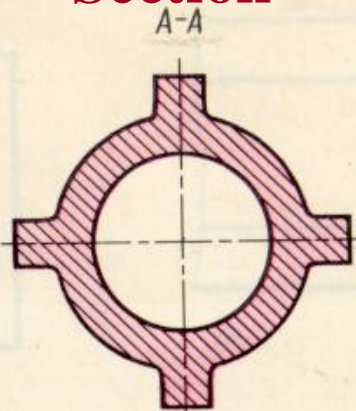
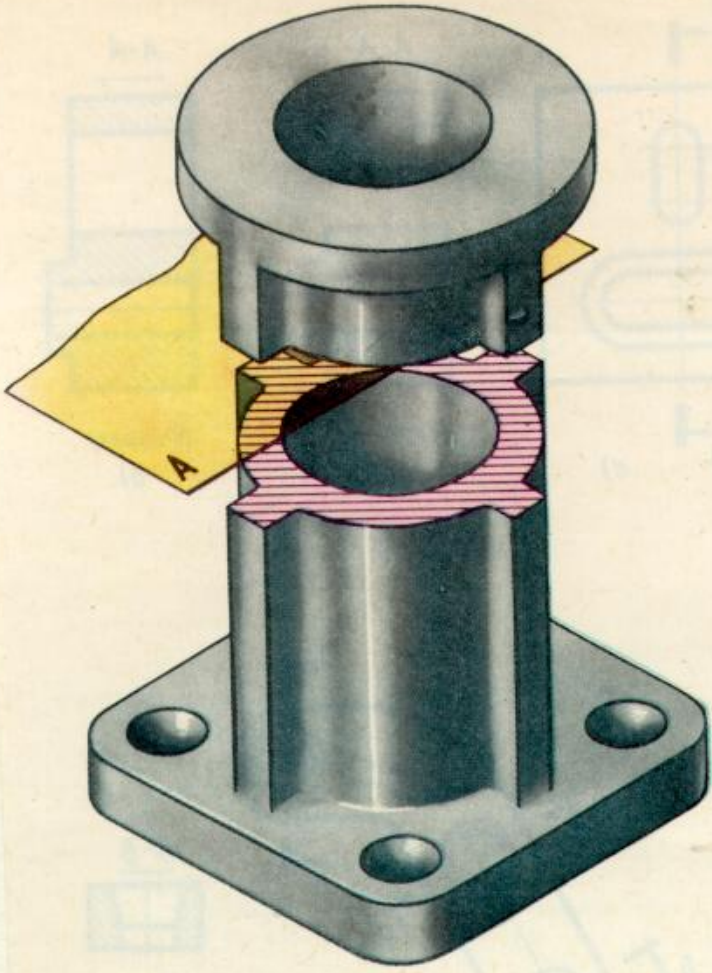
On the section we draw only the elements obtained in the cutting plane.

Removed

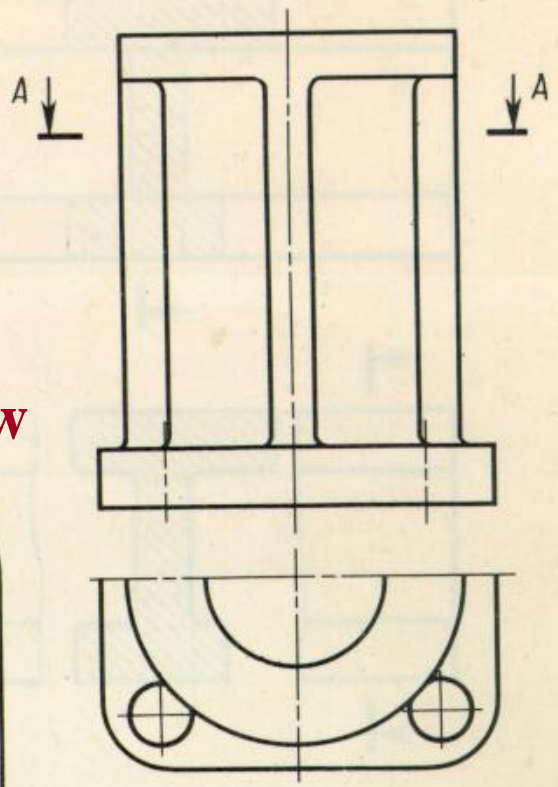
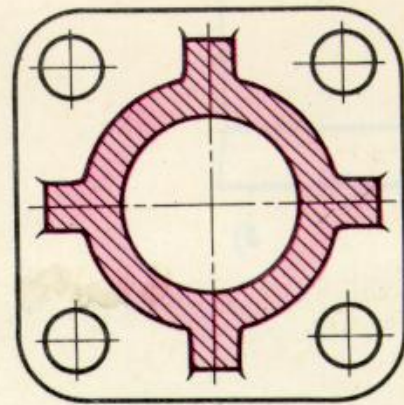
Covering



