Experiment No. 1a

Study of hydro-copying attachment in lathe

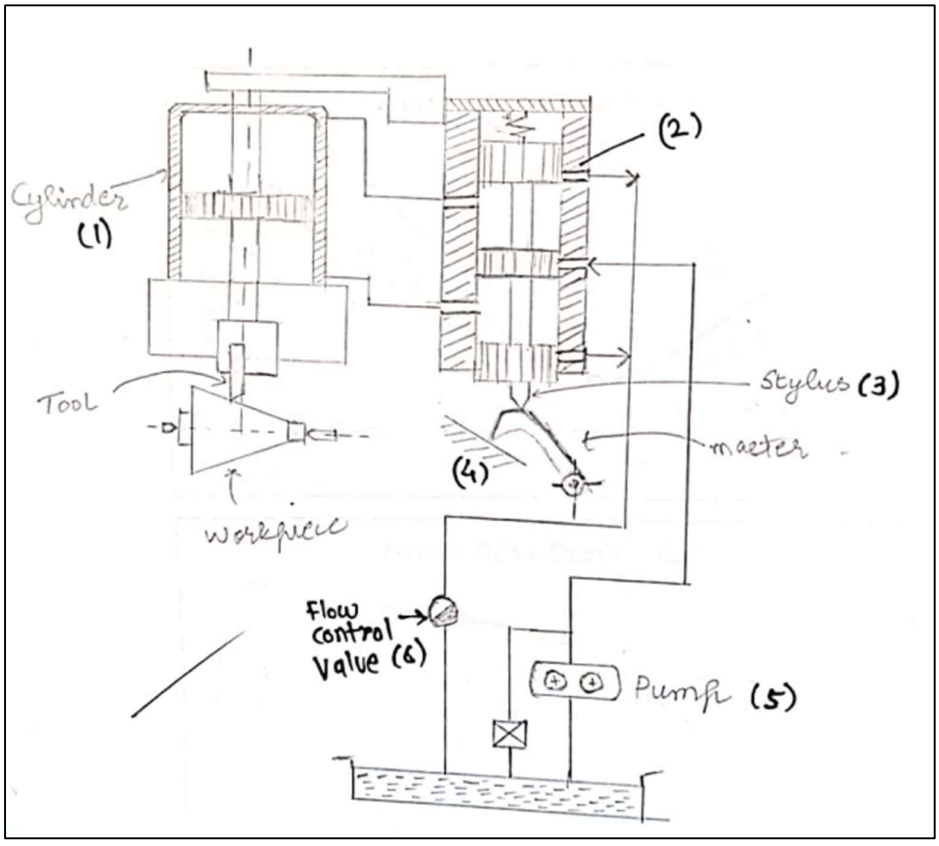
Aim :

I. Study of principle and elements of hydro-copying attachment.
II. To conduct test by turning profile from the master.

Introduction :

Hydro-copying attachment is a very cost effective solution to increase productivity of manually operated lathe to produce a variety of components in small and medium batches. The only requirement is aster, which will be copied by the actual tool and generate profile on the workpiece in the setup installed in the laboratory, feed is given by the conventional lead screw and nut arrangement. In certain case, hydro-copying attachment also control feed of the machine hydraulically.

Working :



Hydraulic circuit for hydro copying attachment

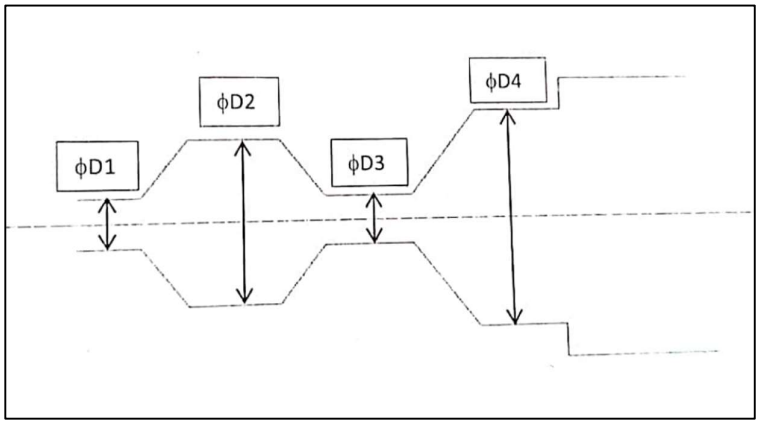
Stylus 3 of tracer 2, in contact with template 4, shifts the valve spool in the direction which corresponds to the rise or fall of the template profile. This admits oil delivered by pump 5 to one end of cross slide cylinder 1 which travels in the direction determined by the rise or fall of

the template profile. The oil forced out of the other end of the cylinder drains flow-control valve 6 to the tank. Since, the housing of the trace is rigidly linked to the cross slide, the slide will continue to travel until the passage between the valve spool and housing is closed by the motion of the side (and valve housing). This shuts off oil flow to corresponding end of the cylinder 1. Thus, the slide reproduces the motion of stylus tip.

Specification :

1. Stroke of hydraulic cylinder : 65 mm
2. Effective radial stroke with slide at 60° to the lathe axis : 55 mm
3. Min. centre height above cross slide & tool facing downwards : 70 mm
4. Min. centre height of cross slide & tool facing upwards : 90 mm
5. Working pressure of oil : 20 kg/cm^2

Procedure :



Profile of the workpiece

In the experimental part, trial has to be conducted to asssess performance of the hydro-copying attachment.

1. Measure initial diameters at four different locations on the workpiece say, D1, D2, D3 and D4.
2. Perform turning operation with depth of cut of "d" mm.
3. Measure the diameters again.
4. Calculate the error, if any.
5. Repeat the turning cycle twice for different depth of cuts in each cycle.
6. Comment on the results obtained.

Results :

1. Tabulate the dimensional measurements of the component.
2. Plot the error vs. depth of cut (0.1, 0.2 & 0.3 mm) at different speeds (420 rpm & 840 rpm)
3. Give your conclusions based on the results.