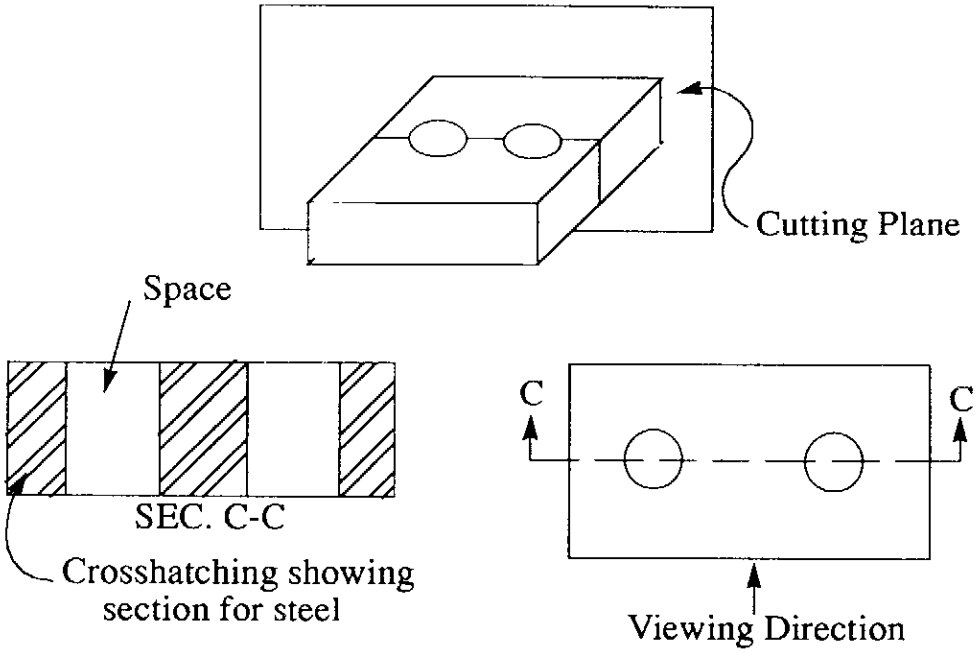
Sectioning

Sectioning is used to show the hidden portions (features) of a complicated part.