Section



Sectional View





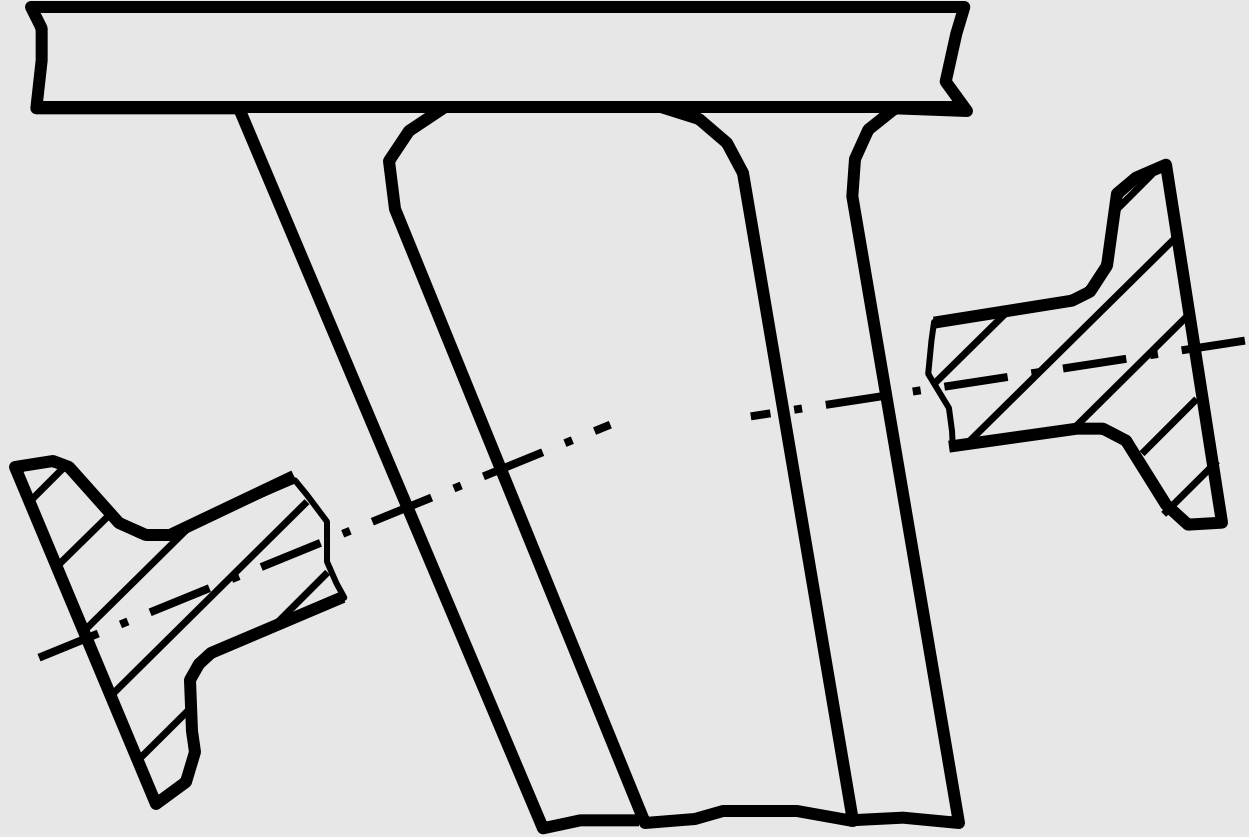
The removed section should be used in preference to the covering one if there is room on the drawing.

It may be located in the break between the parts of one view.



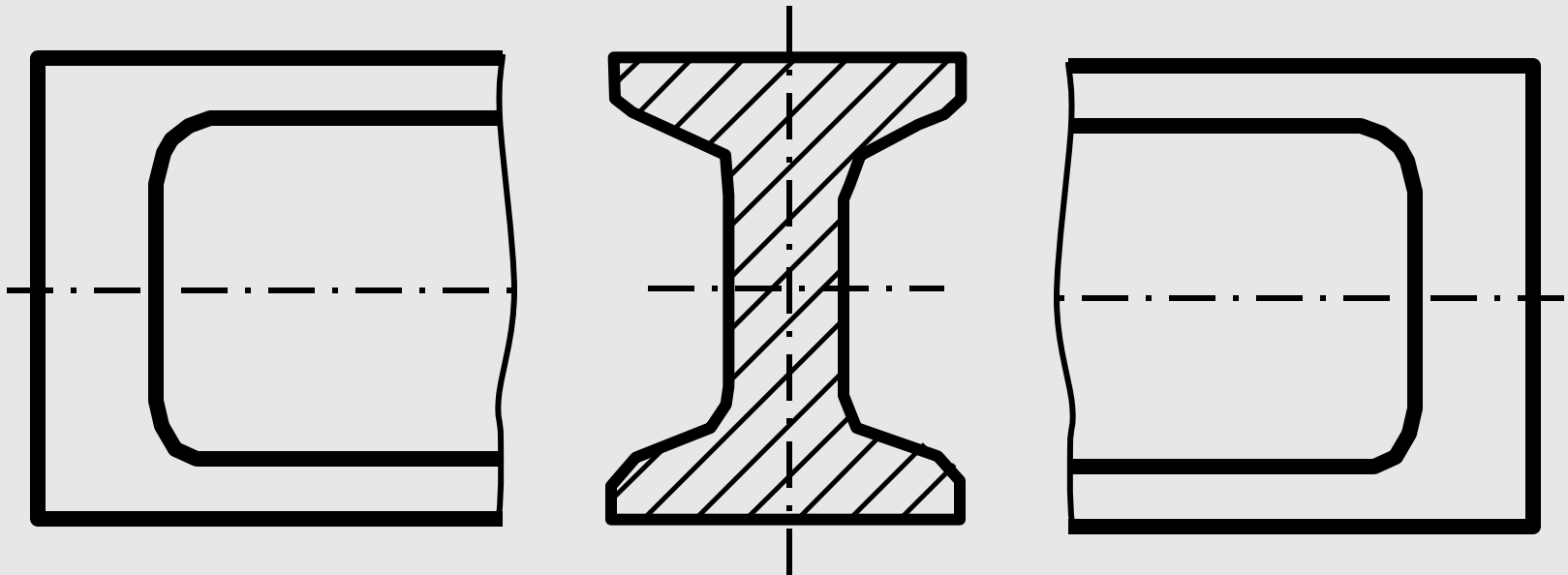
Removed section

The outline of a removed section as well as of that included in a sectional view, is drawn in continuous thick lines.





