

Trade of Metal Fabrication	
Module 6:	Fabrication Drawing
Unit 9:	Details and Assemblies
	Phase 2

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Document Release History

Date	Version	Comments
21/02/07	First draft	
12/12/13	SOLAS transfer	

Module 6 – Fabrication Drawing

Unit 9 – Details and Assemblies

Duration – 3 Hours

Learning Outcome:

By the end of this unit each apprentice will be able to:

- Read, interpret drawing, construct and dimension R.H.S. riveted corner joint

Key Learning Points:

Rk Sk	Drawing – typical scale used. (For more information see Module 6 Unit 3).
Rk Sk	Assemblies.
Rk Sk	Construction of light sheet bracket.
P	Neatness, presentation of drawing exercises.

Training Resources:

- Classroom with full set of drawing equipment, instruments and paper

Key Learning Points Code:

M = Maths **D** = Drawing **RK** = Related Knowledge **Sc** = Science
P = Personal Skills **Sk** = Skill **H** = Hazards

Assemblies

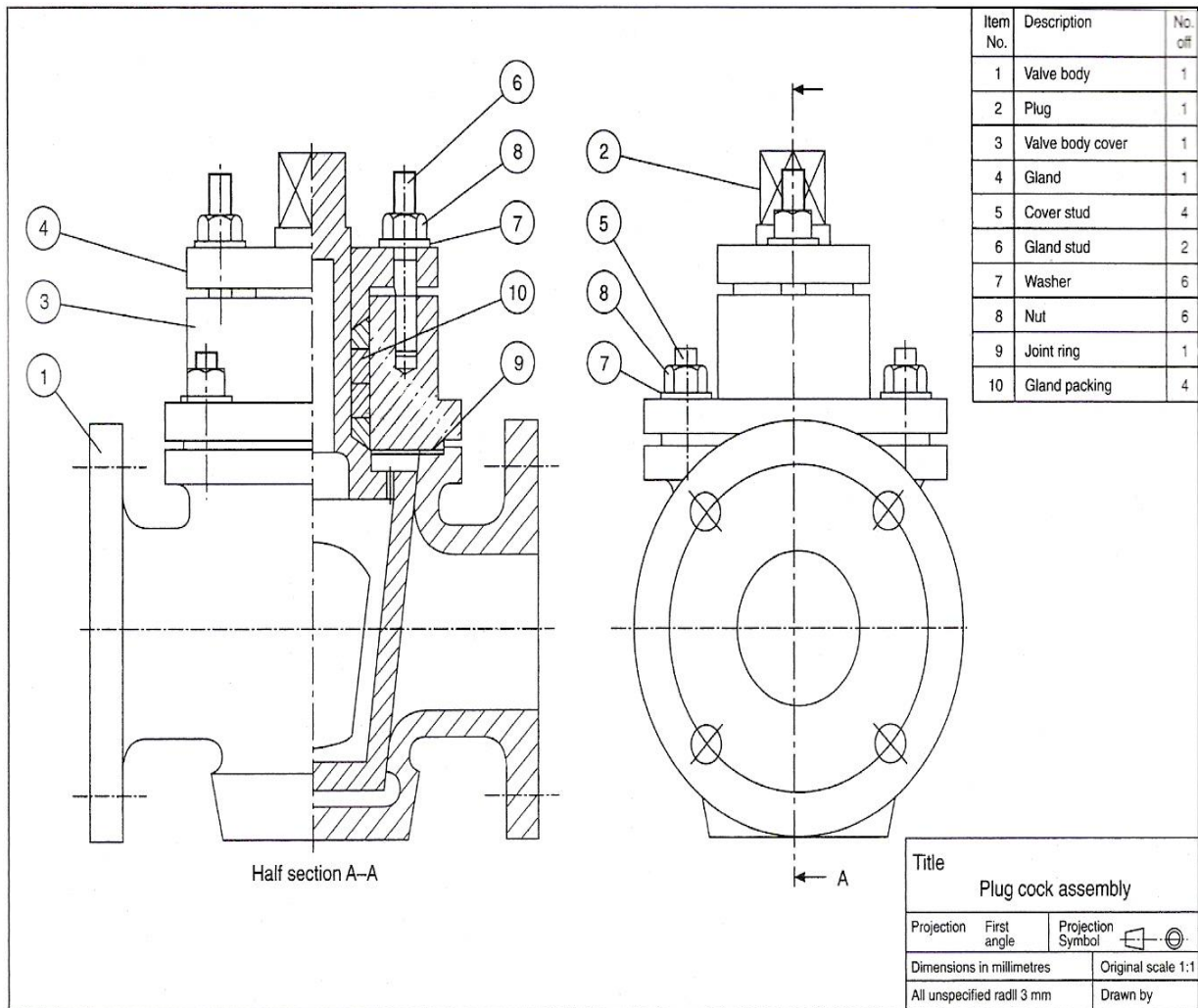


Figure 1 - Plug Cock Assembly

This example illustrates a typical industrial valve. The plug turns through 90° between the on and off positions. Spanner flats are provided and indicated by the diagonal lines. Gland packing (Part 10) is supplied in rings. These rings are contained by the body cover and on assembly are fed over the plug spindle. The gland is tightened and the compressive force squeezes the packing to provide a seal, sufficient to prevent leaks, but enabling the spindle to be turned. The joint ring (Part 9) is too thin to be crosshatched and is shown filled in.

This is also an example of a symmetrical part where the half section gives an outside view and a sectional view to indicate the internal details.

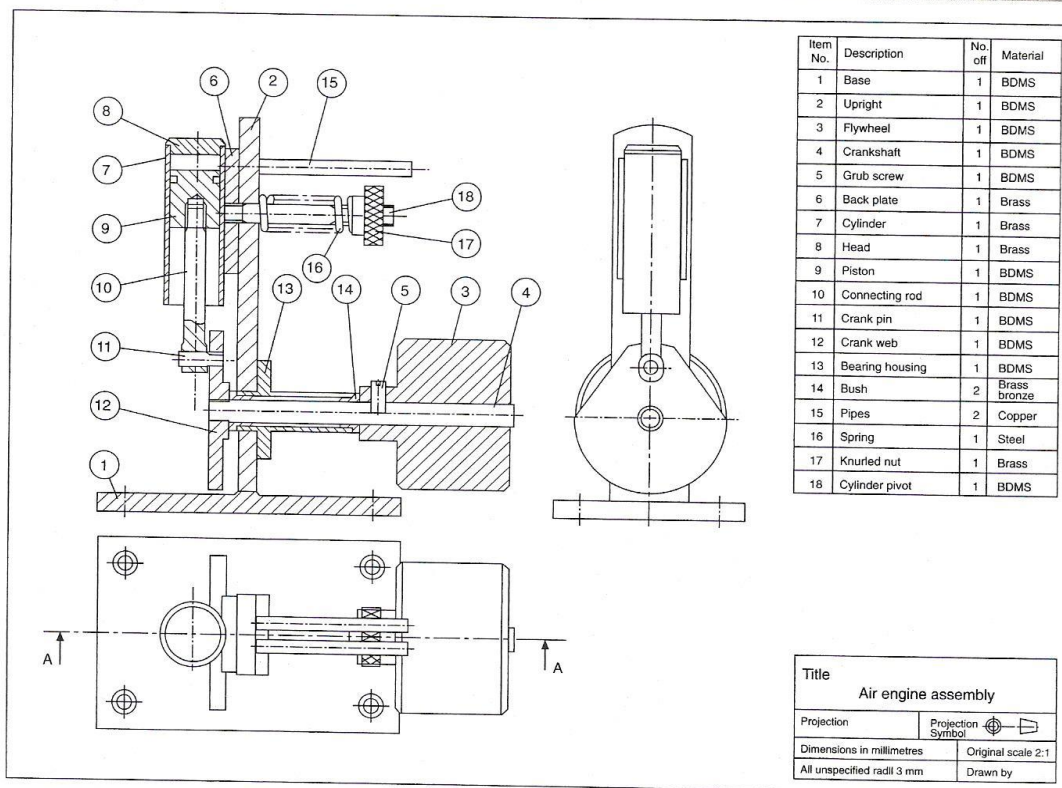
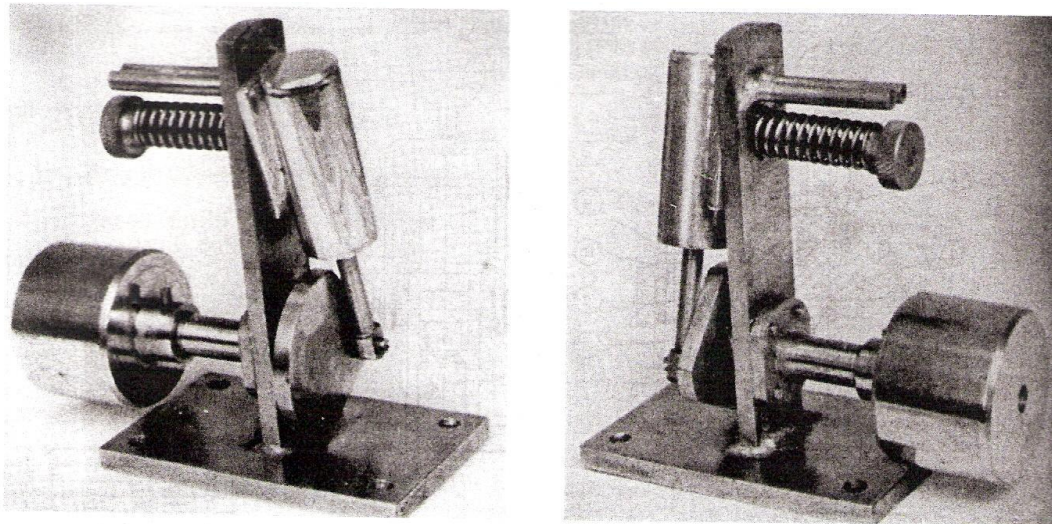