Terminology

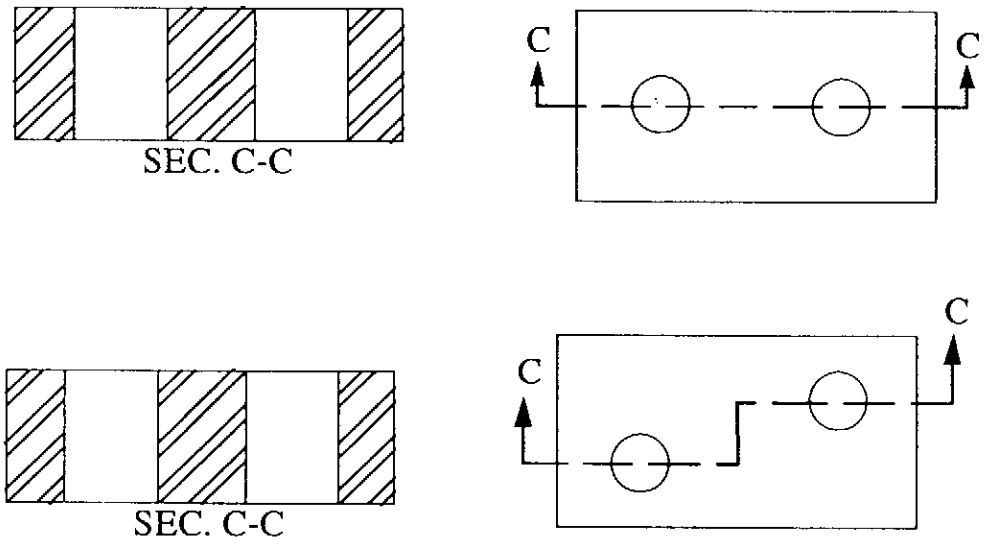


3 Main Types

- Full Sections
- Half Sections
- Revolved Sections

Full Section

- Object is cut fully across from one side to the other

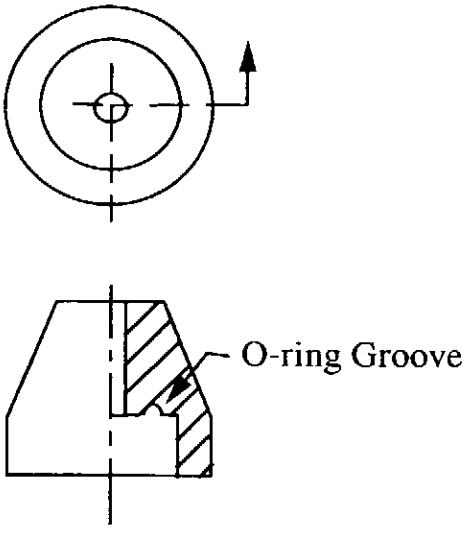


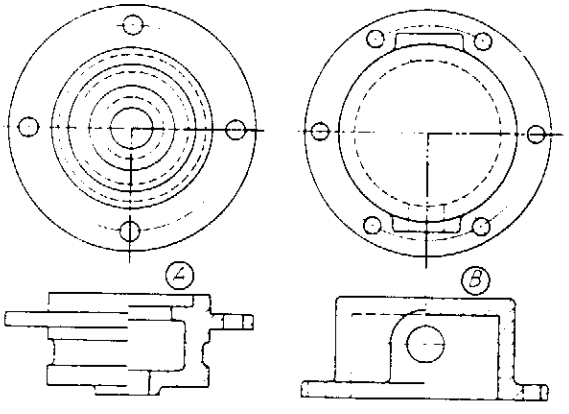
Offset Section

- Cutting plane symbol:
  - Should be DARK & THICK to stand out from drawing
    - Heavy, long dash
    - Long, short, short
  - Should be labeled and resulting section also labeled
- The ℄ may also be used as a cutting plane in which case the is dropped.

Half Section

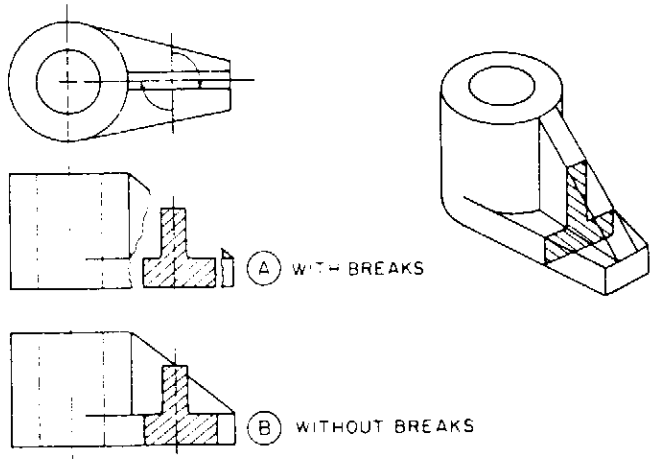
- Used for symmetric objects
- Only half the object is drawn sectioned, other half drawing normally





Revolved Section

- Selected section revolved 90° into the view
  - Can be does either with or without breaks in the object.