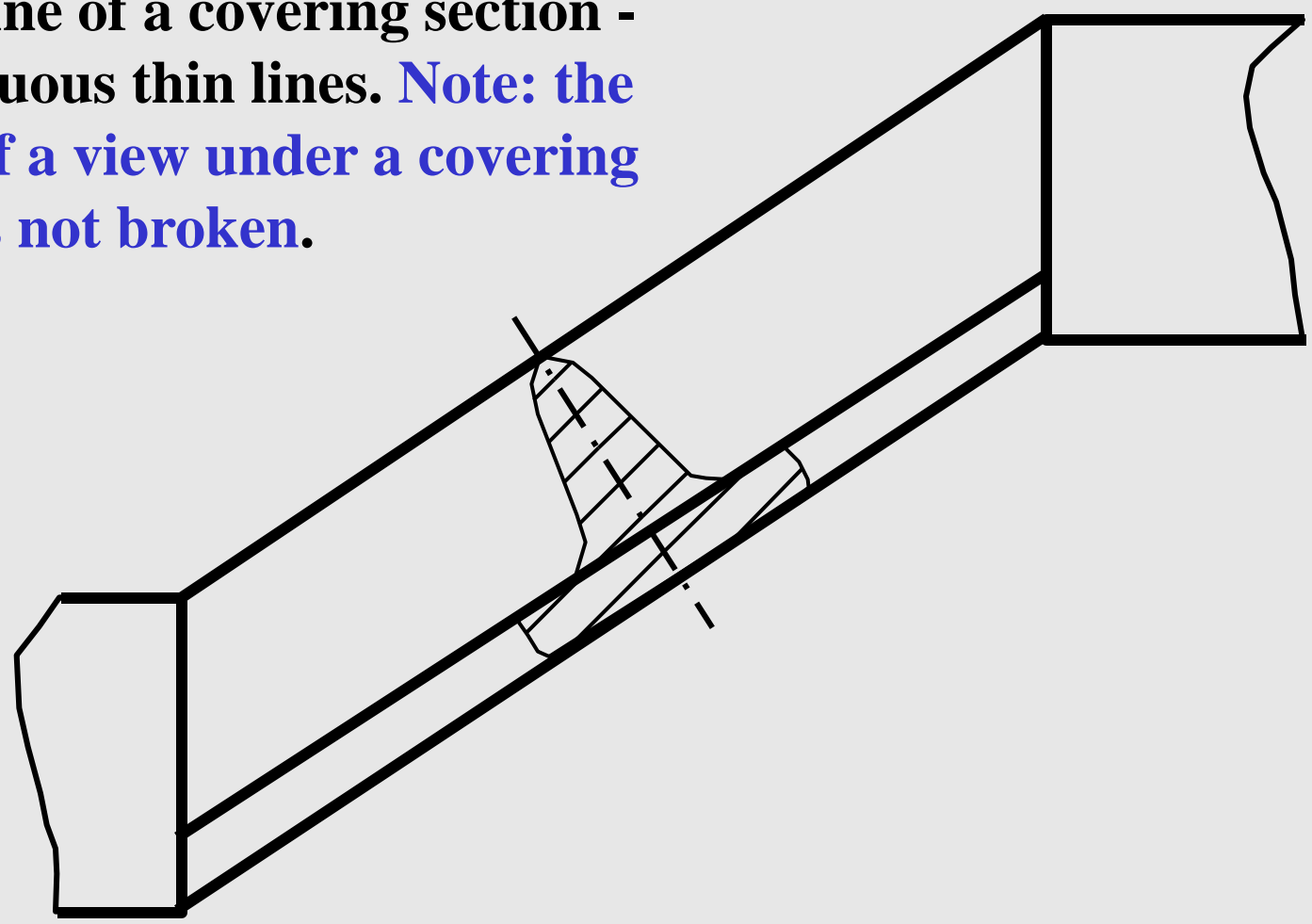
Removed section (in break)





Covering section

The outline of a covering section -
in continuous thin lines. **Note: the
outline of a view under a covering
section is not broken.**

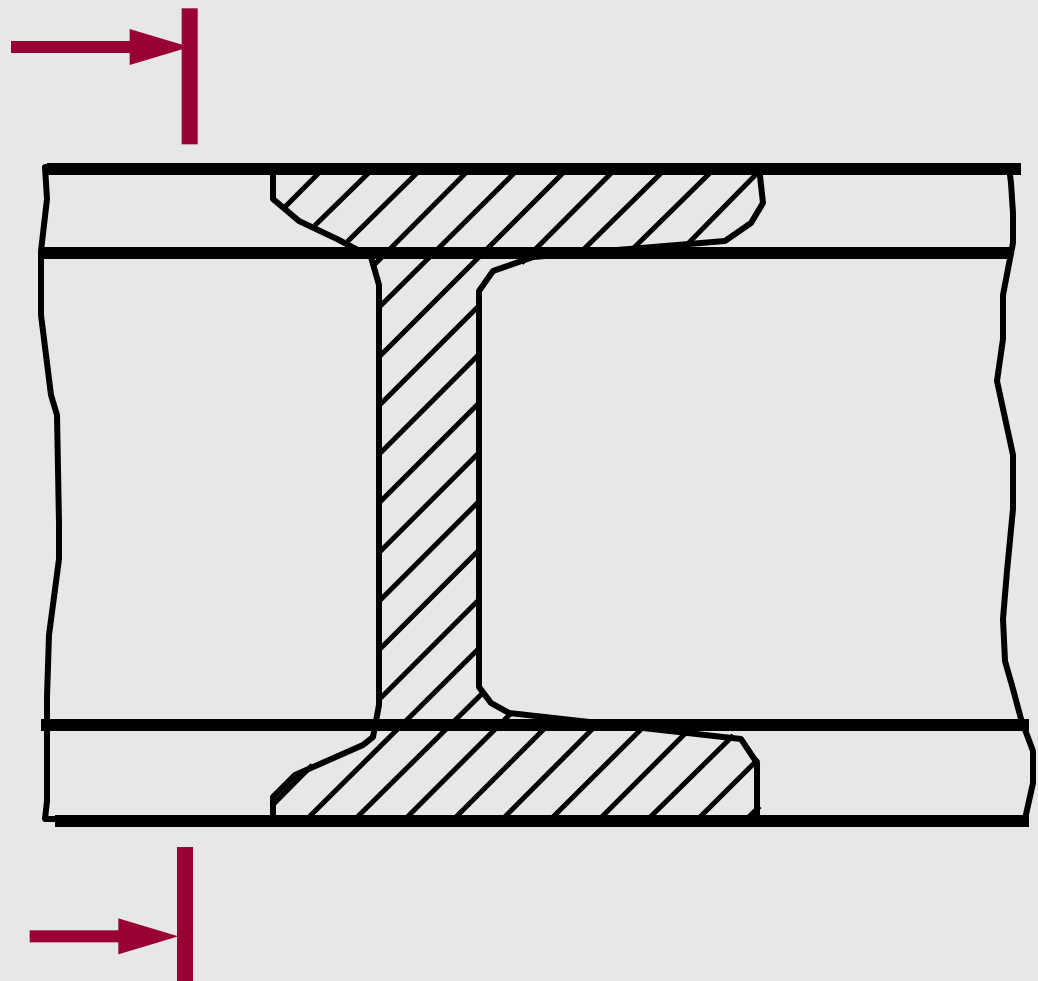




The axis of symmetry of a removed or covering section is denoted with a dash-and-dot thin line without any lettering or arrows, and the section line is not drawn.