Figure 2 - Air Engine Assembly

The engine operates through compressed air entering the cylinder through one of the connecting pipes shown as item 15. The other pipe serves to exhaust the cylinder after the power stroke. The cylinder oscillates in an arc and a hole through the cylinder wall lines up with the inlet and exhaust pipes at each 180° of rotation of the flywheel.

The spindles (Parts 4 and 18) grub screw (Part 5) and the pin (Part 11) would not normally be sectioned. A part section is illustrated at the bottom of the connecting rod in order to show its assembly with the crank pin (Part 11). The BS convention is shown for the spring (Part 16). The BS convention is also shown for cross knurling on the nut (Part 17).

Sheet Metalwork Application

The design of components to be manufactured from folded sheet metal is a field in which CAD systems can offer great assistance.

In the case of the bracket shown in Figure 3 it would first be necessary to establish the overall dimensions of the part.

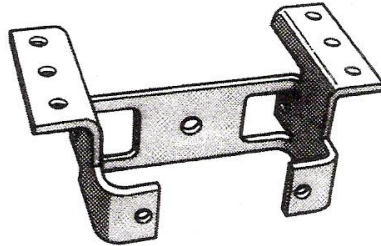


Figure 3 - Bracket

The second step would be to imagine that the bracket is folded back gradually as indicated in Figure 4 into the flat sheet form. This shape would then be stamped from metal strip in a power press.

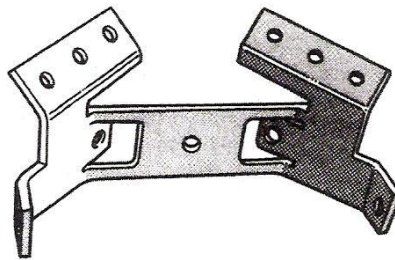


Figure 4 - Folded Back Bracket

The dimensions of the flat pattern have to make allowance for the bend radius, the metal thickness and the type of metal used. Metals behave quite differently when bent and the CAD system can be programmed to calculate an appropriate bend allowance. After stamping the bracket can be refolded with suitably radiused bends.

In this particular case the dimensions of the stamping are also needed for the design of the press tool set.

The design can be checked for material accuracy, weight, volume, and so on, before being committed to manufacture.

Computerised programs can be produced to operate lathes, mills, flame cutting machines, etc. and many other items of equipment in the manufacturing process.

Models may be constructed in several different ways, including: geometric modelling, meshed surfaces, sweeps, volumes of revolution and ruled surfaces. Each of these is summarised below.

Self Assessment

Questions on Background Notes – Module 6.Unit 9

No Suggested Questions and Answers.

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