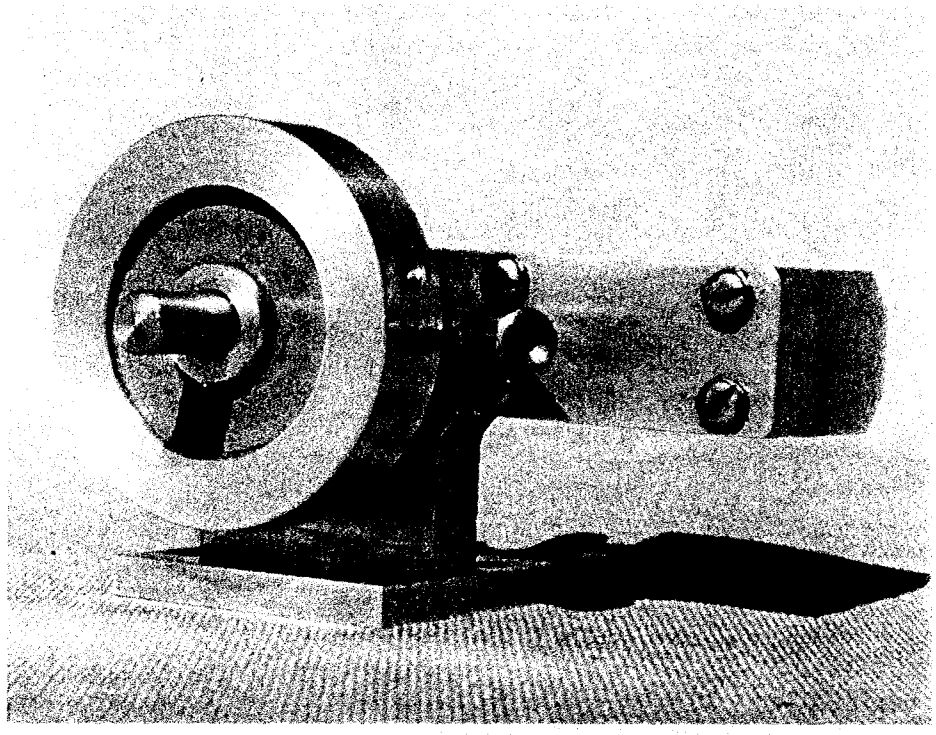
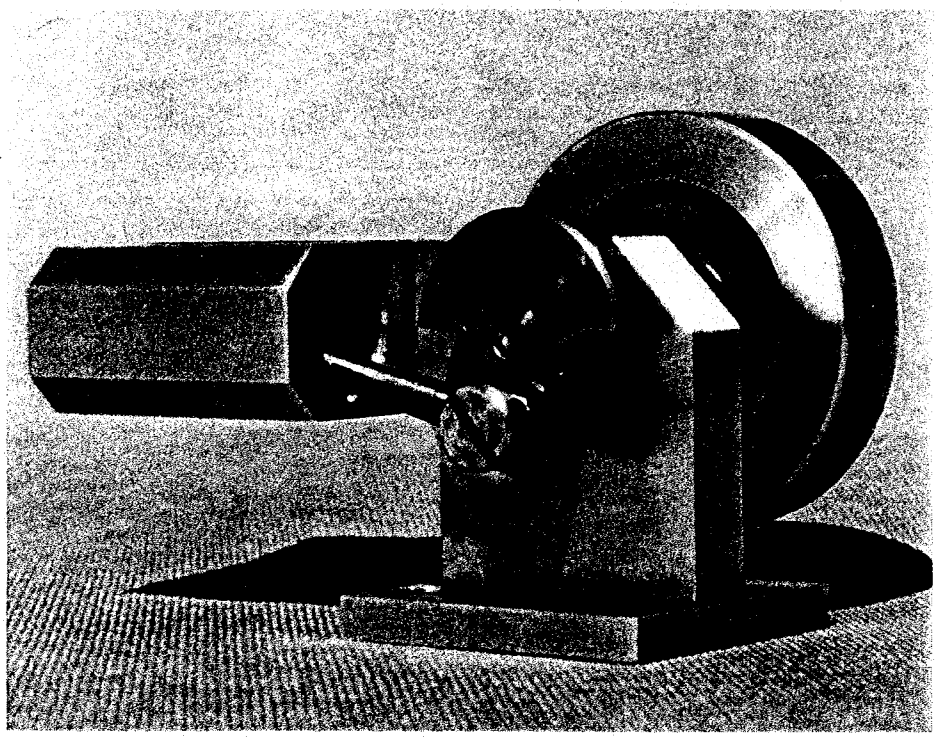
CHAPTER

19 Standby





This engine has a piston-wrist-pin-connecting rod type of construction like an auto engine. Simple valving is done in the slots in the Crankshaft.