- Revolved section can also be placed beside object - Removed section

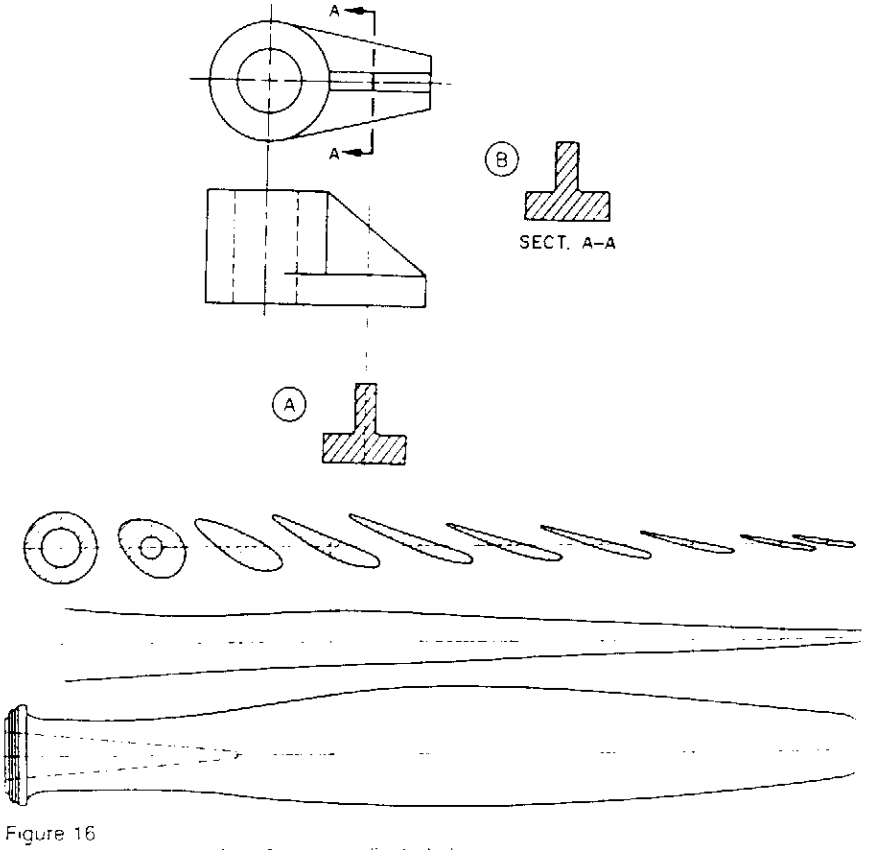


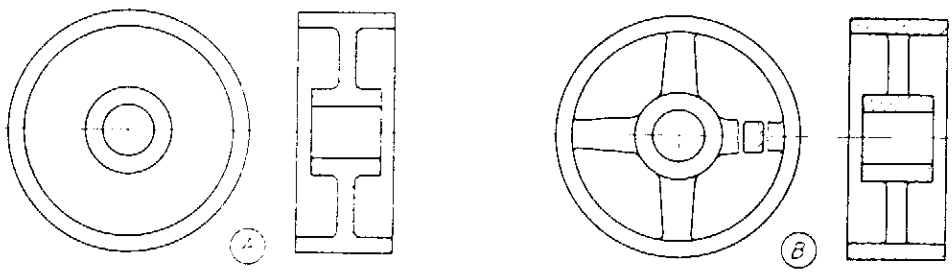
Figure 16
Value of removed sections for a complicated shape.

Sectioning Conventions

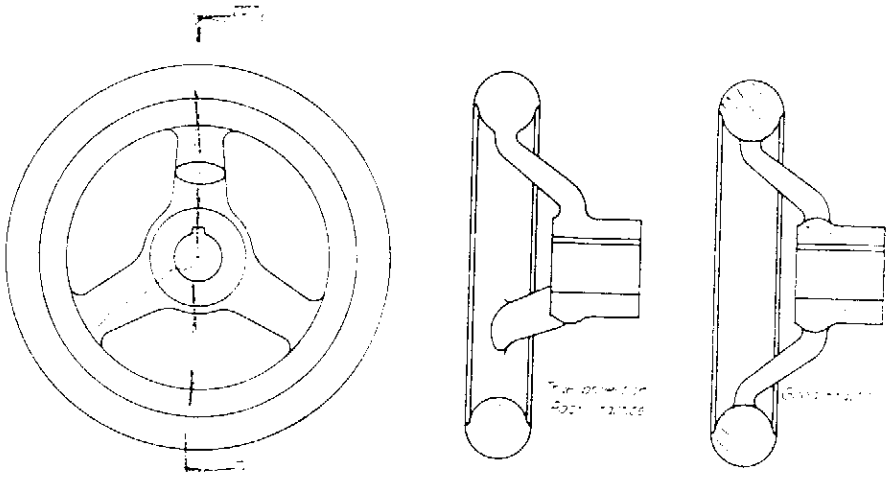
- **CLARITY** is the most important aspect
- allowed some "graphic license" if it improves clarity

