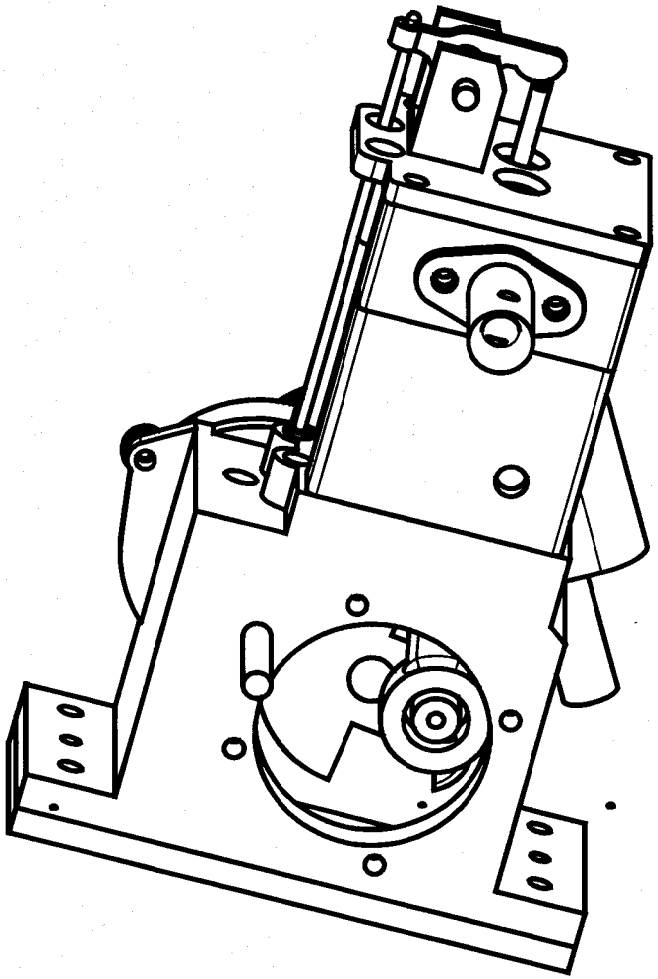
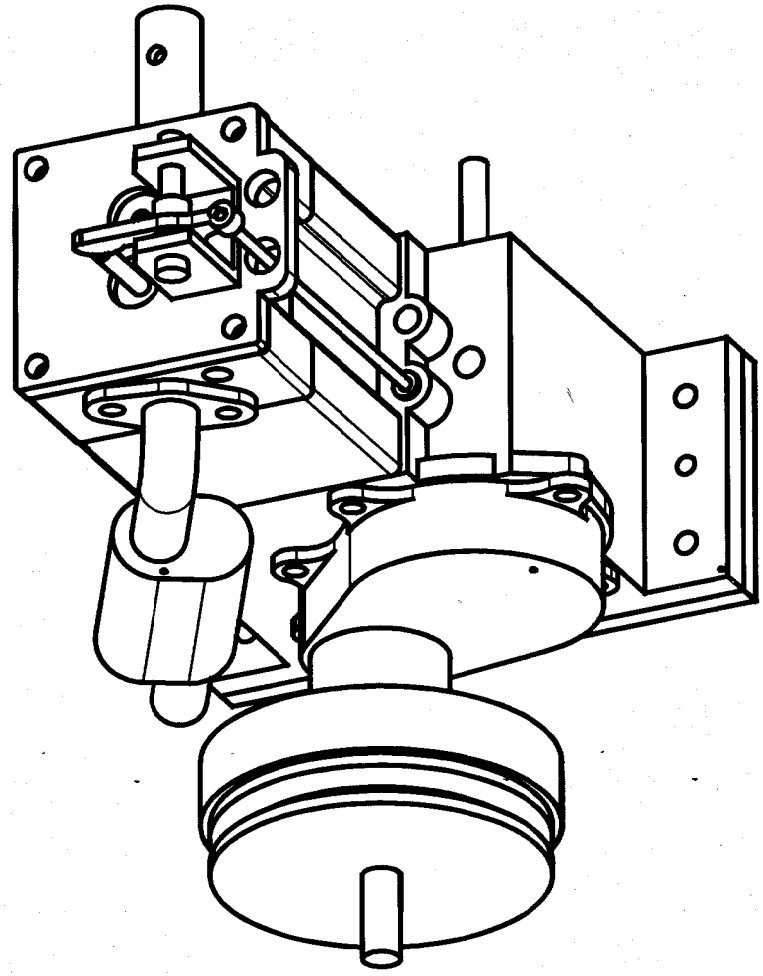
"SIMPLE SIMON"





A 25cc overhead valve water cooled
or water/aircooled fourstroke engine
designed for school construction.

Designed by G.Punter. Bundaberg. 2013 C

SIMPLE SIMON

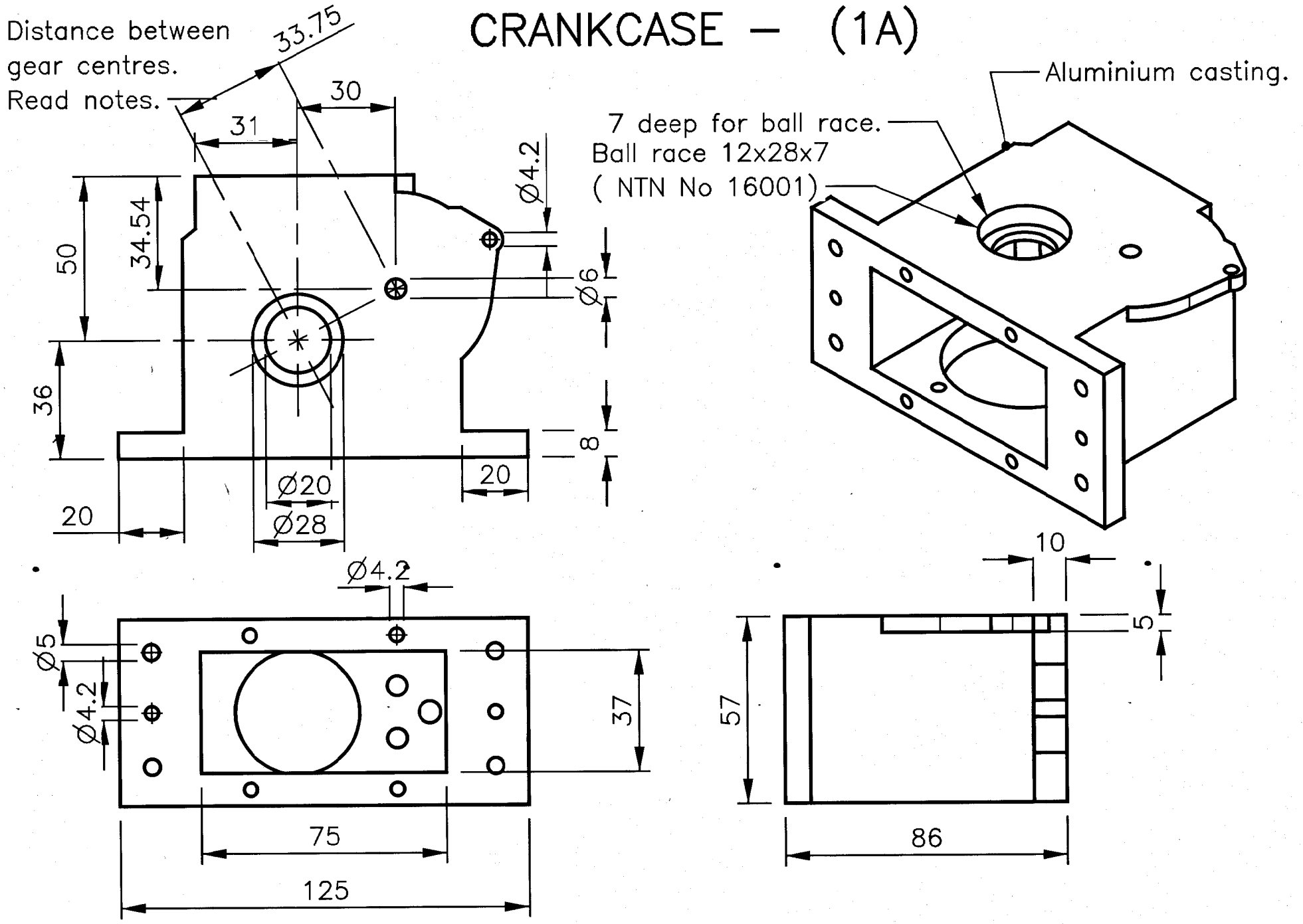
Simple Simon was originally designed in 1984 as an engine that could be made by students at high school. It is not a high performance engine but has been designed so that students can make the parts and have a good understanding of how an engine works. The engine has a bore of 32 mm and a stroke of 30 mm giving a capacity of 25 cc. It has over head valves with only the exhaust being operated by a cam. The inlet valve is automatically opened when the piston descends and creates a vacuum in the cylinder. The lubrication is by splash with the dipper on the connecting rod dipping into the oil in the sump and splashing it onto other moving parts. Ignition is by battery and coil and uses lawn mower points to activate the system. This engine was designed to be water cooled but it has also been designed to have and air cooled head and water cooled cylinder. Other options that should be considered before starting the construction are the use of Honda valves (as used on small Honda Whipper Snippers). These can be purchased from a local dealer and will save time if that is a consideration. The ball and needle roller bearings used can be purchased from a bearing shop and the numbers have been given. The gears are Module 1.5 and care should be taken when machining the blanks to the correct sizes.

Great care should be taken at all times and the quality of the surface finish is important. Treat each part as the "model" that you are working on and remember "she will do" will not do! Work hard and keep focused. *It is said that small things make perfection but perfection is no small thing.*

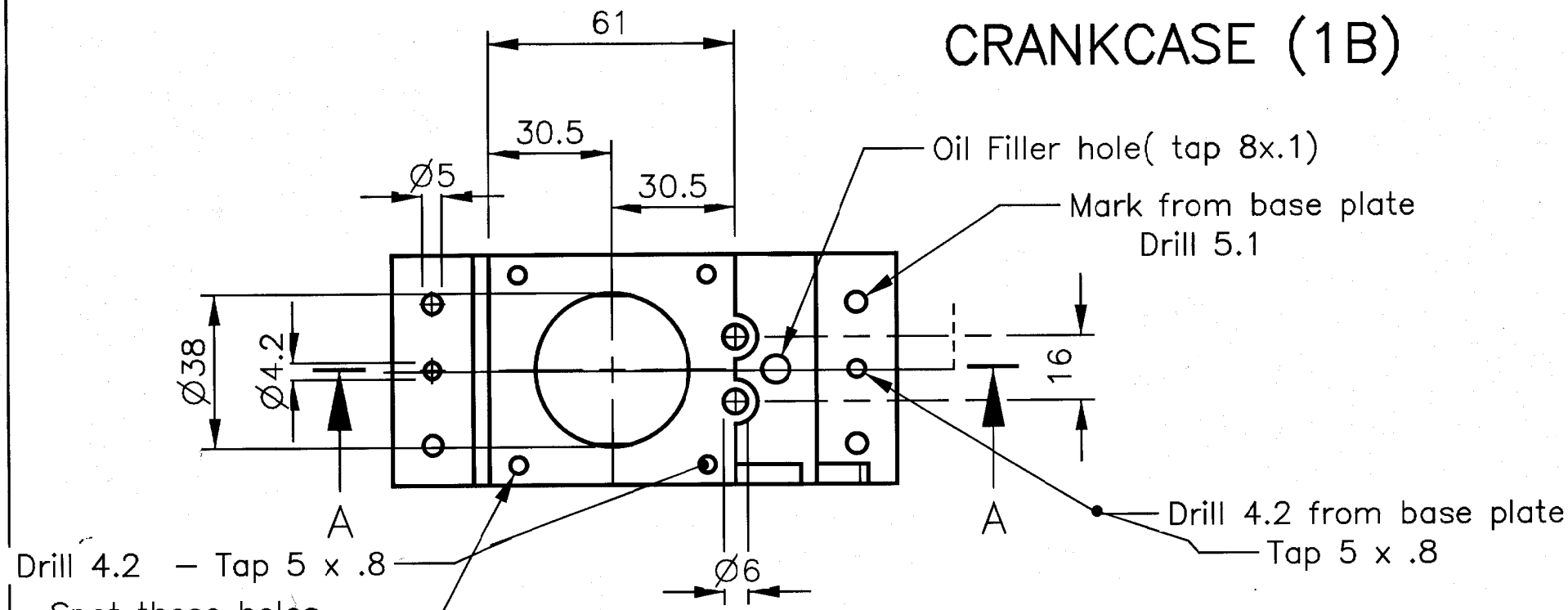
George Punter.