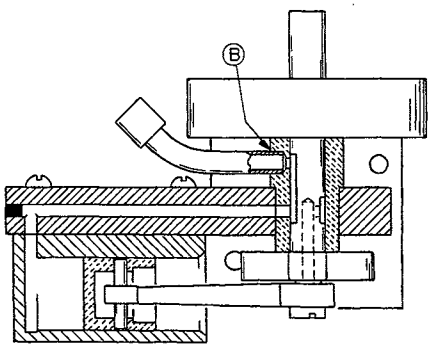
Start the **FRAME** with a finished 1/4" x 1" x 2" piece of metal. Apply layout dye and lay out all hole centers. Machine all holes, but do not plug the 1/16" hole until a drill has been run through the bearing later.

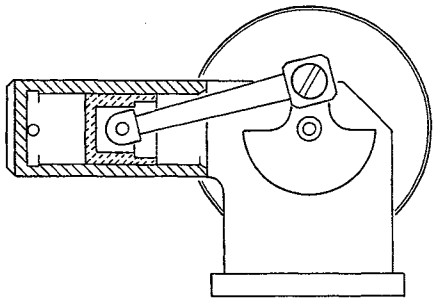
Make the **BEARING** and steam connnection. This connection is for 3/16" plastic tubing. You may have other ideas for this, depending on how you will eventually drive and use this engine. Drill and turn the 3/16" stock and remove from the chuck. Enter the end into 1/8" hole in some scrap stock held in a vise and apply heat with a torch. When almost red hot, slowly bend it to the required shape. Cut it to length and remove burrs. Solder the steam connection to the bearing and set the bearing in the frame with Loctite. Drill the steam passage through the bearing and plug the hole in the frame using a press fit or Loctite.

For the **CYLINDER**, start with a piece 1/2" x 9/16" x 1" and lay out the centers for the 3/8" bore, four screw holes and the 1/16" port hole and prick punch. These holes must match the holes in the Frame. Center in the 4-jaw using a center test indicator; make the 3/8" bore. Square up the bottom with a boring bar. On the last pass before reaming, make a light undercut for reamer runout so as not to leave a shoulder for the Piston to strike. Do not break into the bore when drilling and tapping (with a bottoming tap) the four screw holes.

Make the **CRANKSHAFT** as shown. The important thing here is the accurate location and depth of the valve flats 180 degrees apart and the throw of the crank set midway between the flats, as shown in the assembly view. The piston is halfway in its stroke and getting full steam. Attach the crank disk to the shaft with a press fit or Loctite.

The **PISTON**, **FOOT** and **SHOULDER SCREW** need no explanation. The thread on the screw is best made





STANDBY

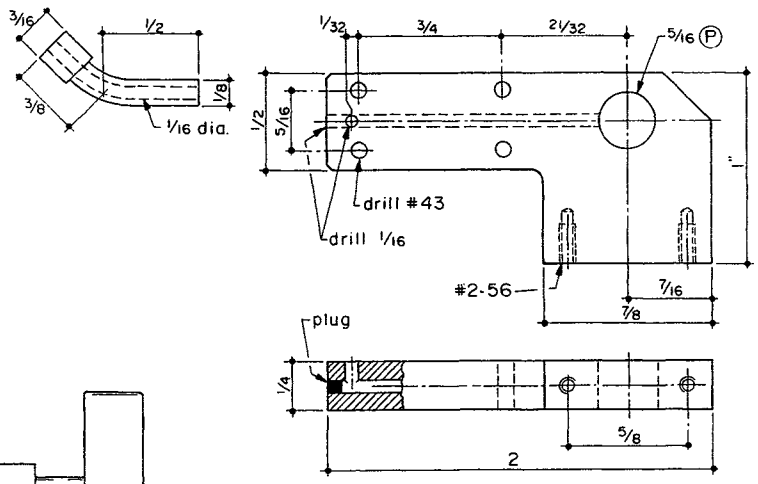
using a tailstock die holder.

For the **CONNECTING ROD**, use 1/8" x 1/4" stock and lay out the center on the end and prick punch. Chuck in a 4-jaw with about 1/4" projecting and center it with a center test indicator. Centerdrill with a tiny 3/64" center drill. Mark two adjacent jaws with chalk. Free these two jaws and move the stock out so about 1-1/2" projects from the jaws. Retighten the two marked jaws while holding the piece against the tailstock center. Turn the center portion and make parting cuts at each end down so about 1/8" diameter remains. Remove from the chuck and lay out and ream the 1/8" and 1/16" holes. Then you can file or mill the Piston end down to the 3/32" x 3/16" dimensions shown. Finish to length.