i.e.

1. Leave **unsectioned** any feature through which a cutting plane passes if:
   d) The shape of the feature would be lost.
   e) The feature is a **fin**, **spoke**, or other aspect not solid throughout the entire object.
2. Leave **unsectioned** solid objects on the centreline of any assembly parts.

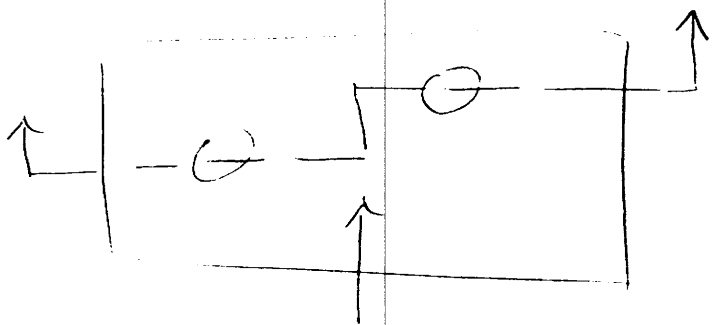


- Can change an object's alignment to improved clarity

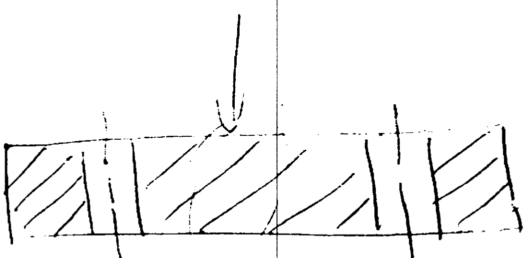


Exercises: 39 & 40

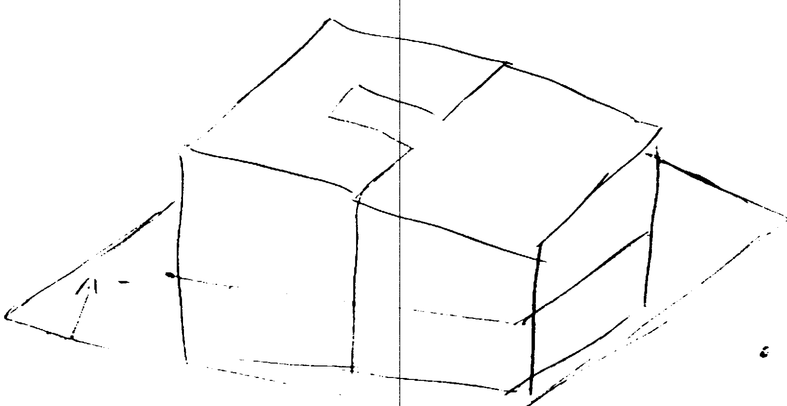
OFFSET CUTTING PLANE.