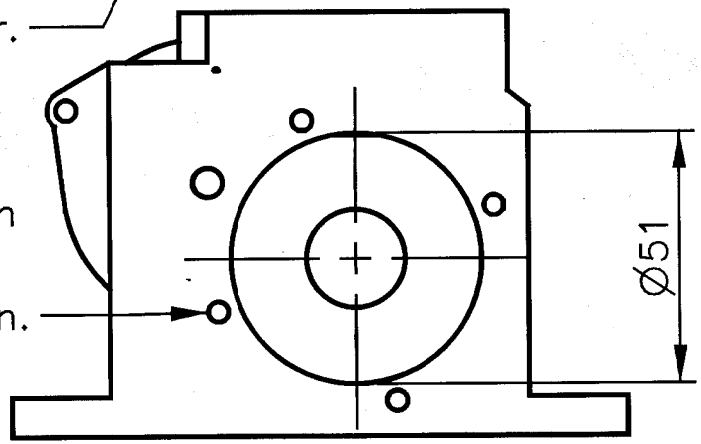
Bundaberg.

CRANKCASE – (1A)

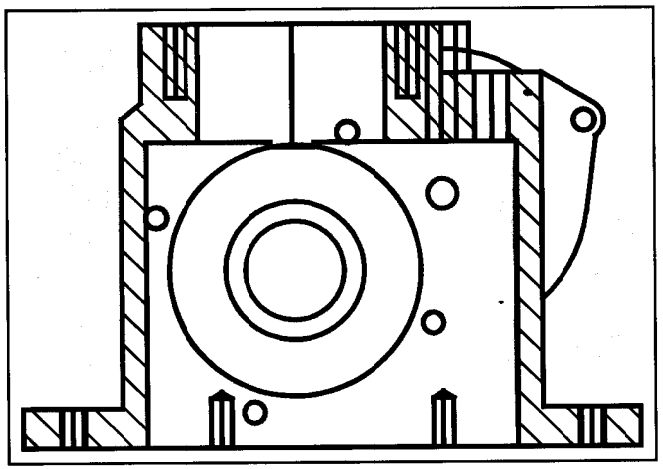


CRANKCASE (1B)



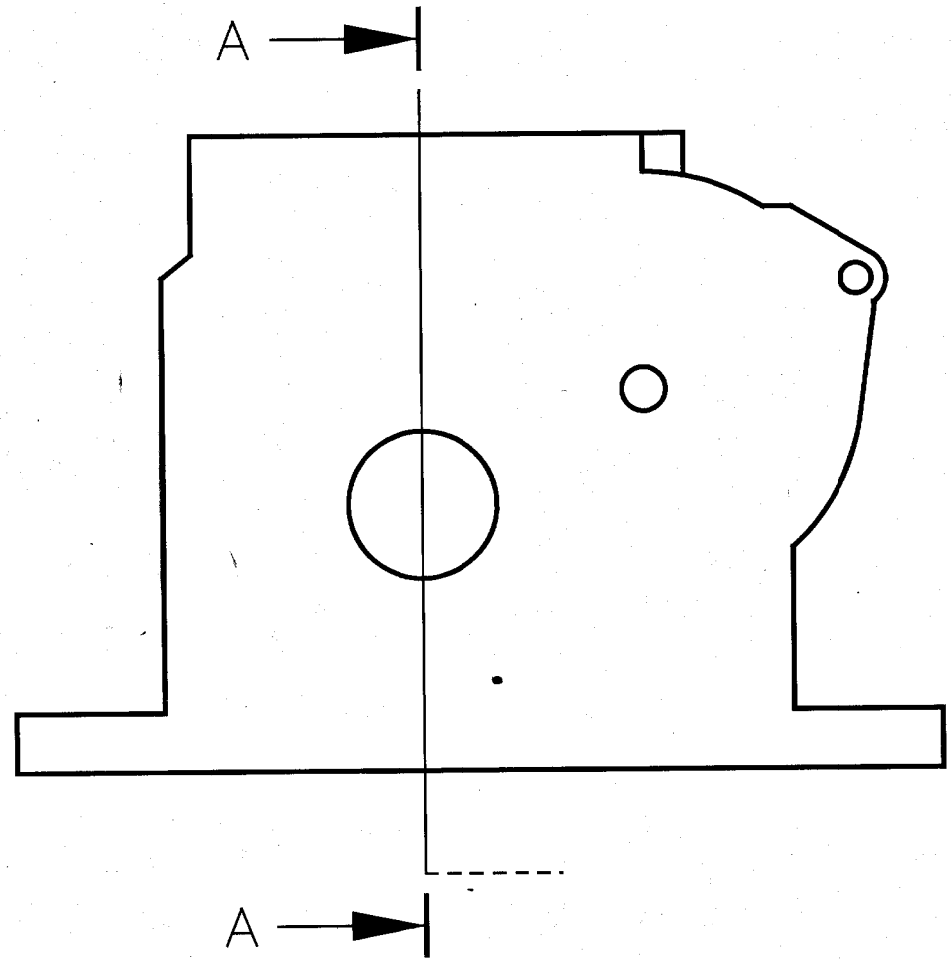


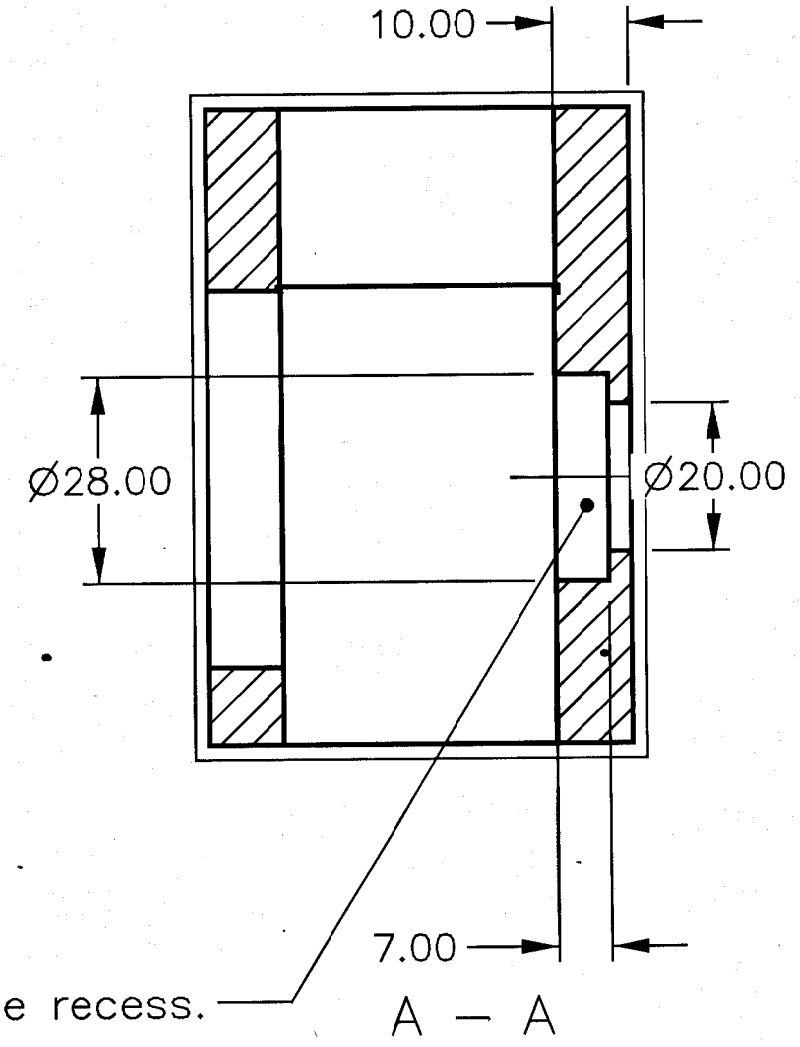
Back View.



A – A

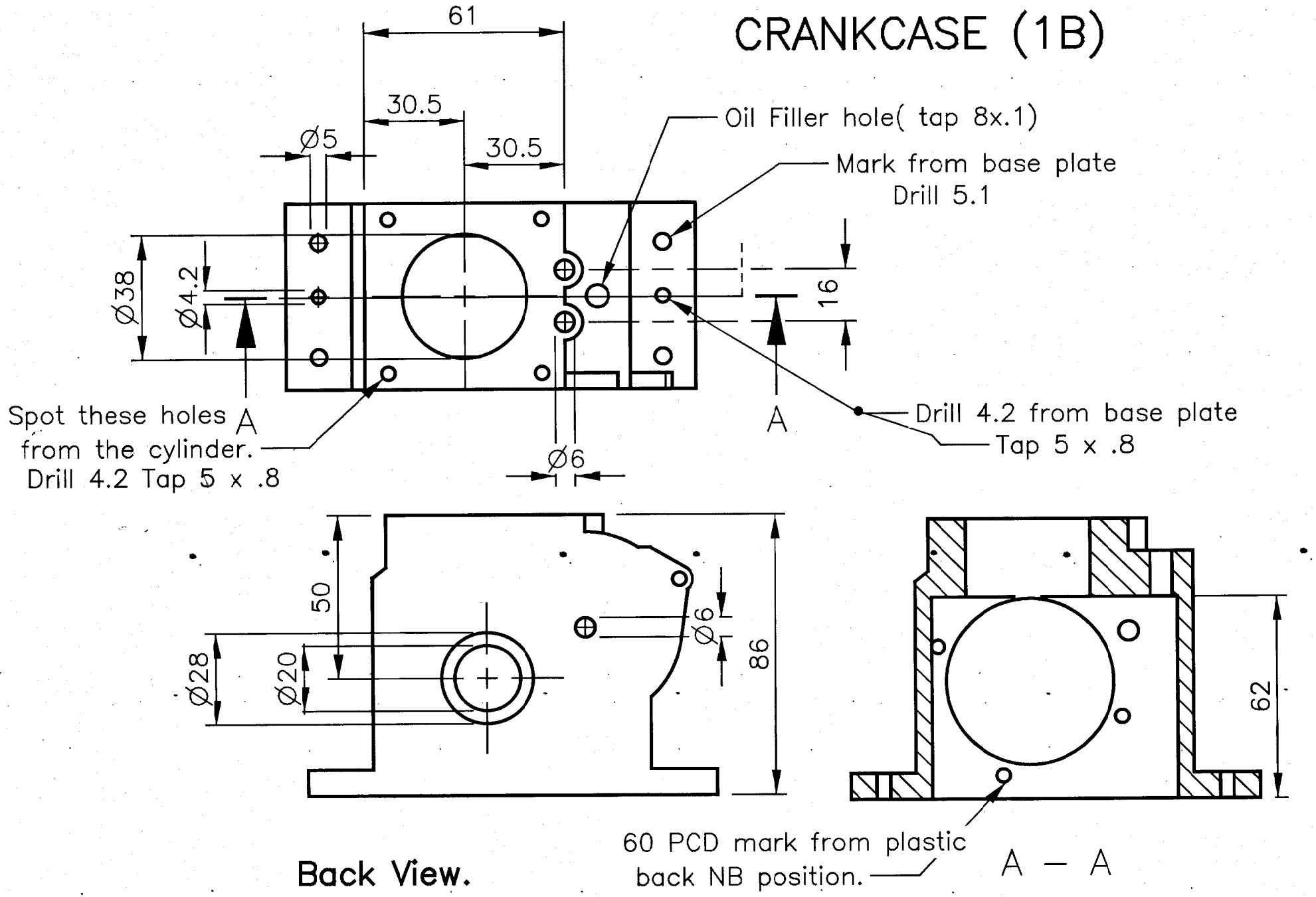
CRANKCASE (1C)





Section view to show ballrace recess.