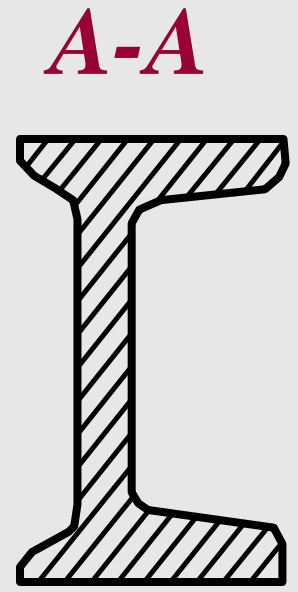
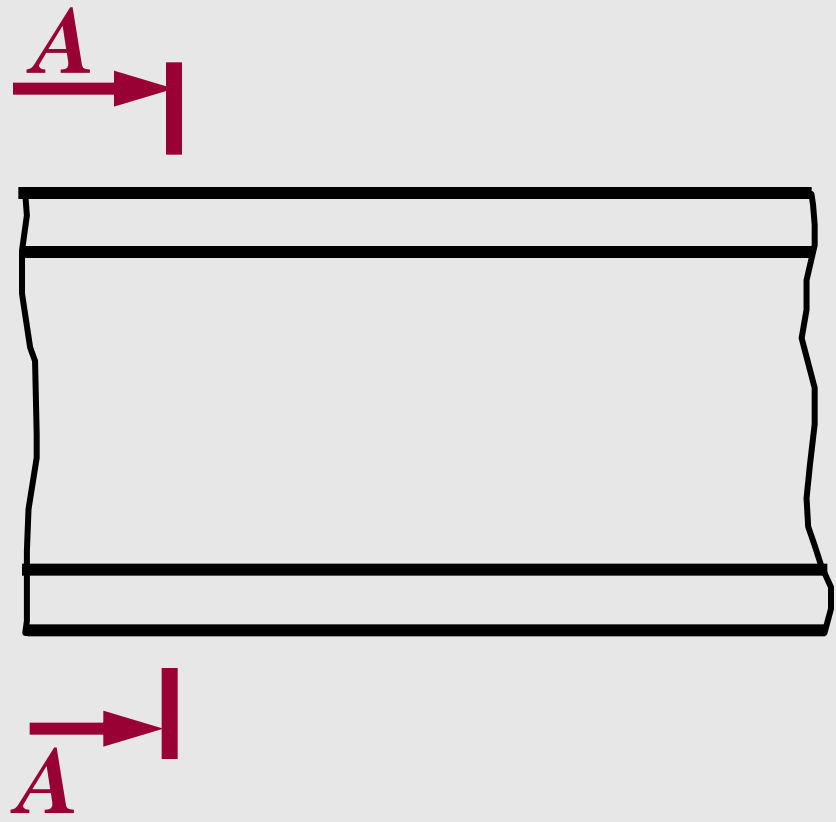


Covering section of the asymmetric sections



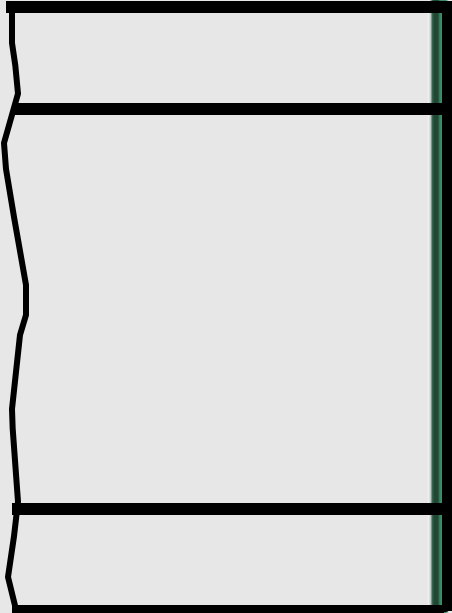
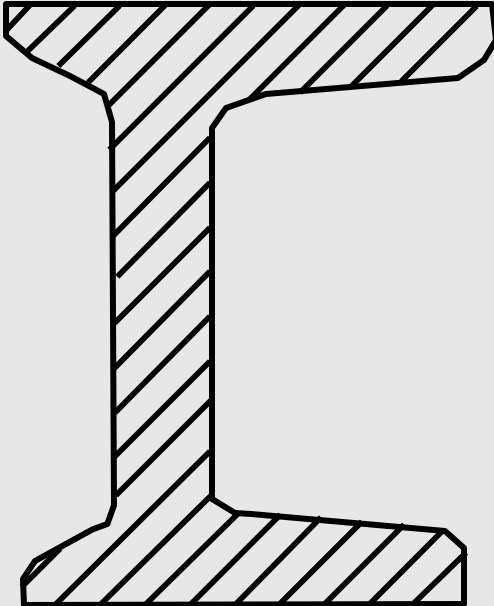
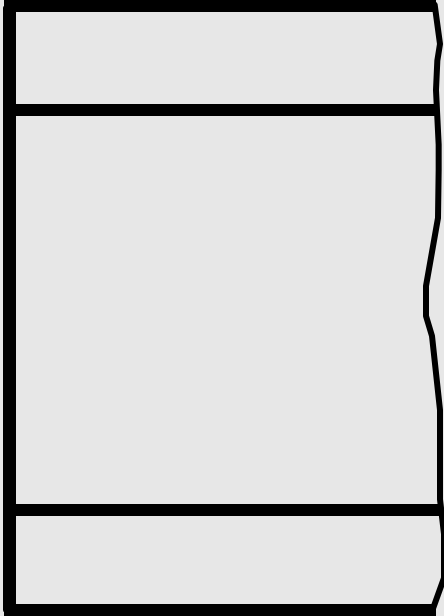


Removed section of the asymmetric sections





The section line of the asymmetric sections located in a break





Extension Elements



An extension element is an auxiliary independent representation (usually enlarged) of a certain part of an object which requires the graphic and other designations to clarify the object form, dimensions and other data.