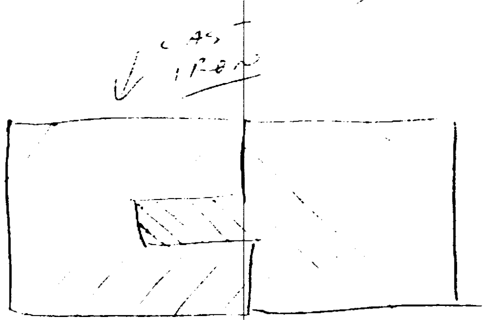
• LINE CREATED BY OFFSET
<u>NOT</u> DRAWN



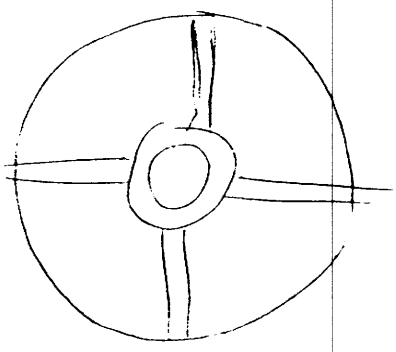
WHAT IF MORE THAN ONE PIECE CUT ~~PIECES TOUCH~~ IN SECTION VIEW.

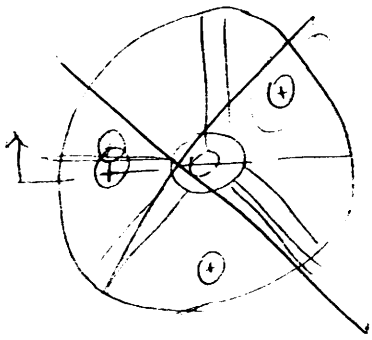


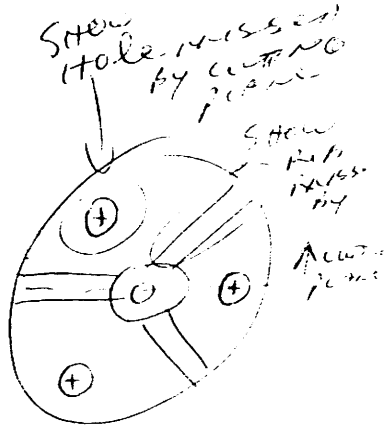
TYPES
• MANY SECTIONING SYMBOLS DEPENDING ON THE MATERIAL (NOT COVERED)

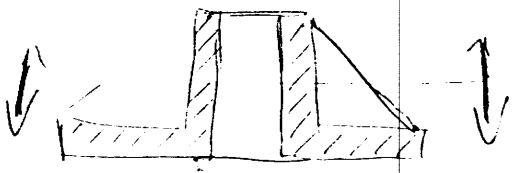


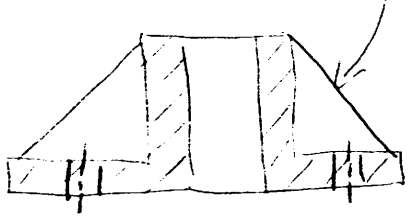
RIBS / FINS.





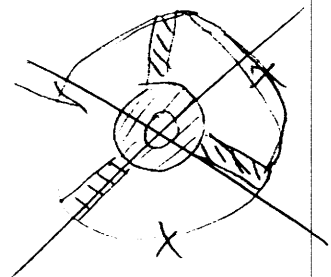


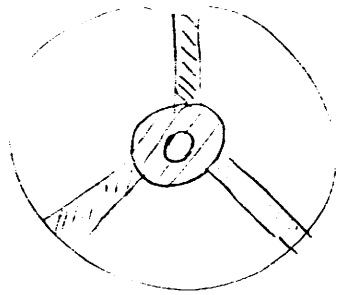




- RIB/FIN ROTATED TO MAKE FEATURE SYMMETRIC.

Only SECTION RIB/FIN IF CUTTING PLANE PASSES ⊥ THROUGH FIN.