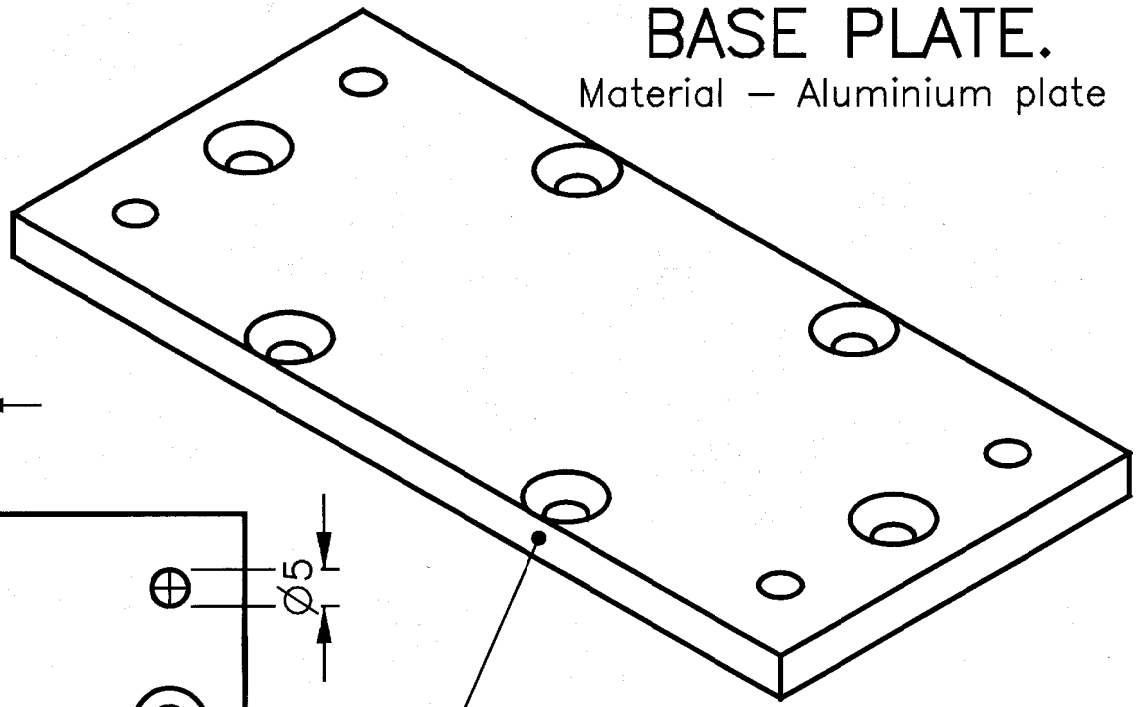
CRANKCASE (1B)

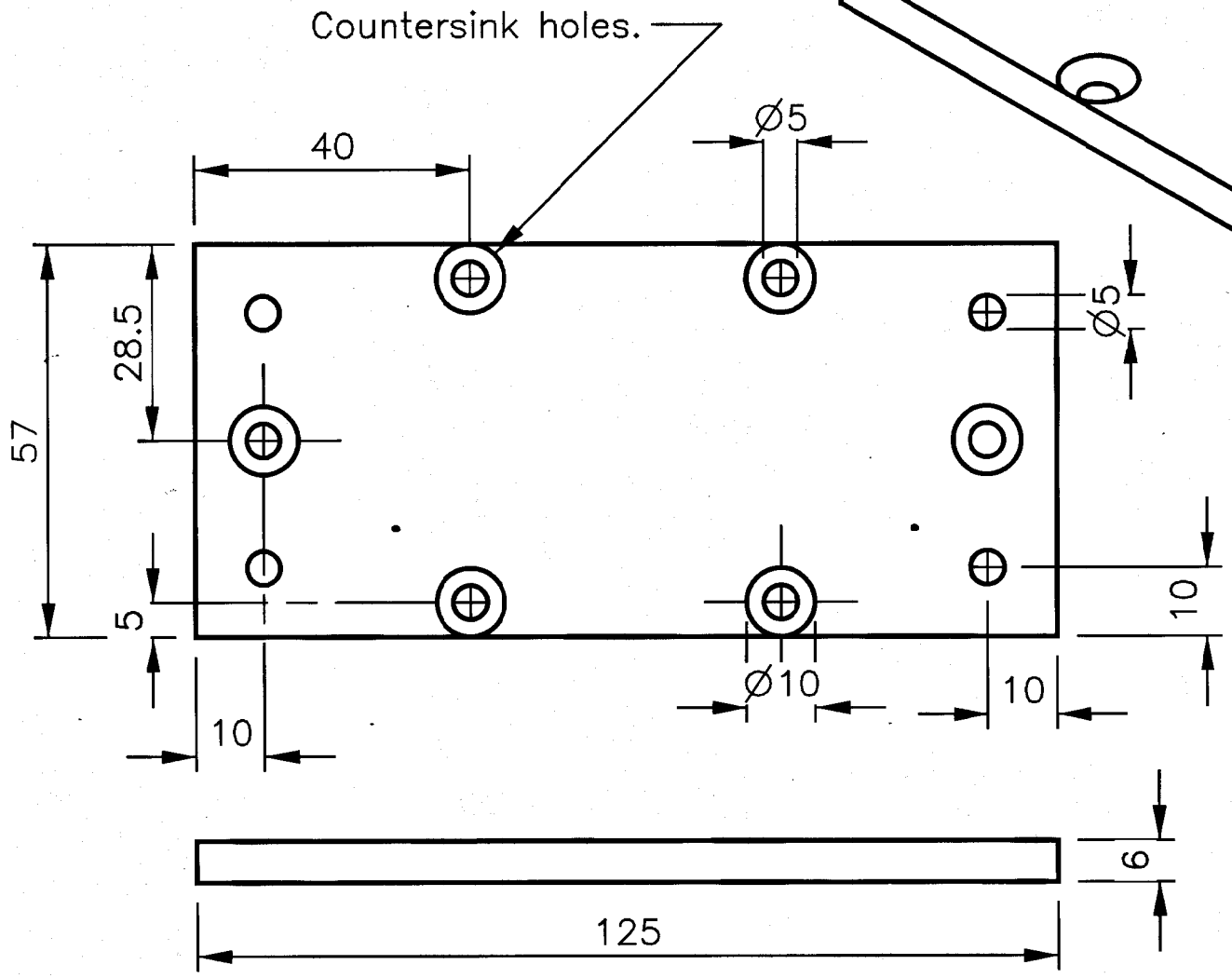


Back View.

BASE PLATE.

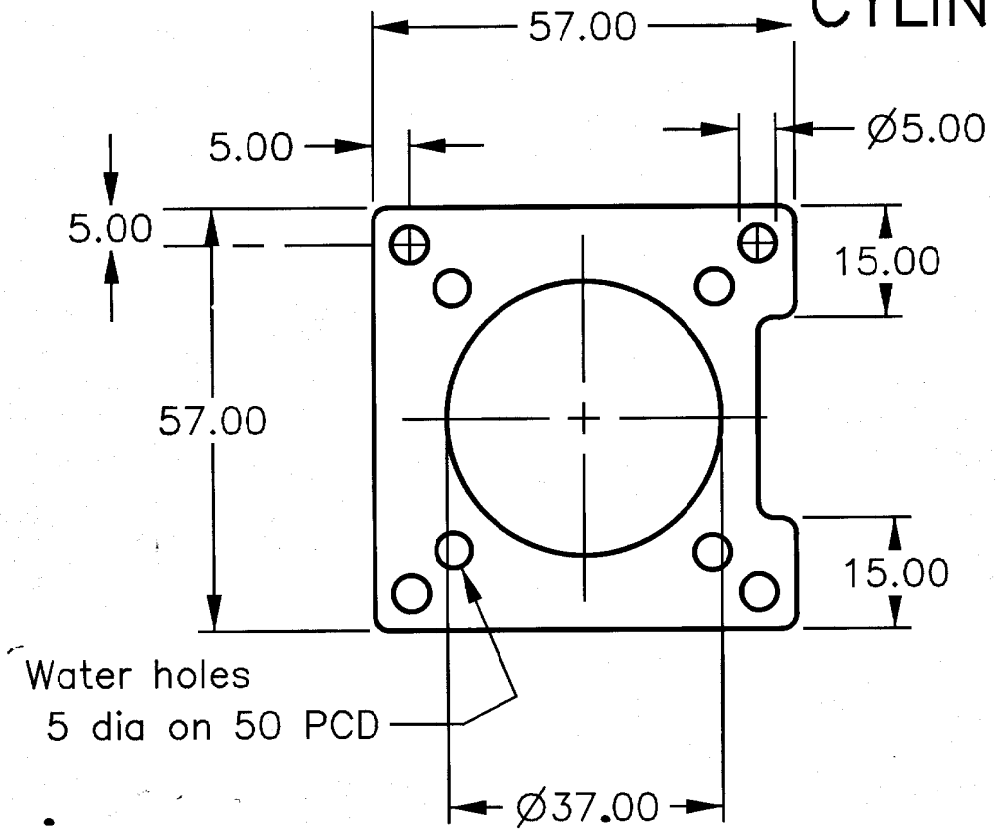
Material – Aluminium plate

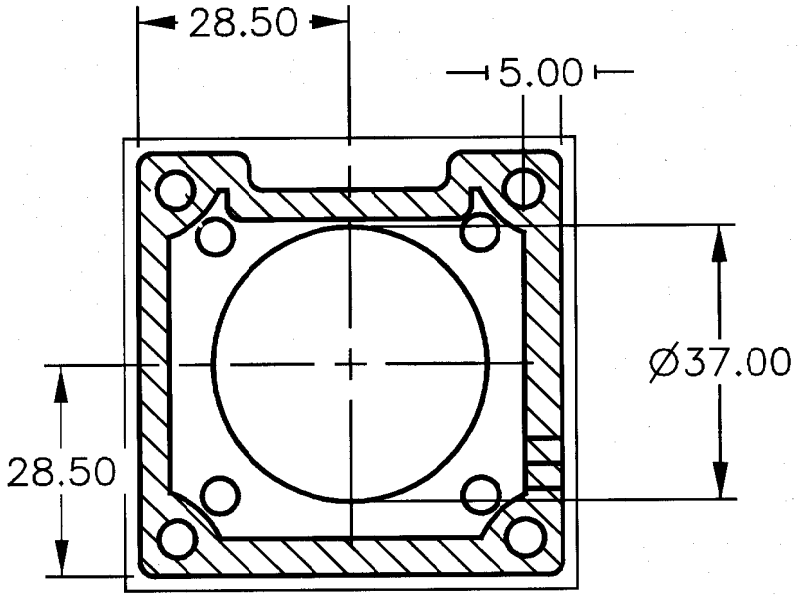




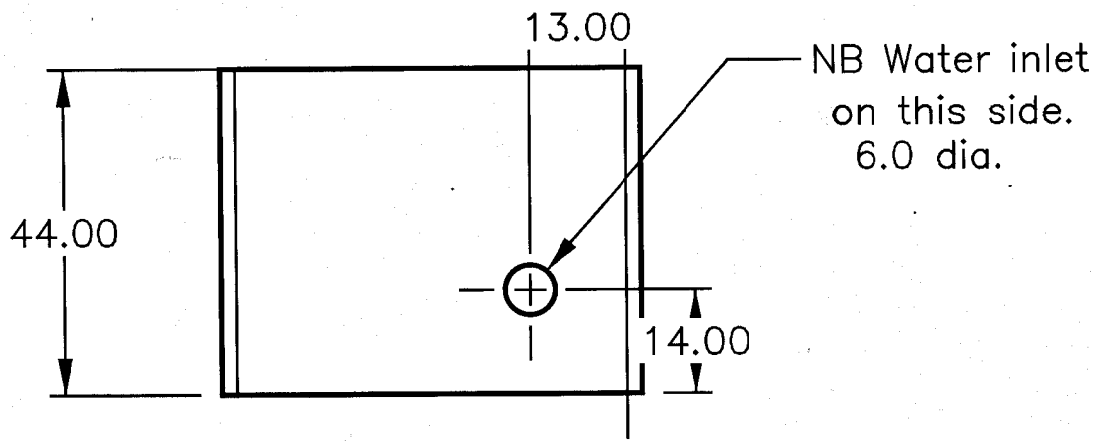
Use 5 x .8 mm countersunk head screws to hold plate to engine base.