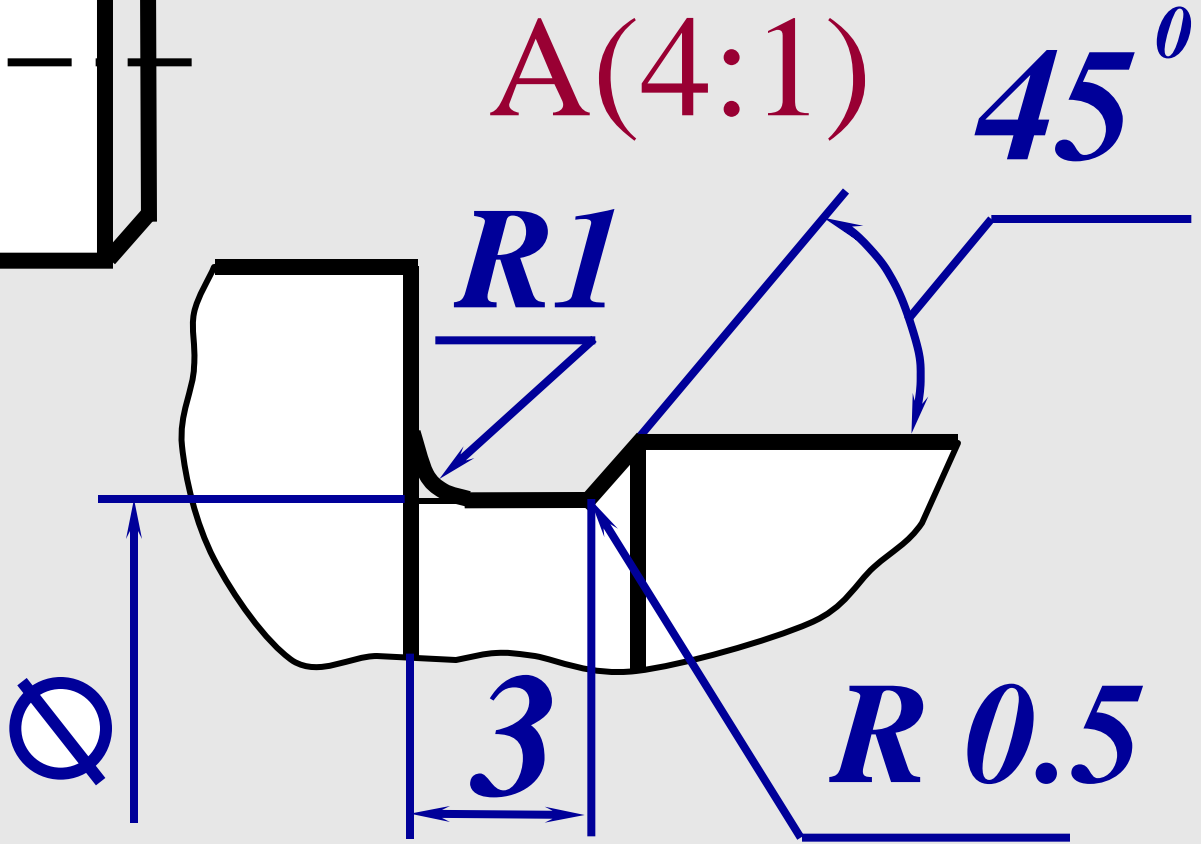
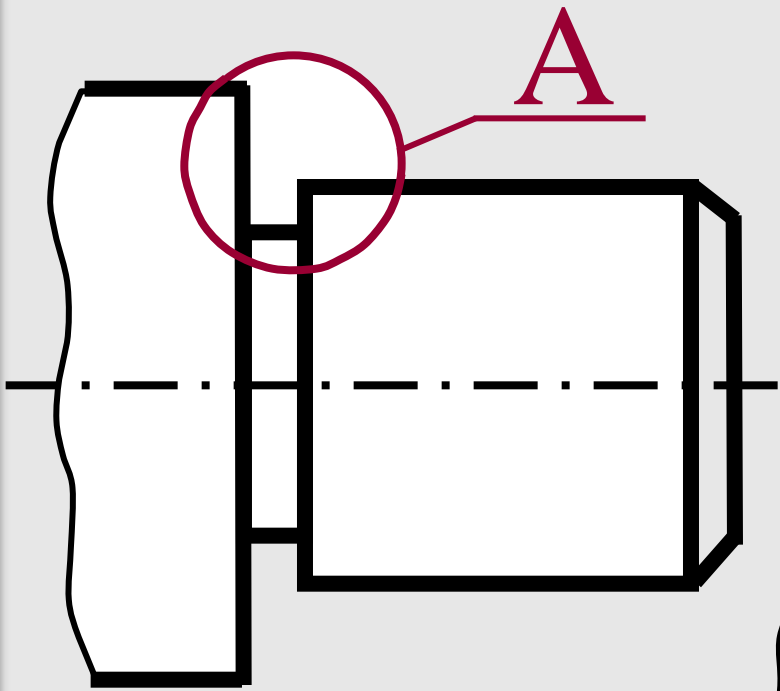
An extension element may include the details not shown on the corresponding representation and may differ from it in contents.

When an extension element is drawn, the corresponding space on a view, sectional view or a section is marked with a closed continuous thin line (a circle, an oval, etc.) with the extension element designation (a capital letter) on an extension line.

The designation and the scale are denoted above the extension element representation