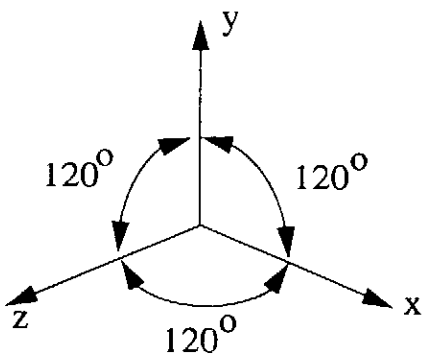


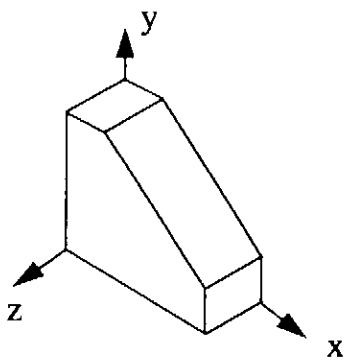
3-D Viewing Formats

There are **3** basic classes of 3D drawing formats we are concerned with:

1. **Isometric** - (subset of axonometric pp. 77-81)
2. **Oblique** - 2 types
   - cabinet
   - cavalier
3. **Perspective** - 3 types
   - 1 point
   - 2 point
   - 3 point (rarely used)

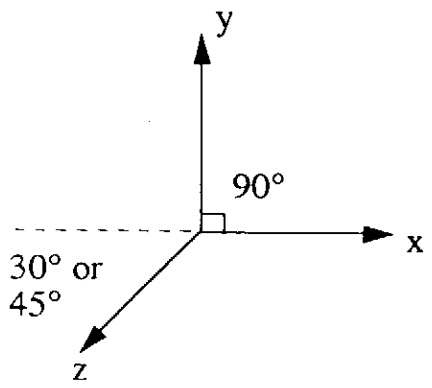
1. Isometric

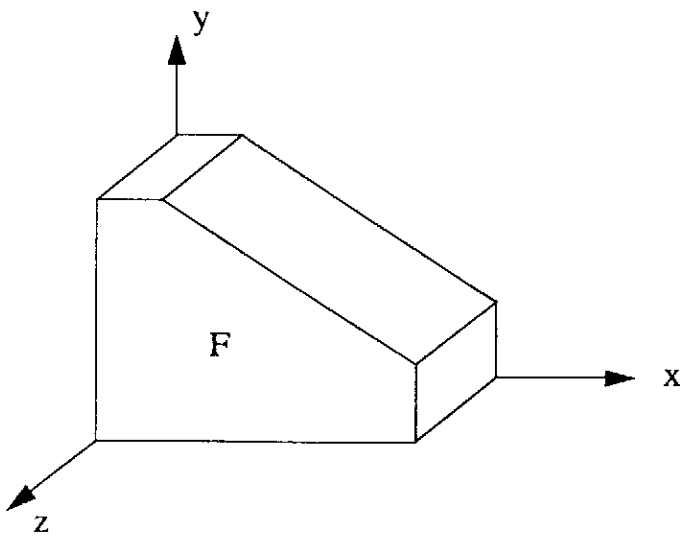




- all 3 axes are separated by 120°
- convenient - since the axes are easy to lay out
- subset of axonometric (trimetric, dimetric, and isometric)
- disadvantage - features are **not** true shape

2. Oblique





- y and x axes are separated by 90°
- z axis is separated from x-axis by 30° or 45°
- advantage - object faces are **true shape** (e.g. F)
- disadvantage - z-axis portion can look distorted (too long)
  - solution - use half scale on z-axis (**cabinet**)

(If z-axis is full scale then drawing is termed **cavalier** oblique)