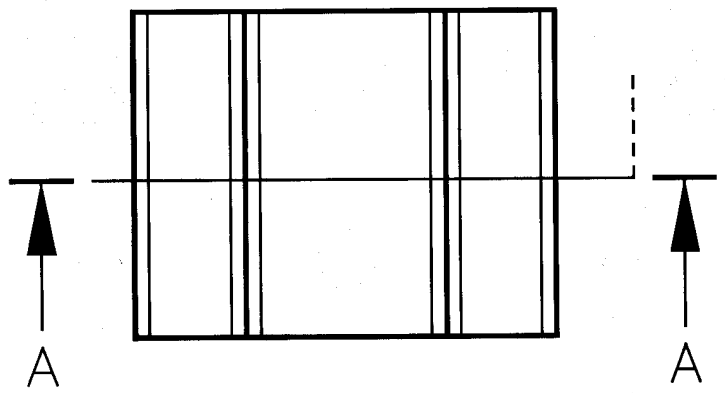
CYLINDER CASTING. (Water cooled)





A – A

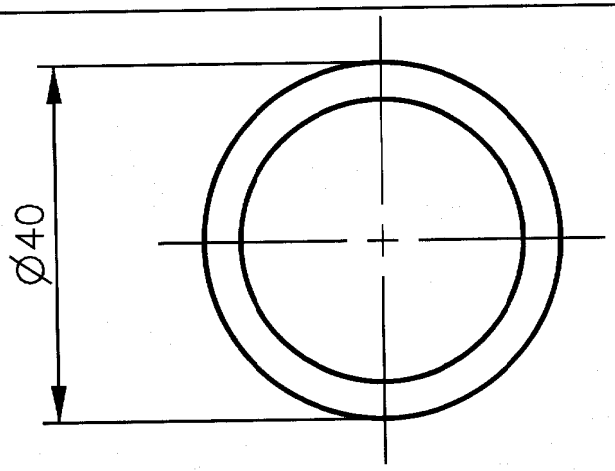


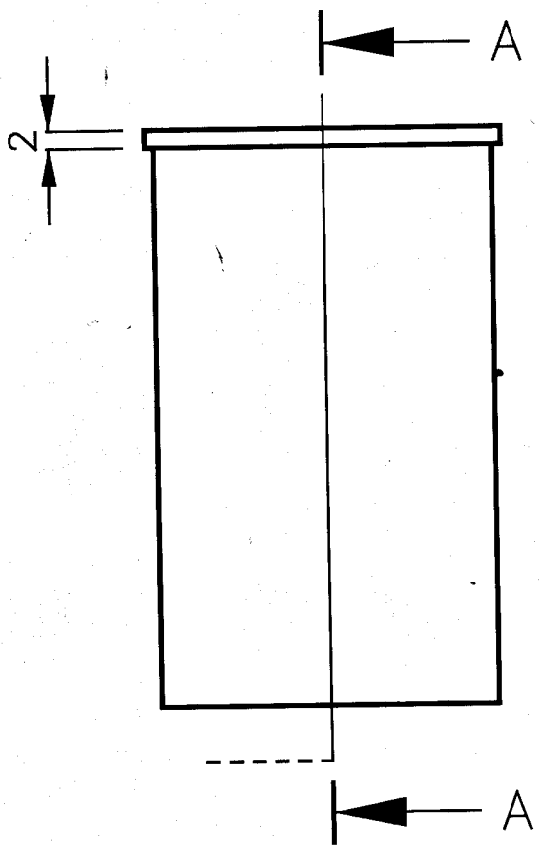


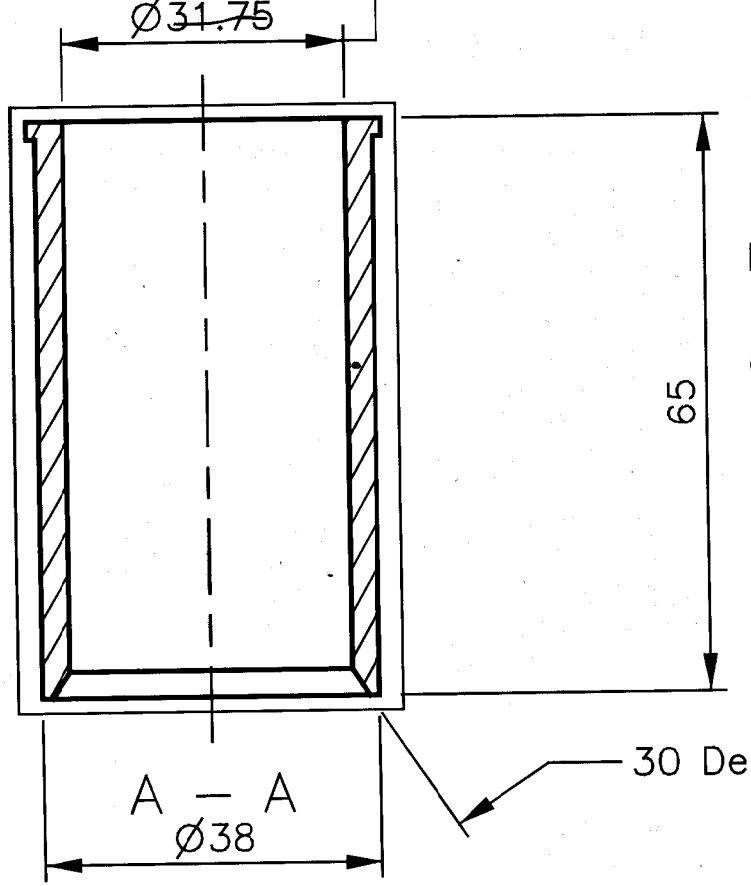
Material – Aluminium casting

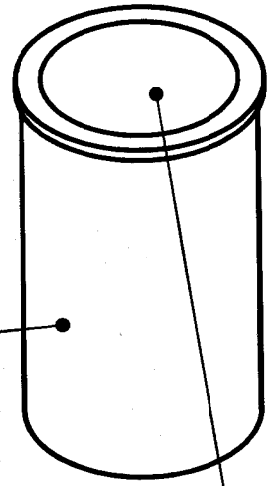
CYLINDER LINER.

Cast Iron or 4140 Steel.



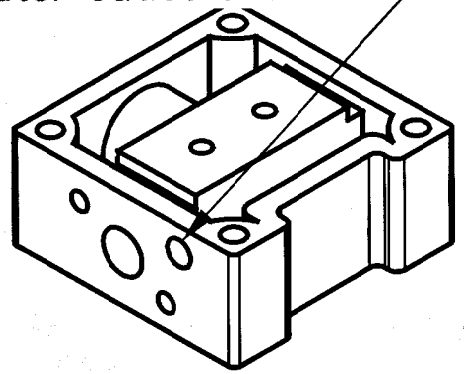


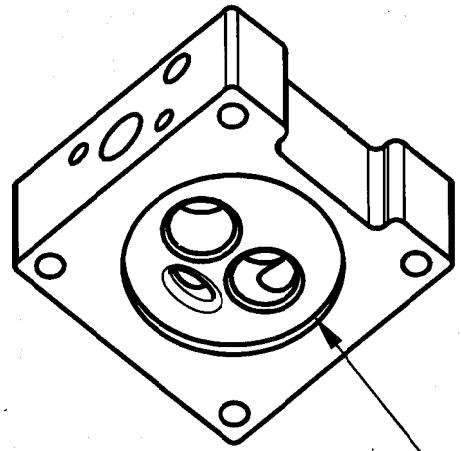


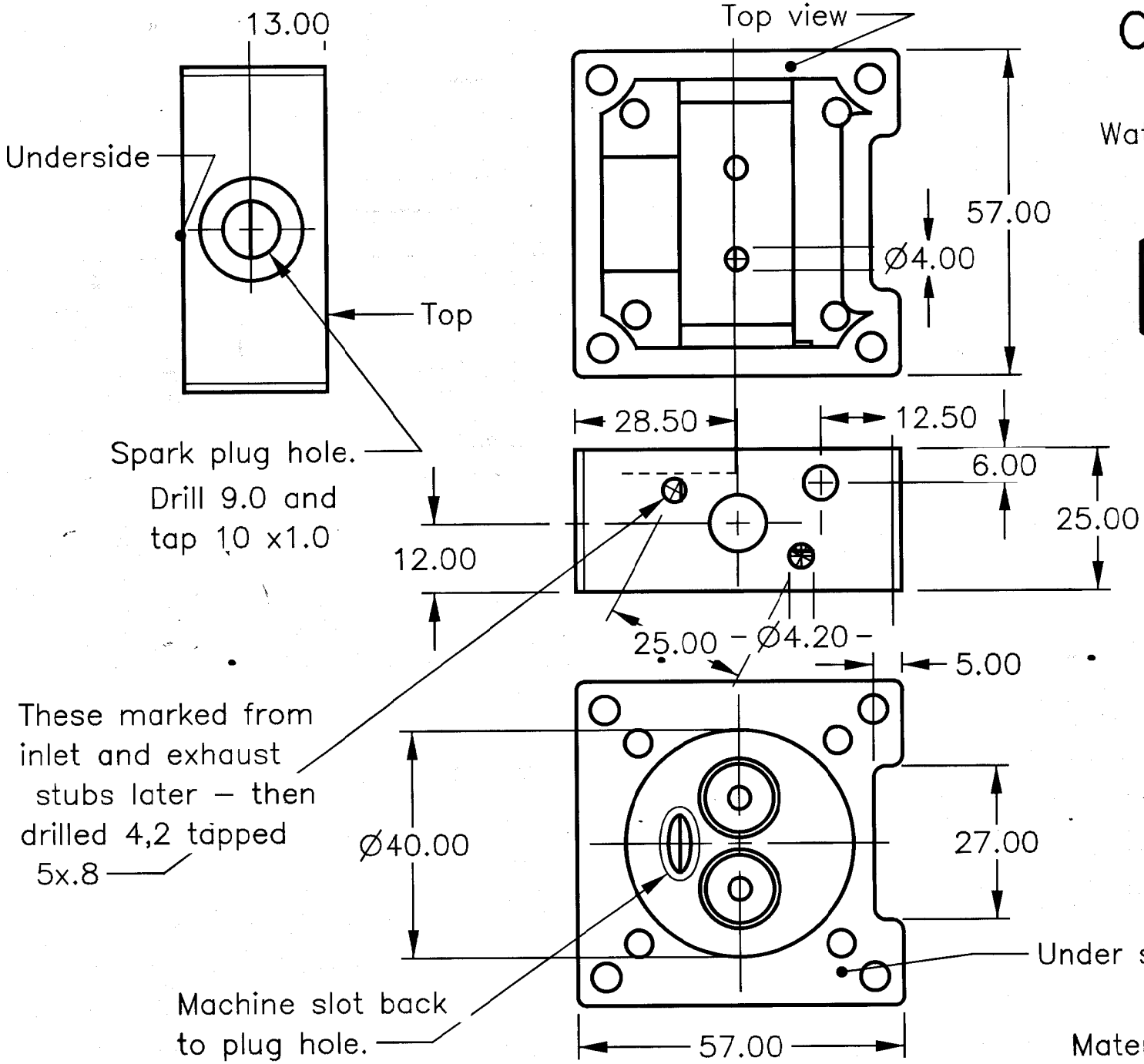


CYLINDER HEAD

Water cooled.