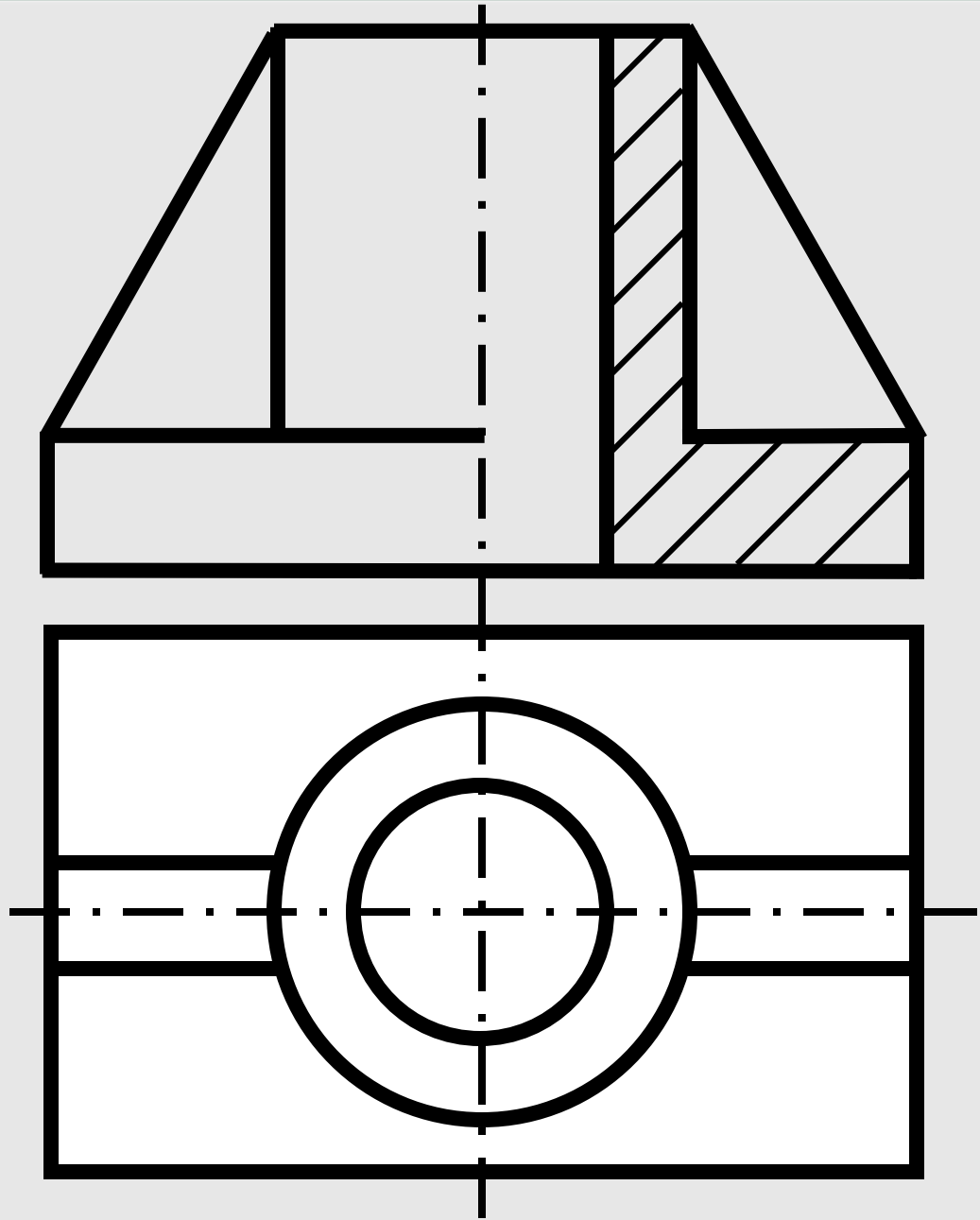


The extension element is usually placed as close as possible to the corresponding part of an object representation.





Conventions and Simplifications





If a view, sectional view or a section represent a symmetric figure, only half of the representation may be drawn, or a bit more than half, but in this case a break line should be passed.



If in constructing a sectional view, you join a half view and a half section, each being a symmetric figure, the axis of symmetry serves as a separating line. The sectional view here should be drawn to the right or below this axis