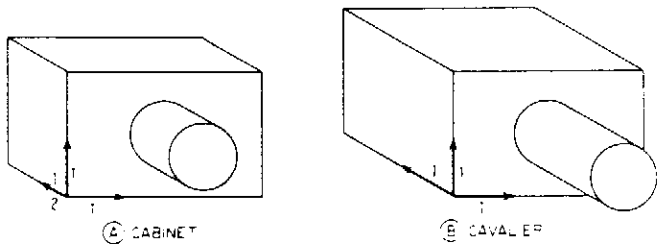
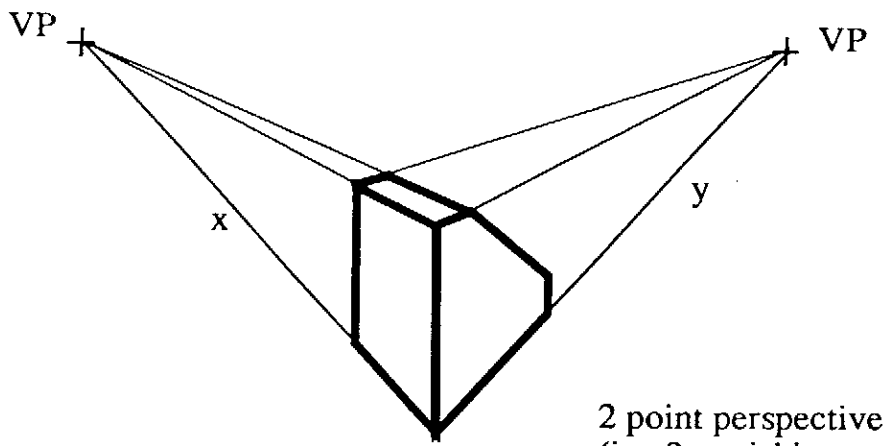


Figure 6
Obliques: cabinet vs. cavalier.

- Object generally placed so that longest side is along x-axis.
- 1/2 scaling on z-axis is then used to reduce distortion effects.

3. Perspective

In reality, object lines appear to converge to a point in the distance (termed vanishing point (VP)).



2 point perspective
(i.e. 2 vanishing points)

- used mainly by architects, artists, landscape architects, etc.

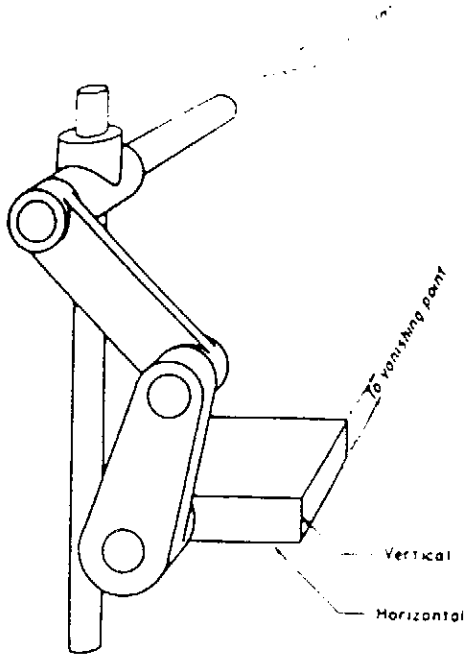


Fig. 17-56. A one-point perspective. (Courtesy of ANSI: Y14.4-1957.)

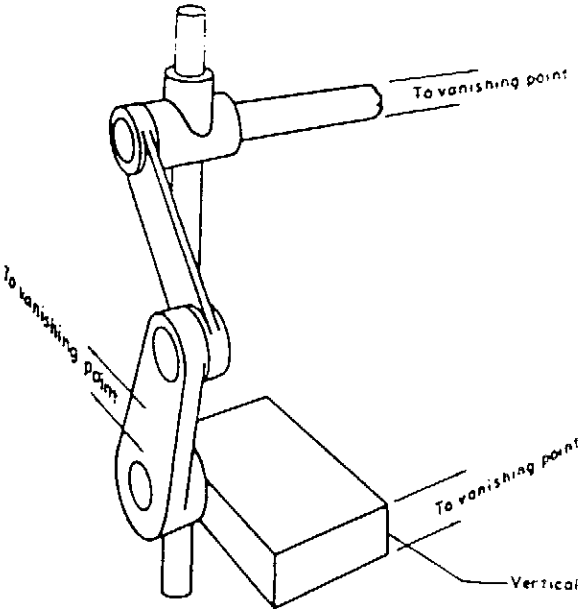


Fig. 17-58. A two-point perspective. (Courtesy of ANSI: Y14.4-1957.)

Exercises: #29, #19