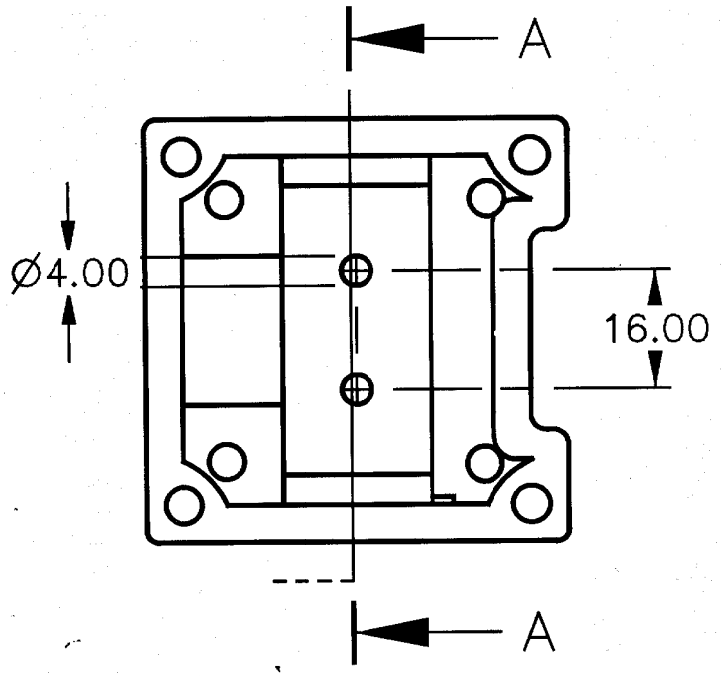


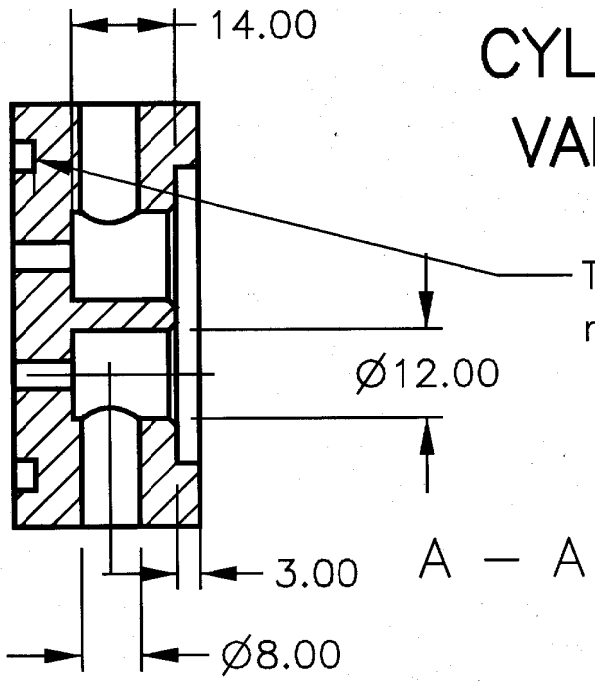




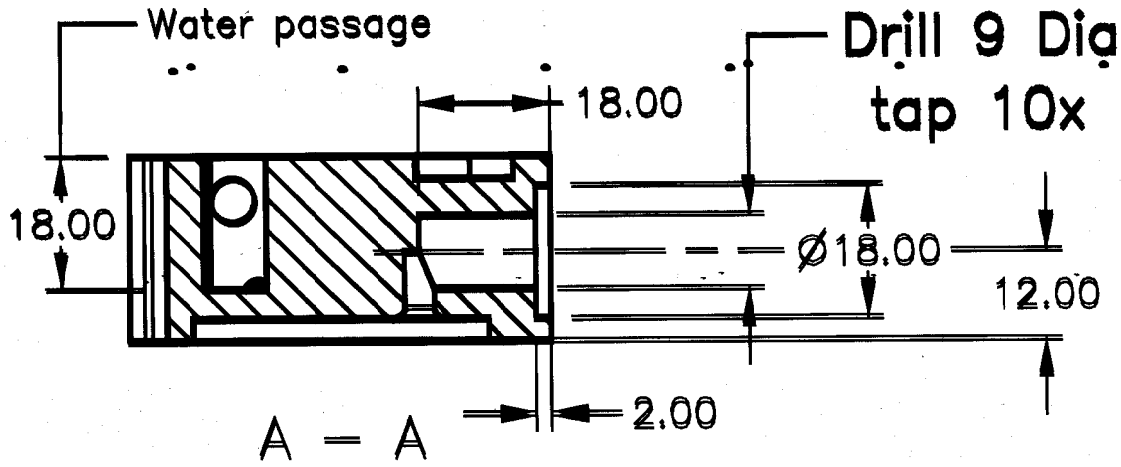
Material – aluminium casting

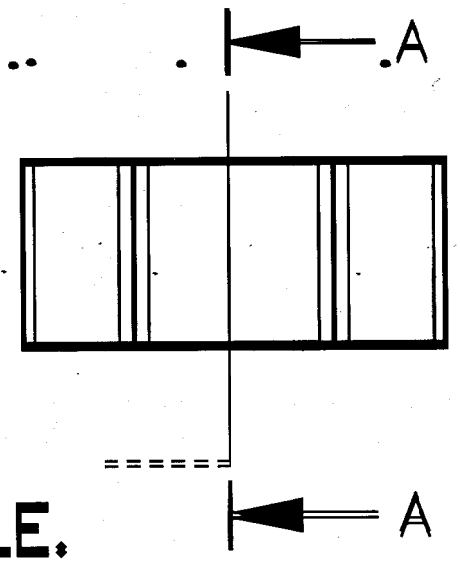
CYLINDER HEAD VALVE POCKETS.





These water passages may need to be machined deeper to allow water to flow from one side to the other.



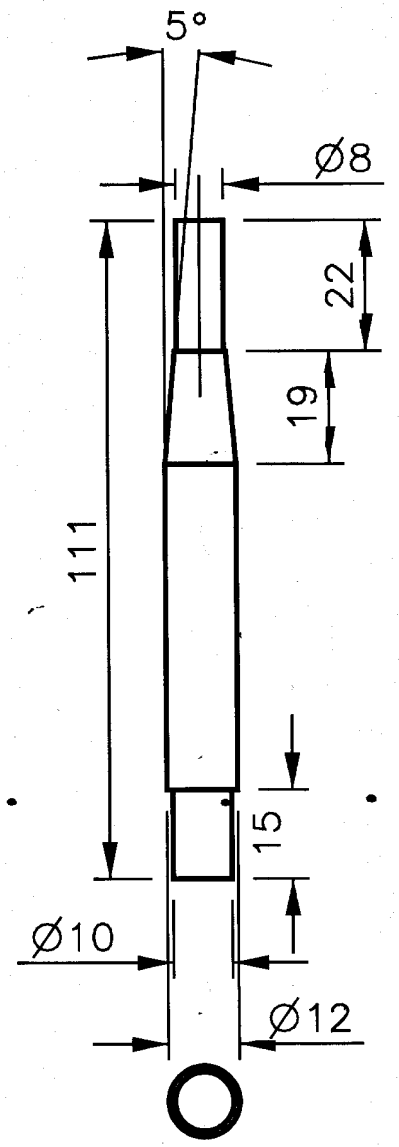


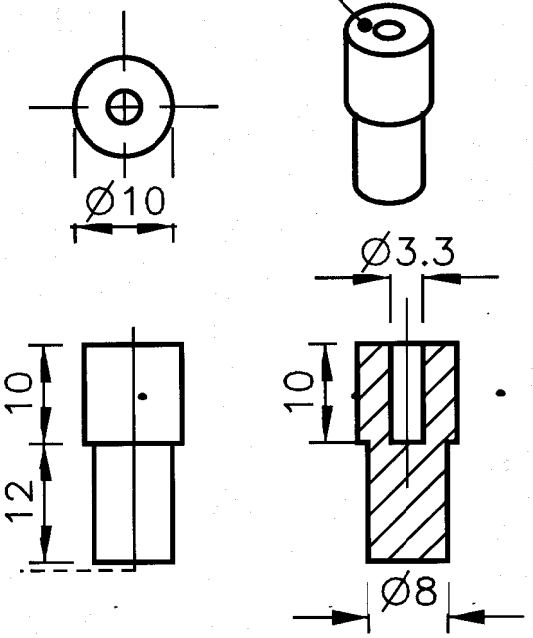
CYLINDER HEAD – SPARK PLUG HOLE.

CRANK PIN .

Silver Steel or 4140

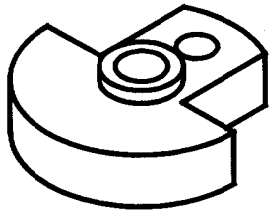
Tap 4 x .7
for retaining bolt.

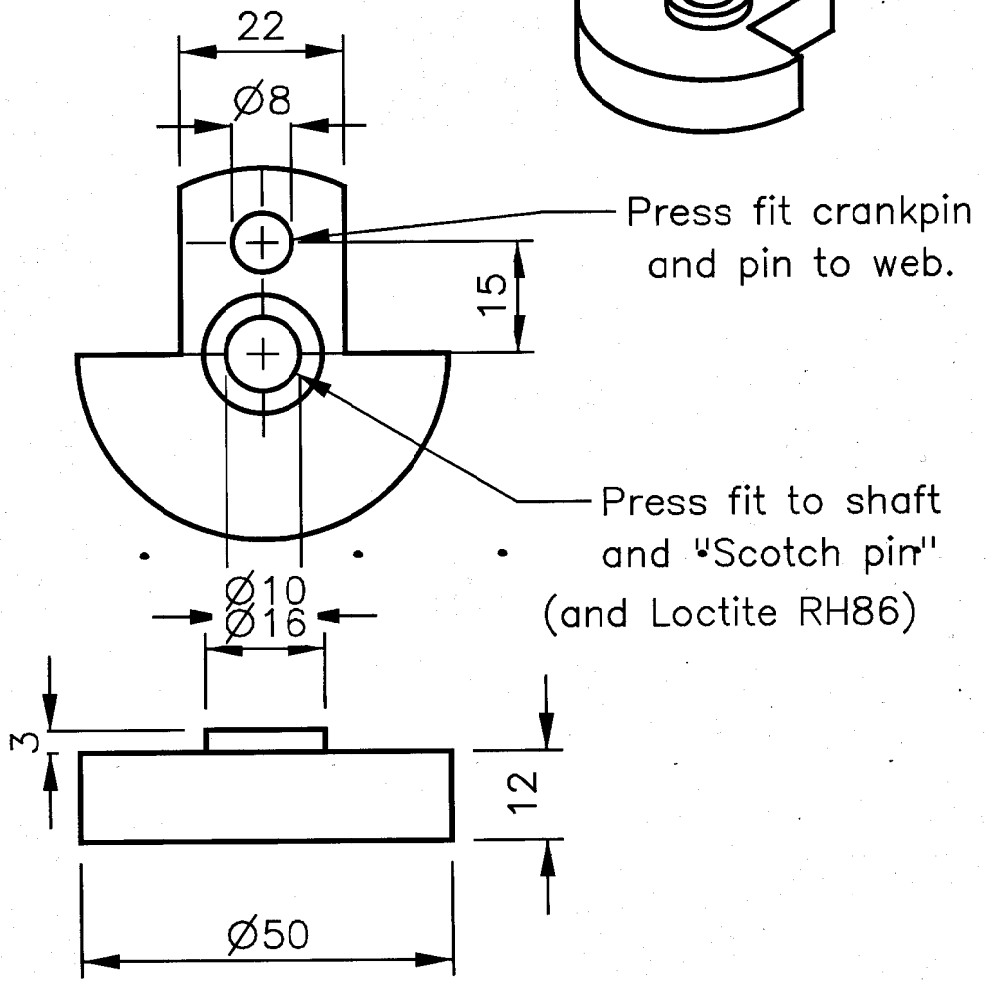




CRANKSHAFT WEB.

4140 Steel.





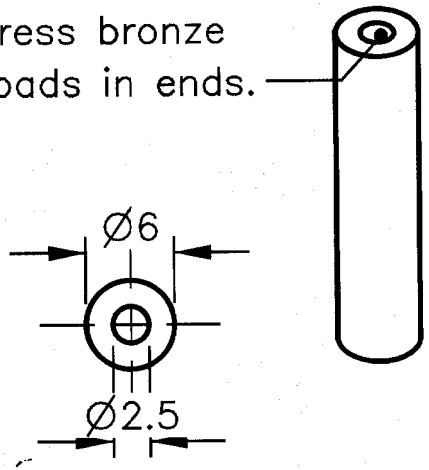
CRANKSHAFT

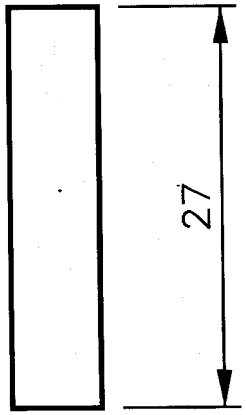
– Steel (4140)

GUDGEON PIN

Silver steel.

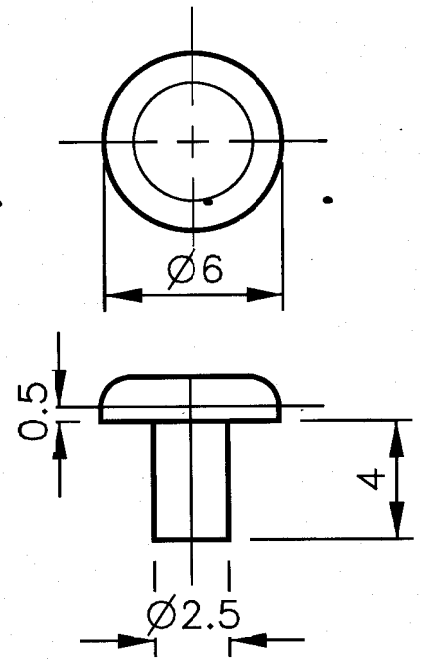
Press bronze pads in ends.



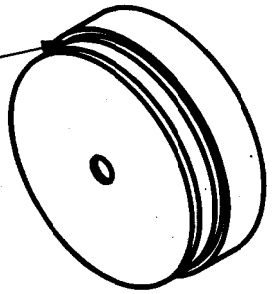


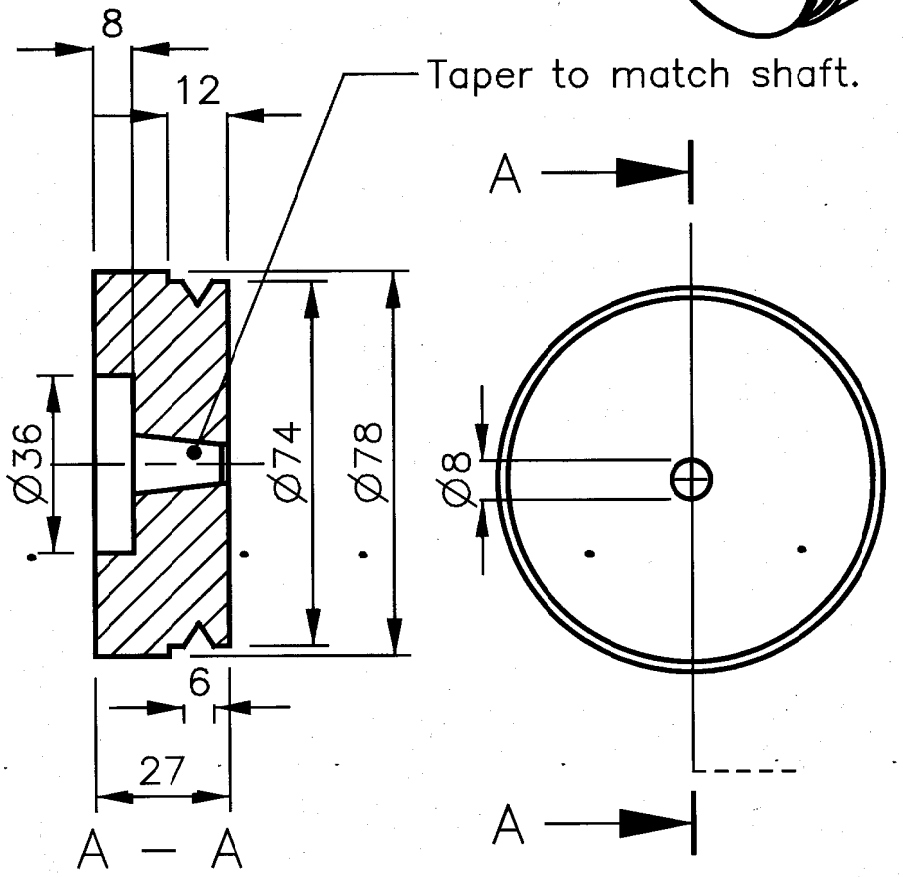
GUDGEON PIN PADS.