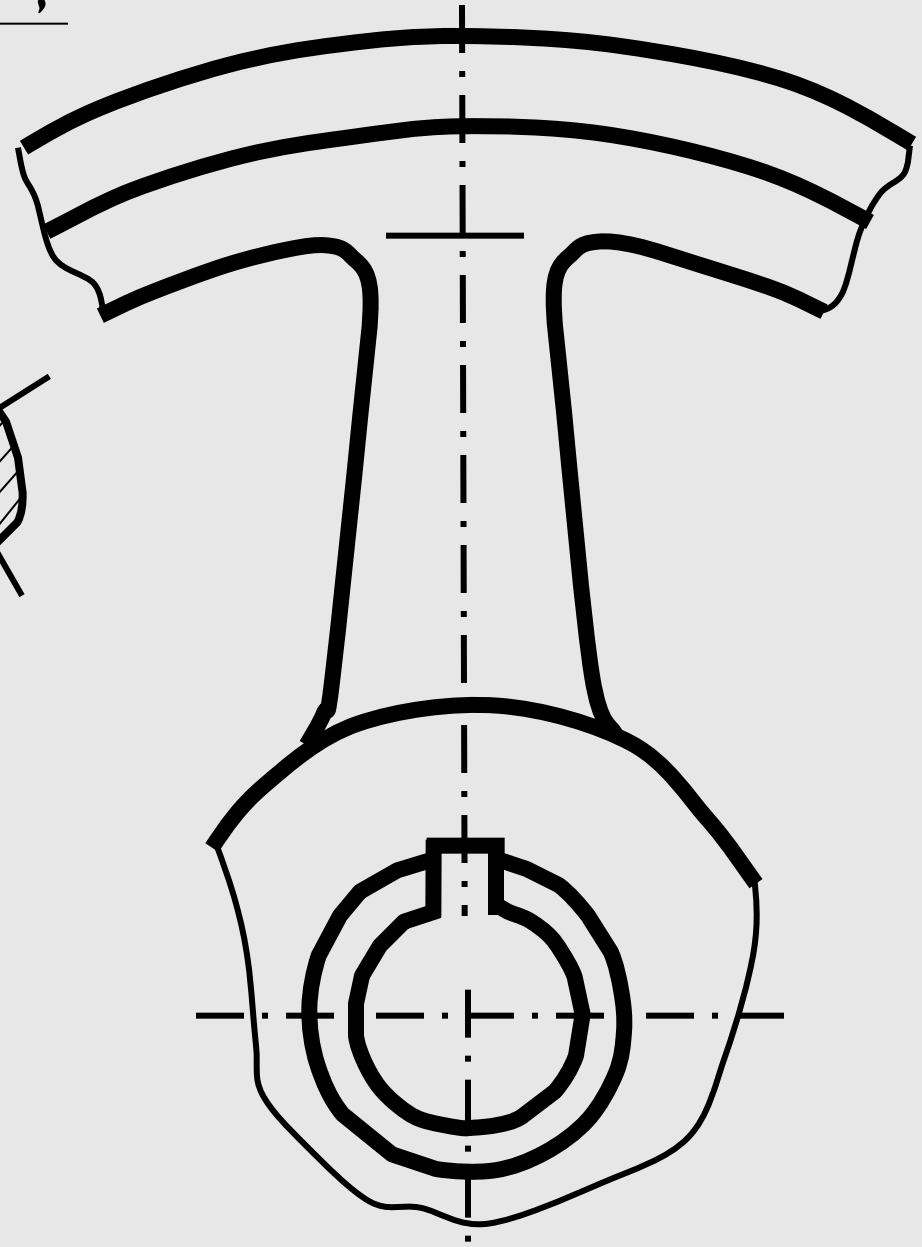
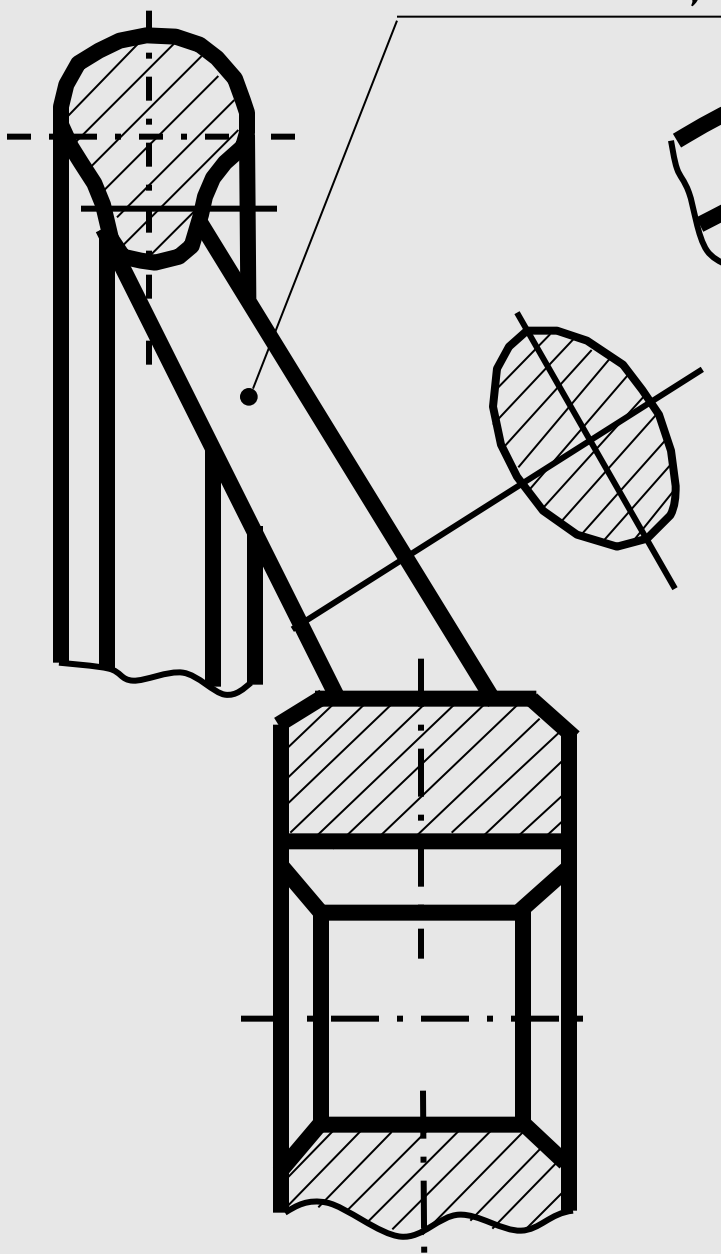
Such elements like spokes of flywheels, pulleys, pinions, thin walls, say, of stiffening ribs, are not hatched if a cutting plane is directed along the axis or long side of the element.



It is also possible to draw a part of an object with the appropriate designation of the number and location of the elements.