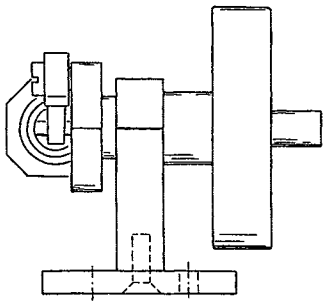
The **FLYWHEEL** is 1-1/4" x 5/16" wide and is fitted with a setscrew. The small taps are not long enough to reach the center, so a free fitting pin in the tapdrill hole transmits the pressure to the shaft.

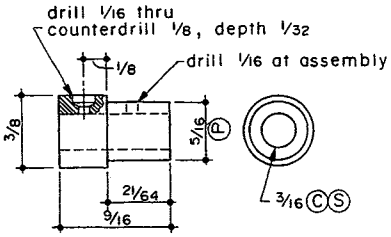
At assembly, insert a 1/16" x 11/32" long steel Wrist Pin in the Piston through the Connecting Rod. Make a light prick punch mark at each end of the Pin, flowing a tiny bit of the Piston metal over the ends as a retainer. Use an oil stone to remove any raised metal that might bind the Piston in the Cylinder.

If all has gone well, you can now lubricate it and give it a trial run on 5 to 10 pounds of air.

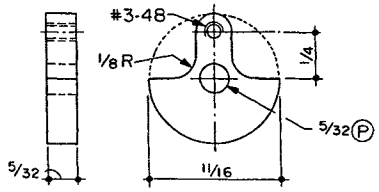


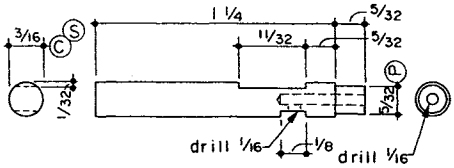
FRAME
Aluminum



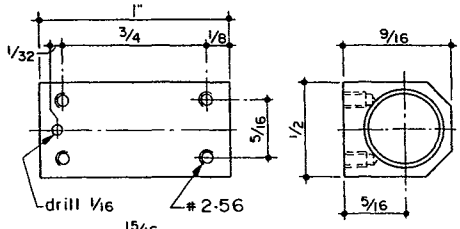


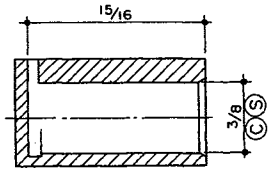
BEARING
Brass



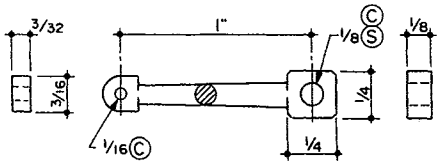


CRANKSHAFT
Steel

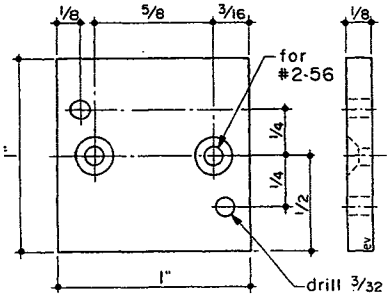




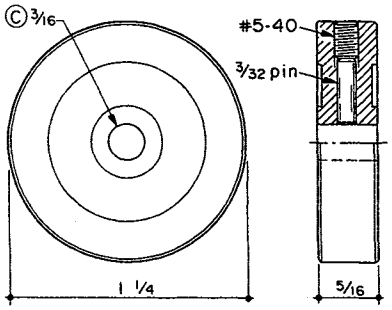
CYLINDER
Hard Aluminum



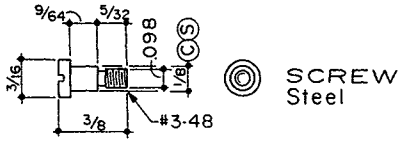
CONNECTING ROD
Brass



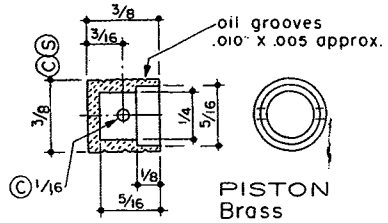
FOOT
Aluminum



FLYWHEEL
Any Metal



SCREW
Steel



PISTON
Brass