Material – Bronze.



Machine a "V" for the starting rope.

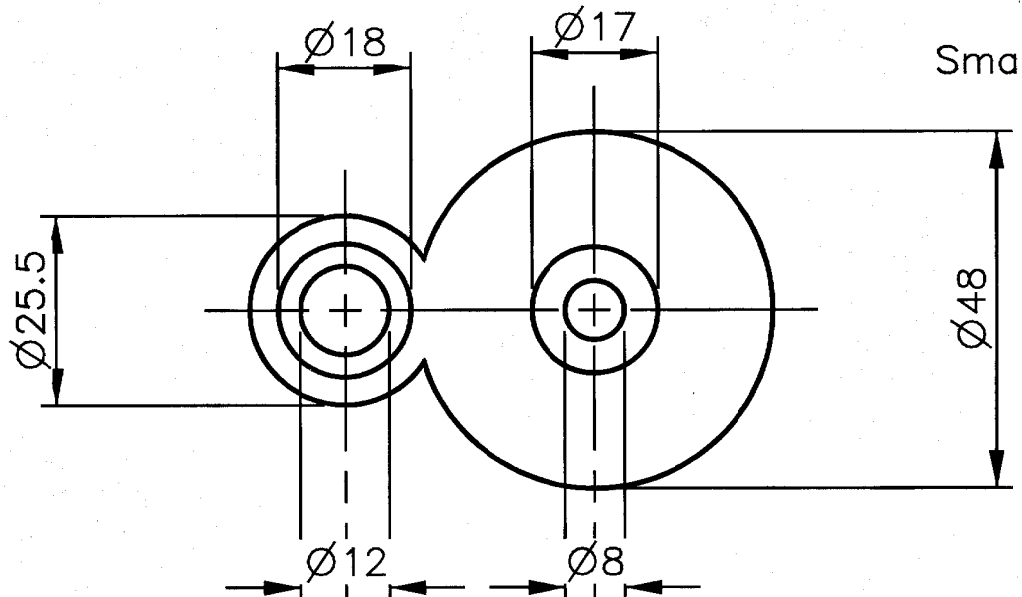


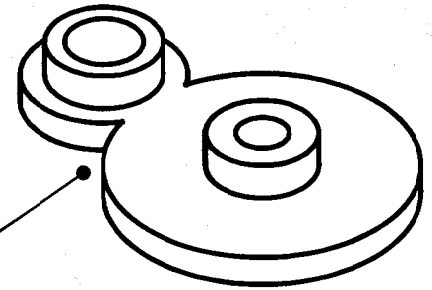


FLYWHEEL – Steel.

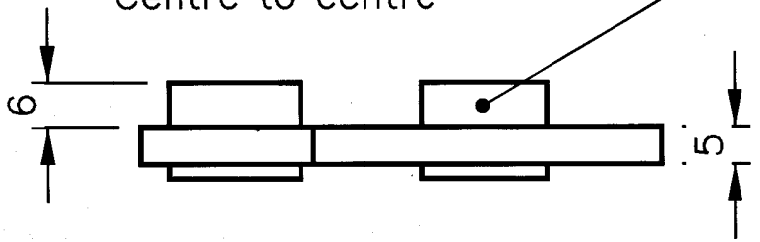
GEARS.

Small gear in bronze, large gear in steel.

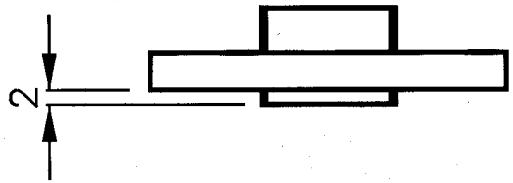




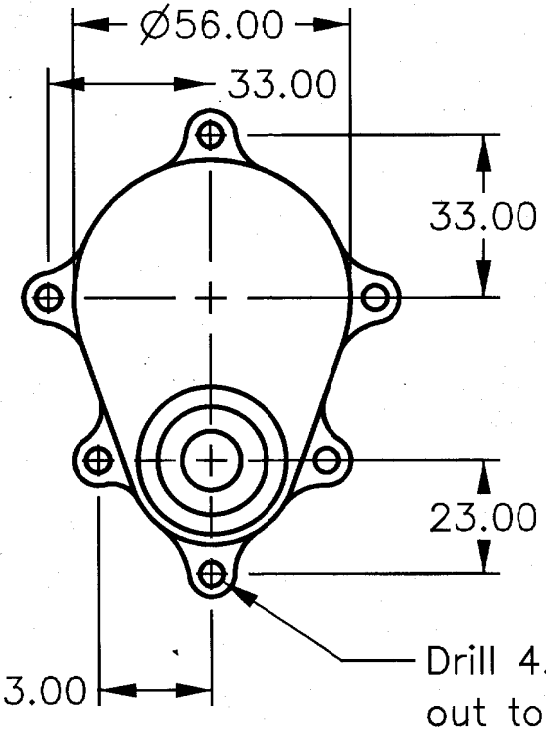
GEARS (shown meshed).
Module 1.5 Small 15 teeth
Large gear 30 teeth.

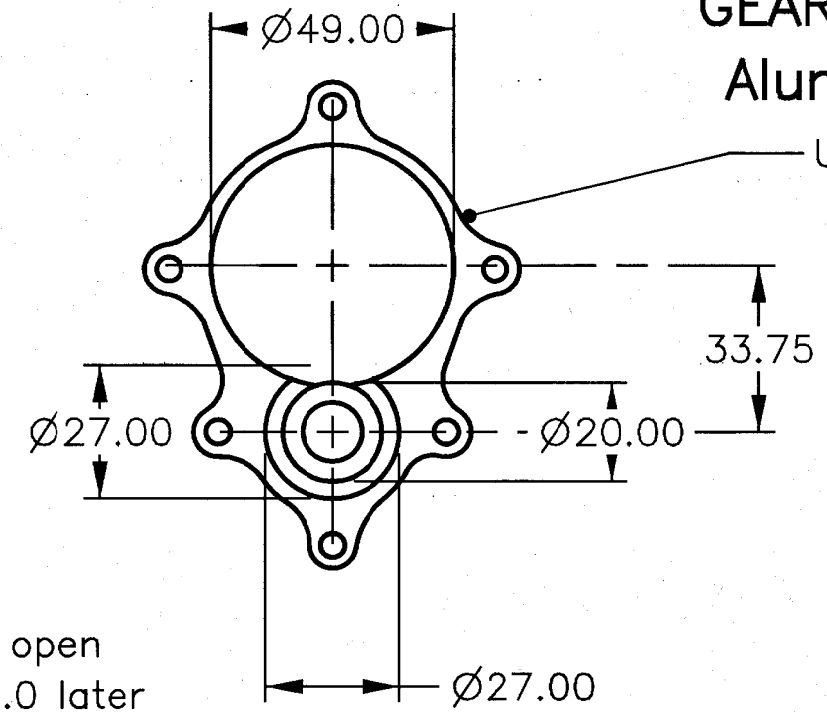


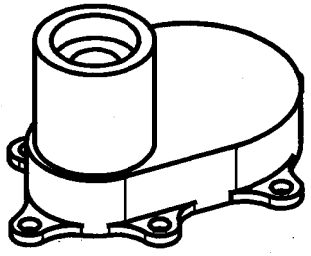
Drill 2.5 and tap 3x.5 for grub screws on both gear bosses.

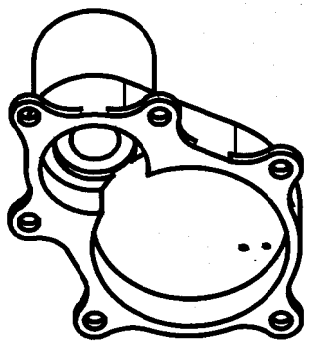


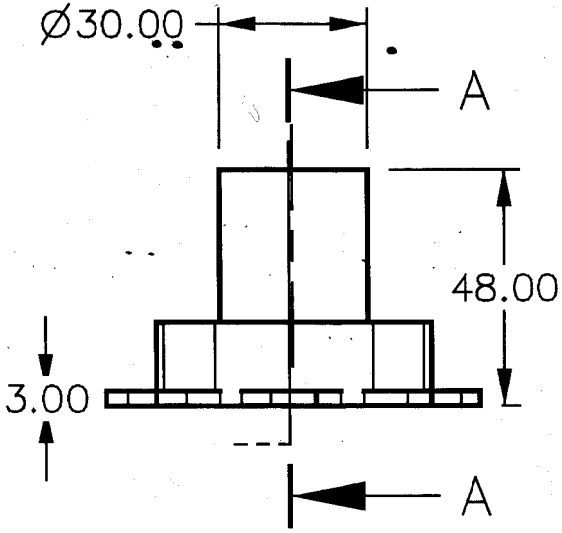
GEAR CASE.
Aluminium Casting.