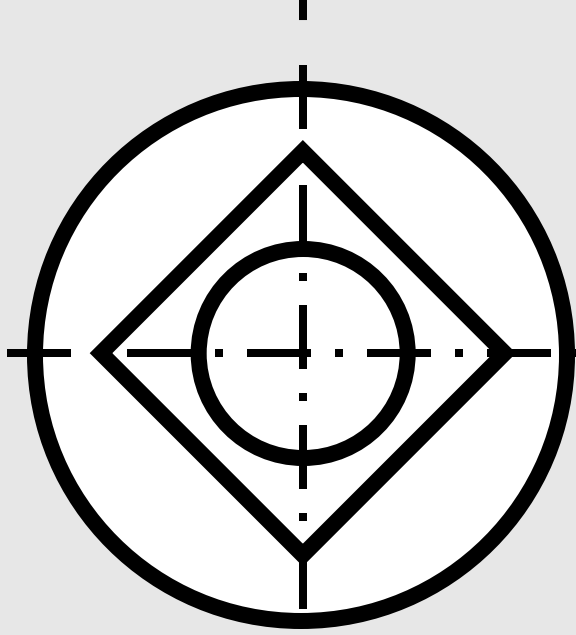
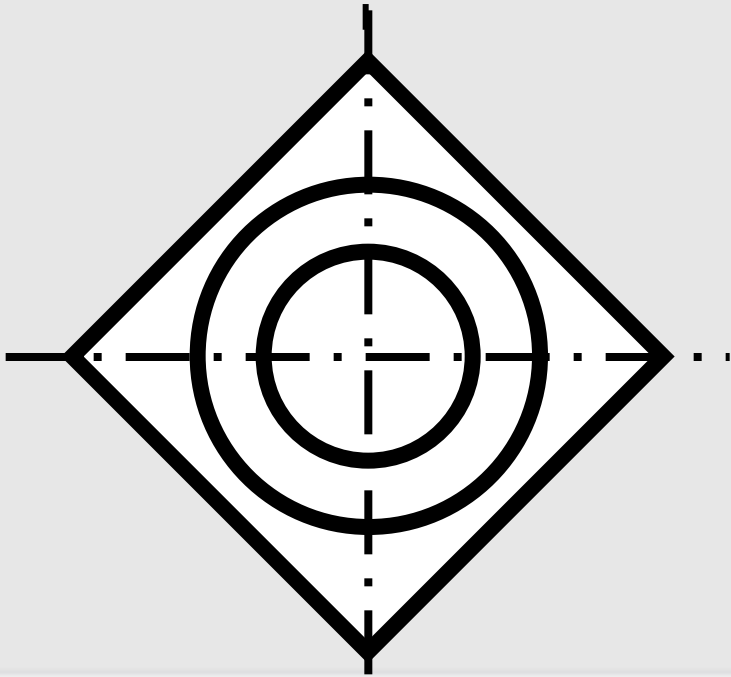
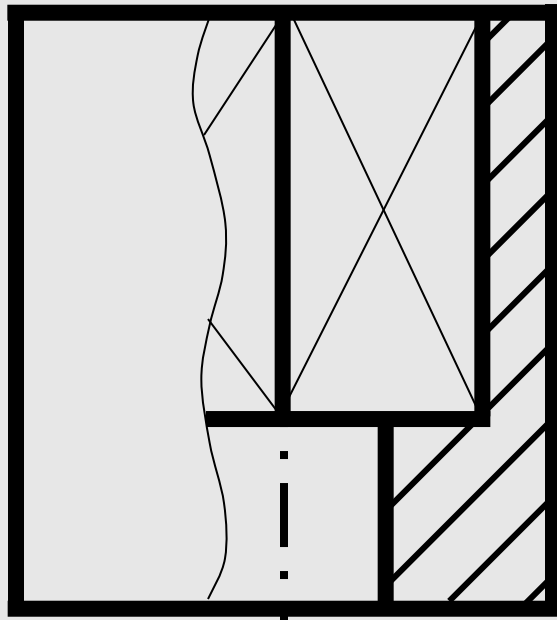
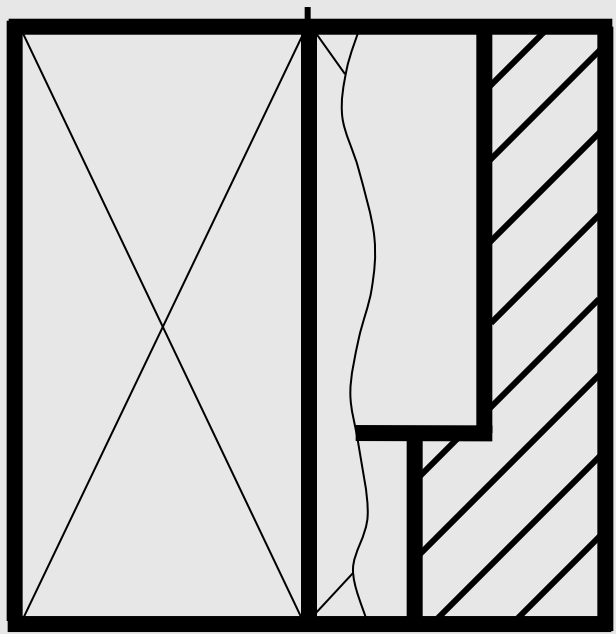


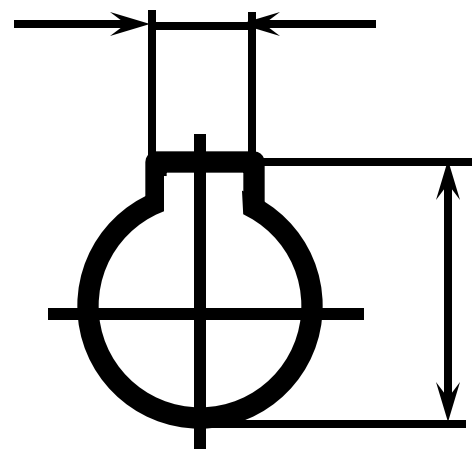
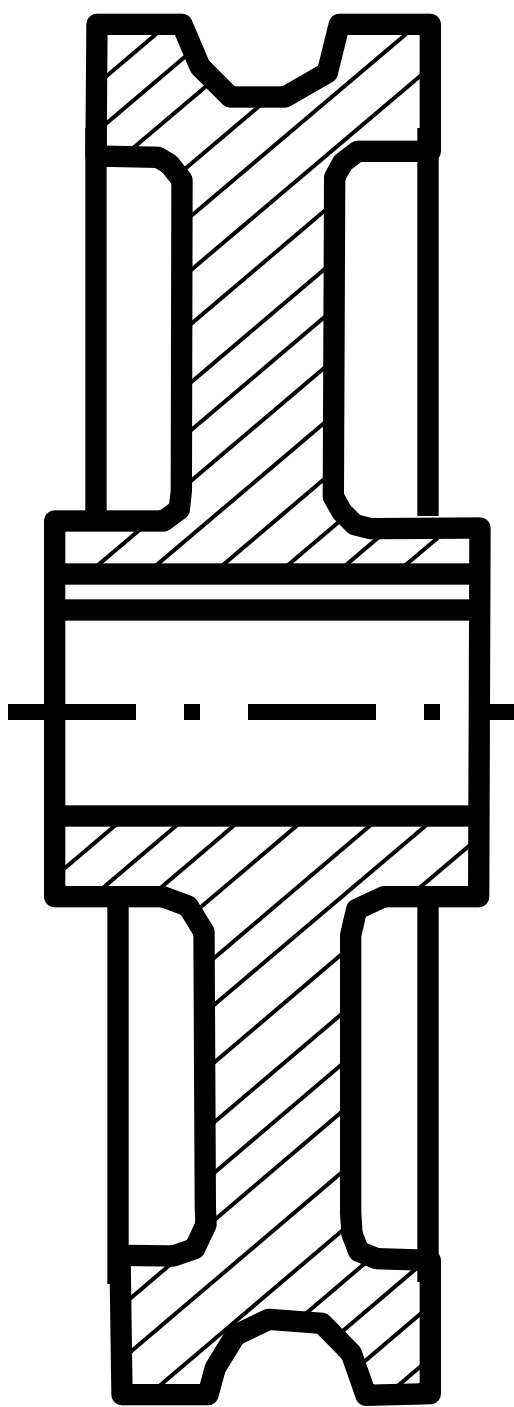
5 снуц





If it is necessary to mark out the plane surfaces of an object on a drawing, draughtsmen pass the diagonals with the continuous thin lines







If an object consists of several similar elements, located evenly, only two or three such elements are represented on a drawing (for example, one or two holes), the rest of the elements are to be shown simplified or conventionally.