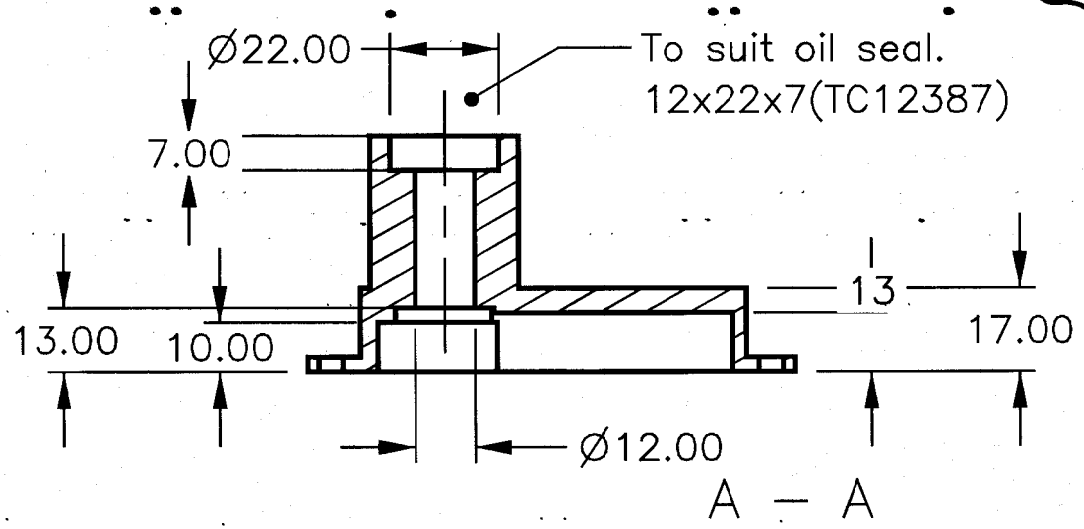




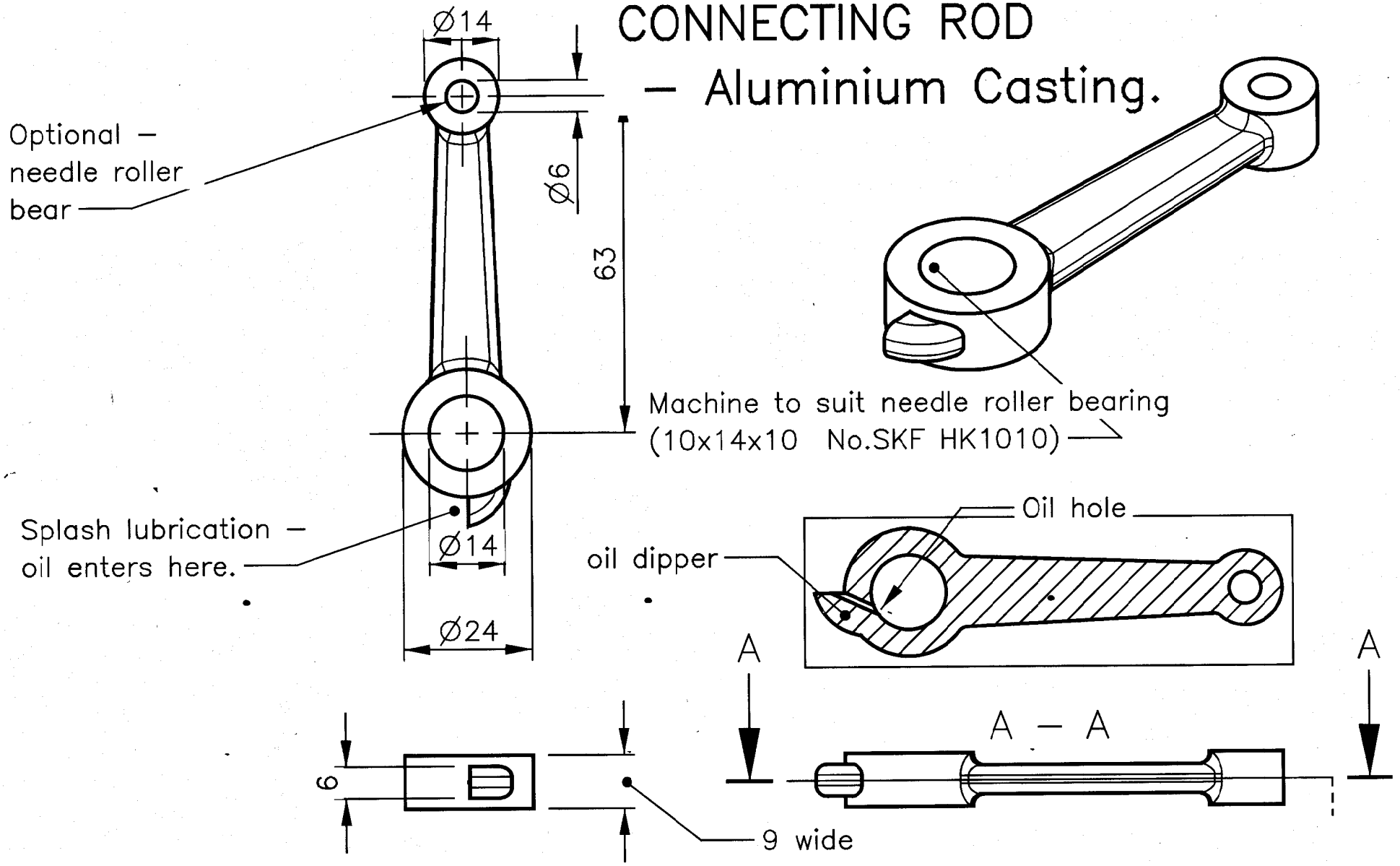




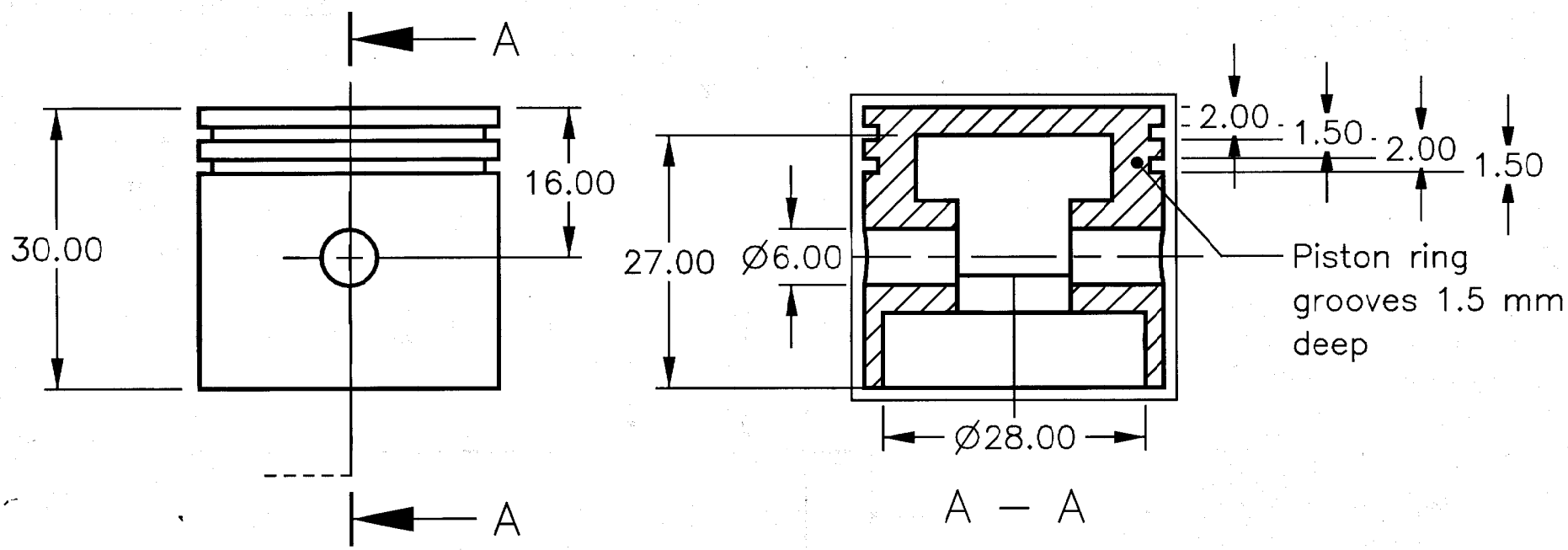




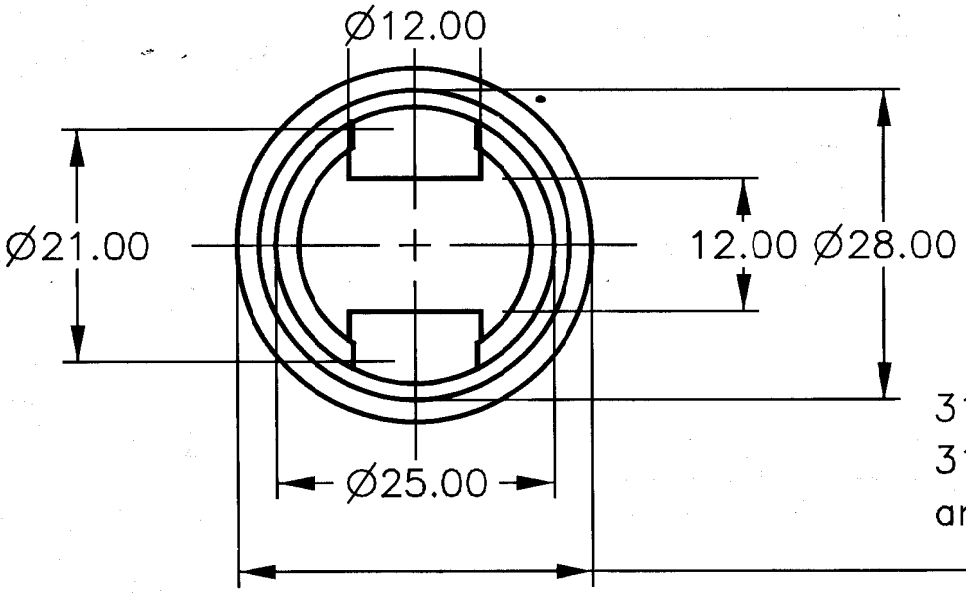
CONNECTING ROD
– Aluminium Casting.

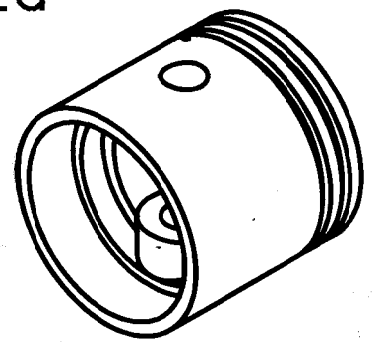


The connecting rod can be polished to help reduce fatigue.


A
30.00
16.00
A
27.00
Ø6.00
2.00
1.50
2.00
1.50
Piston ring grooves 1.5 mm deep
Ø28.00
A – A

PISTON MK 2a

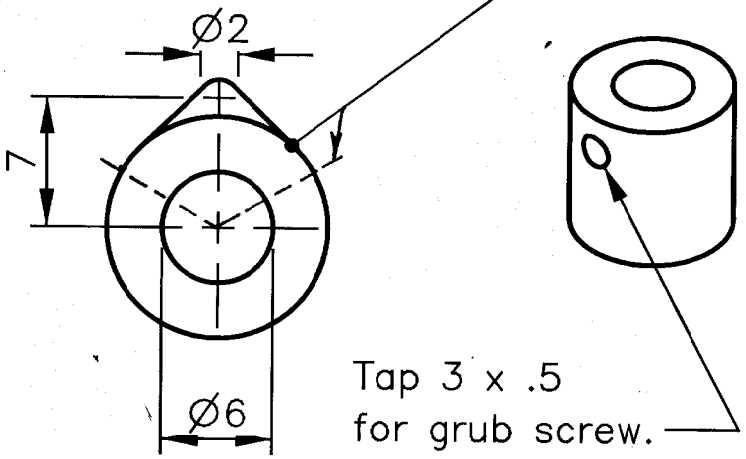

Ø12.00
Ø21.00
12.00
Ø28.00
Ø25.00
31.93 mm dia. skirt.
31.5 top piston land
and between the rings.



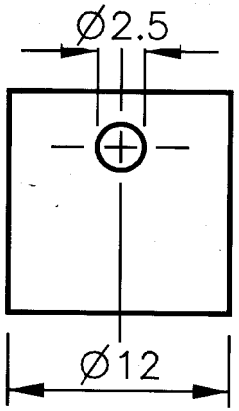
CAM

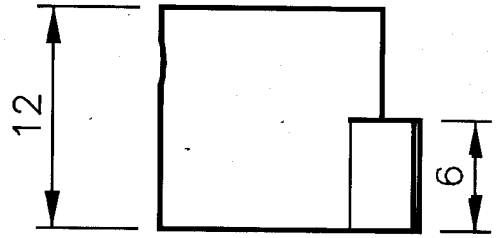
Material Silver Steel.

Cam angle is 120 degrees
from rise to fall.



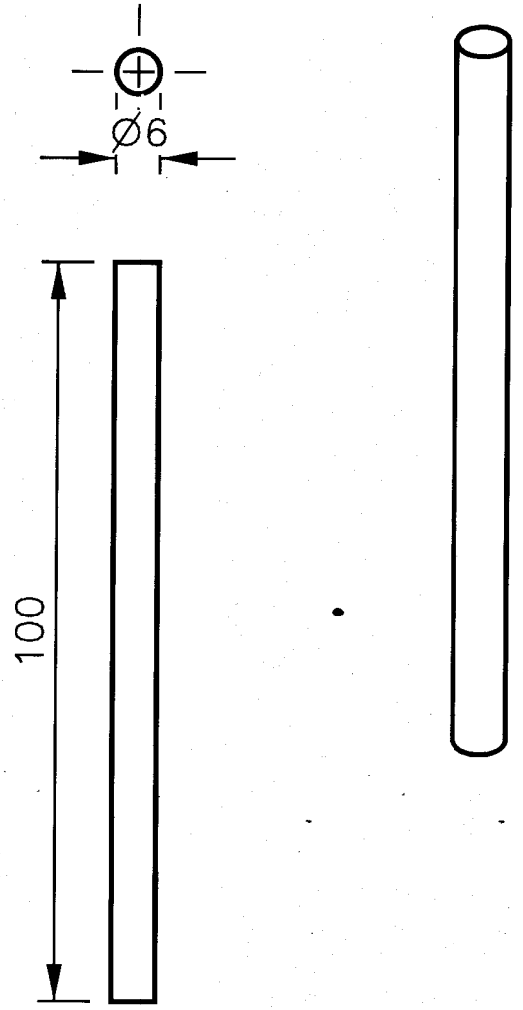
Tap 3 x .5
for grub screw.





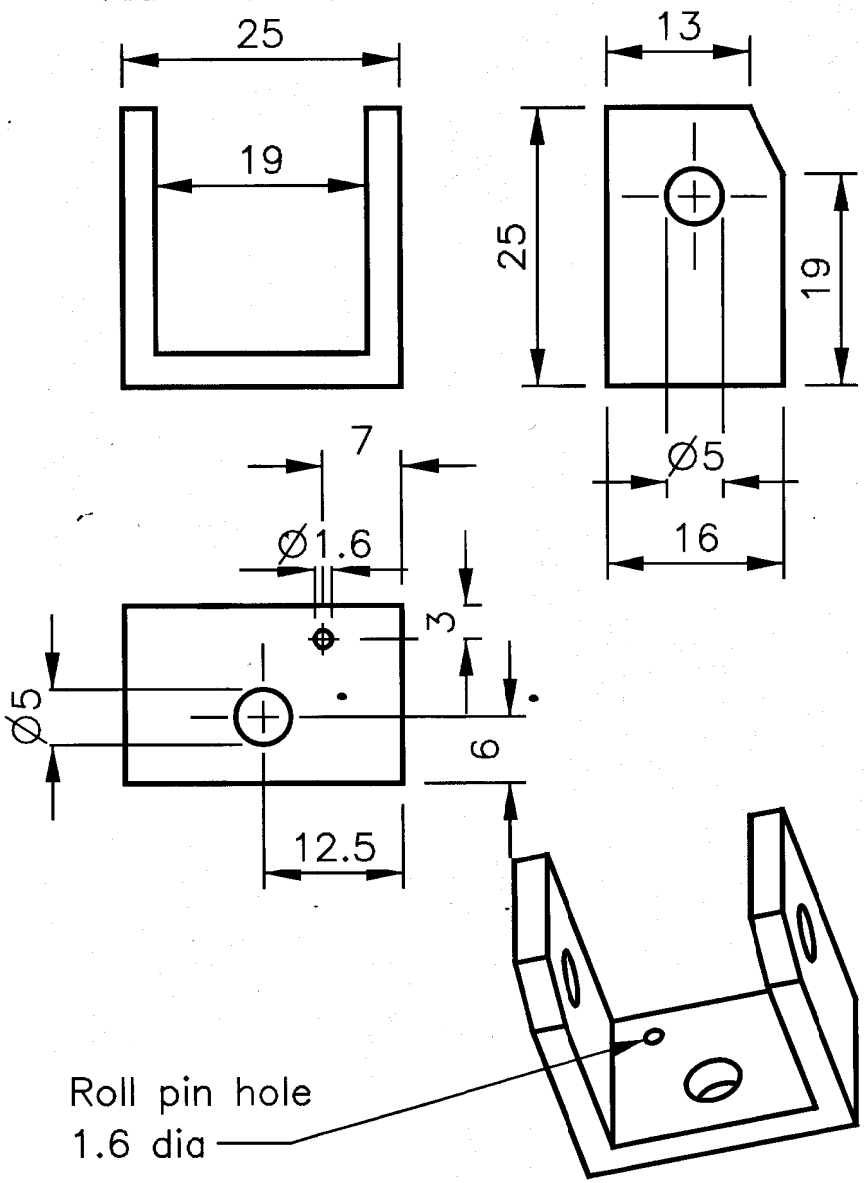
CAM SHAFT

Material – Steel

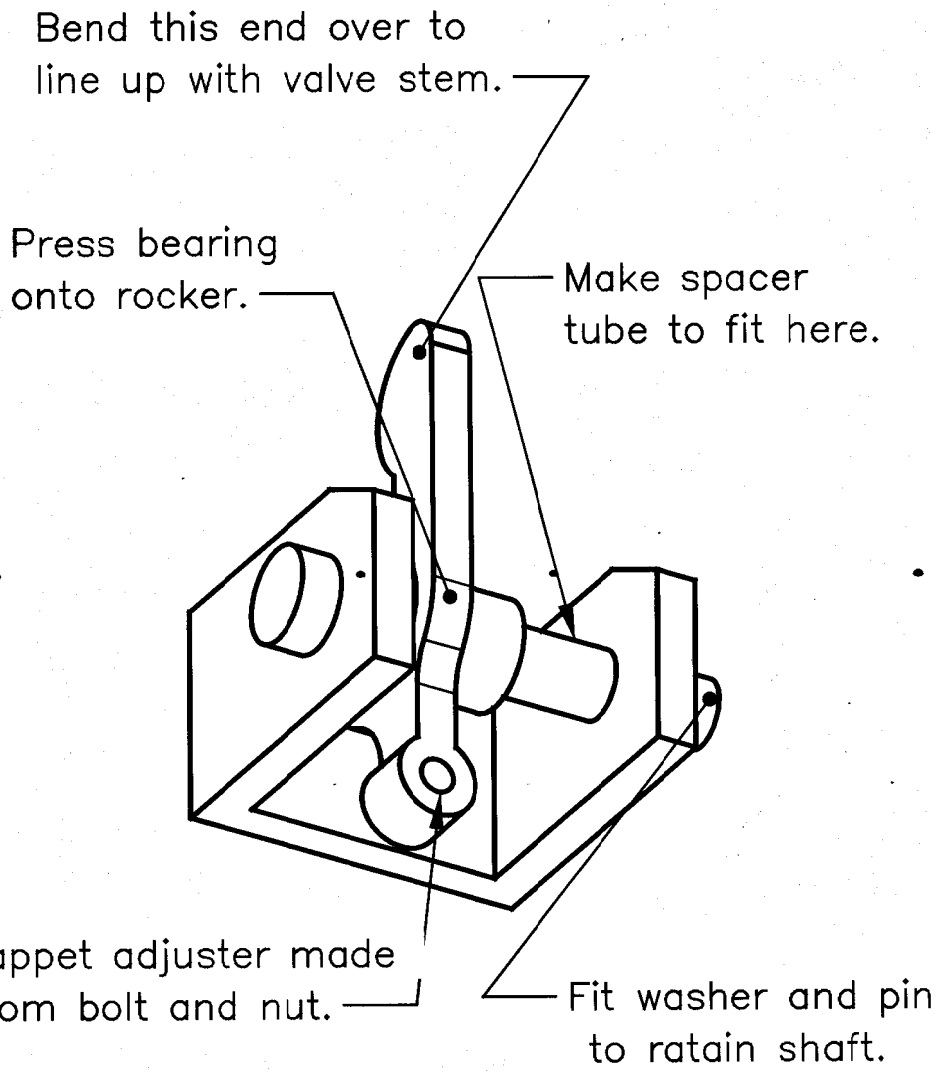


ROCKER POST.

Aluminium channel.

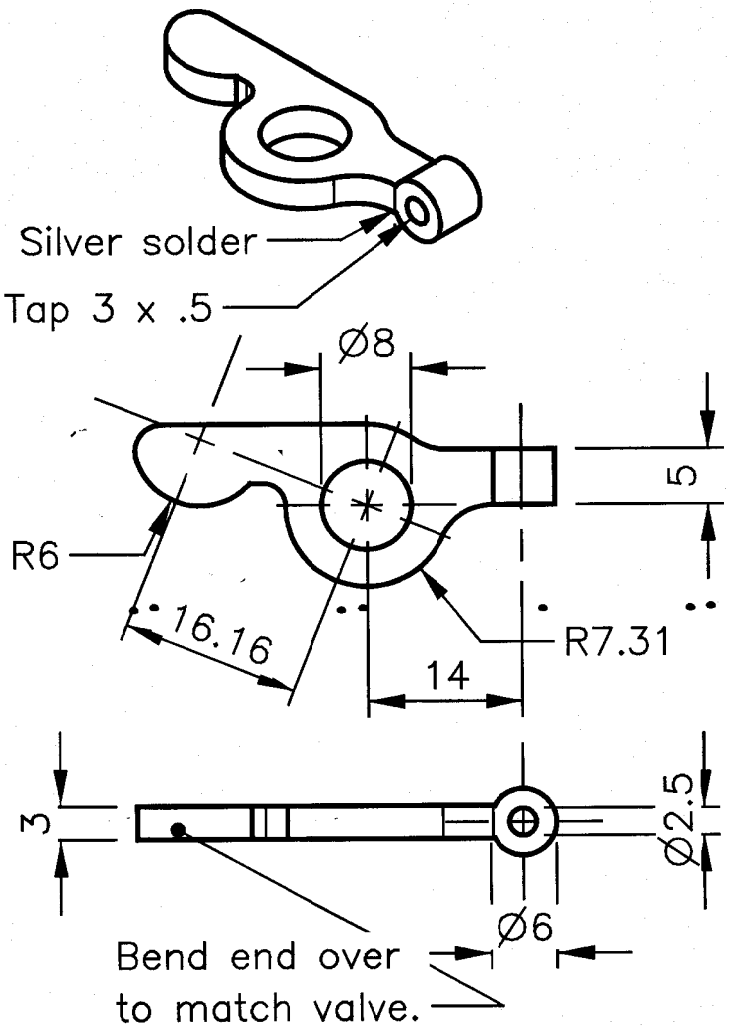


ROCKER UNIT COMPLETE.



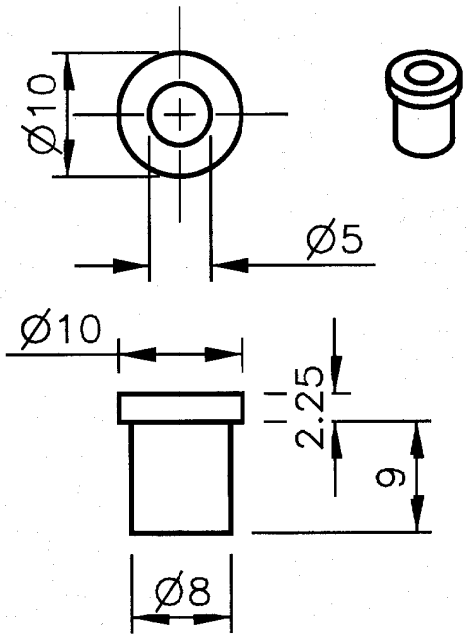
ROCKER.

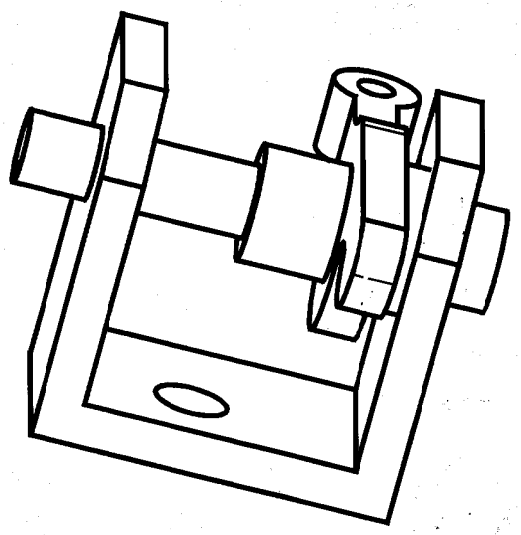
Material – steel.



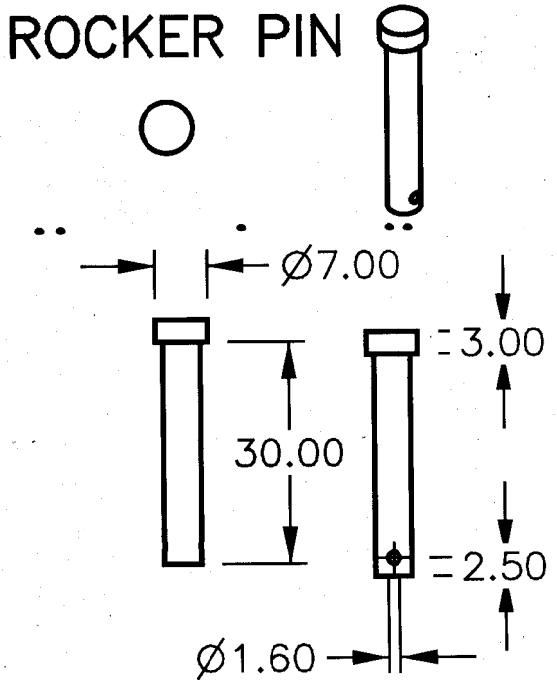
ROCKER BEARING

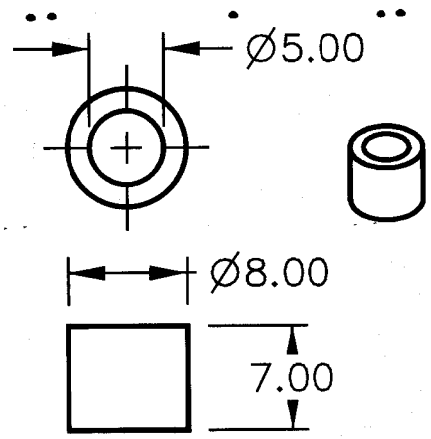
Material – Bronze





ROCKER PIN





ROCKER SPACER.