CHAPTER

22 V Twin

This engine is a tiny vertical twin wobbler. It features guides for the Crossheads, though it is quite a simple design. The one shown is mostly aluminum. The Pistons and Shafts are brass and the Flywheel and Crank Disks are steel.

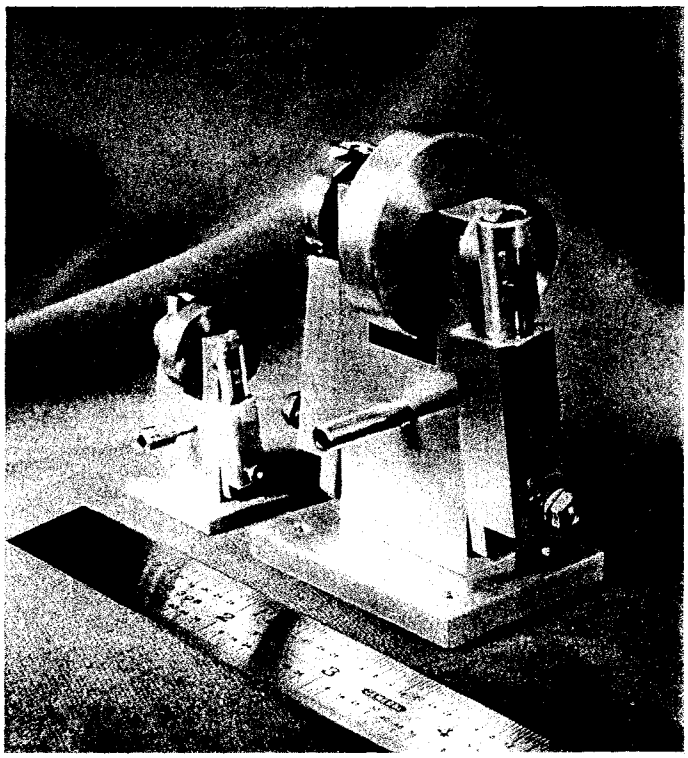
Start the **COLUMN** with clean square stock 1/4" x 3/4" x 1-1/2". Lay out and make the two Foot holes and the two Shaft holes. Mill the 3/8" opening. Make the drill jig from a 1/16" steel strip. Keep the edge **X** true and square. Insert close-fitting pins 3/32" diameter in the Column. Place the jig over the Pivot pin and hold side **X** against the Crankshaft pin. Drill #56 for the steam passage. Turn the jig over to get the other hole. Note — the two exhaust holes are shallow. Drill the intake holes from each face. Do not drill all the way through from one side. Drill the 1/16" exhaust holes and tap the SteamConnection as shown on section **AA**. Add a couple of oil holes for the Crankshaft. Make the Foot as shown.

For the **CYLINDERS**, square up the end of 5/16" x 5/16" x 1-9/16" stock and lay out the bore centerline 11/64" from one face. Center-punch and chuck in a 4-jaw, centering with a center test indicator. Turn the 9/32" diameter 9/16" long and make the 3/16" Cylinder bore. Lay out and make the Pivot hole and drill the #56 steam passage at **Y**. Mill or file to the sections shown at **A** and **B**. Later, when the Pistons are complete, insert a 3/32" close-fitting pin in the Pivot hole. Place the drill jig over this pin. Insert aPiston in the Cylinder and a 1/16" close fitting pin through the jig and the eye of the Piston. Drill #56 only 1/32" deep as shown. If you have an end mill smaller than 1/16", this is the place to use it. On this model, a 1/16" mill was used and precautions taken to keep the #56 hole outline accurate as drilled. If the mill alters the opening at **Z**, it will cancel out the accuracy your jig helped you get. Watch closely and stop short at hole **Z** and then clean up the small break-through with a needle file. Dress the Valve face smooth and flat on a sheet of very fine emery paper on a surface plate or a piece of plate glass.

Make two **PISTONS** of brass. Use the Cylinders as gauges to make close, free fits. Add oil grooves. Mill the flats and lay out the Crankpin holes. If the twoCylinders are not identical, keep eachPiston with its own Cylinder.

Make the two **SHAFTS** as shown. On theCrankshaft, make the shoulder-to-shoulder dimension about .005" greater than the width across the Column.

Make the **FLYWHEEL** and **CRANK DISKS** as shown. Set theCrank pins in the Disks with Loctite. After curing, start the assembly of the Crankshaft in the Column. Note - this is, more or less, a permanent job, so take care. It will not be easy to take apart. Insert the Crankshaft through the Column andFlywheel. Place a rubber band around the Flywheel and down around the bottom of the Column to prevent the Shaft and Flywheel from sliding around too freely. Snub it up quite tightly. Add one very tiny drop of oil to eachBearing. Rotate slightly to distribute the oil and then wipe off any excess. Now center the Shaft in the Column and carefully clean the 1/16" ends with a pipe cleaner and lacquer thinner, avoiding the 3/32" diameter of the Shaft. The oil will prevent the Loctite from locking up the Shaft in the Column. Clean the bores of the Disks with lacquer thinner and apply a small amount of #601 Locite to the bore only (not on the Shaft). Place the two Disks on the Shaft, rotating slightly to distribute the Loctite. Don't dally too long because 601 is fast acting. Line up the Crank pins 180° apart by eye and set aside to cure. If you can work up a simple, fast way to get 180°, good, but a few degrees off won't make much difference in the performance. Center the Flywheel and tighten the set screw.



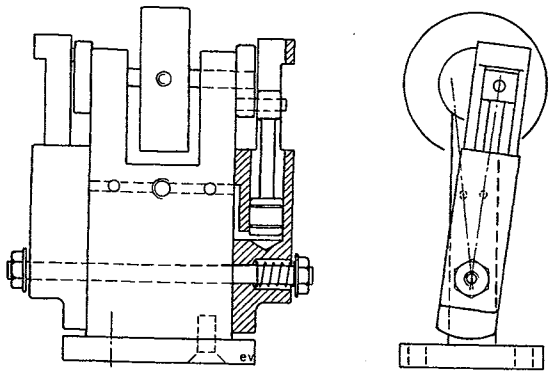
If this photo looks familiar, it is because it also appears on page 9. The *V Twin* described in this chapter is a small version of the *Twin Vertical Wobbler* presented in Chapter 2 and shows that you can take many of these designs and enlarge or reduce them to suit your particular desires, capabilities or equipment.

The **SPRINGS** are salvage and about the proportions shown.

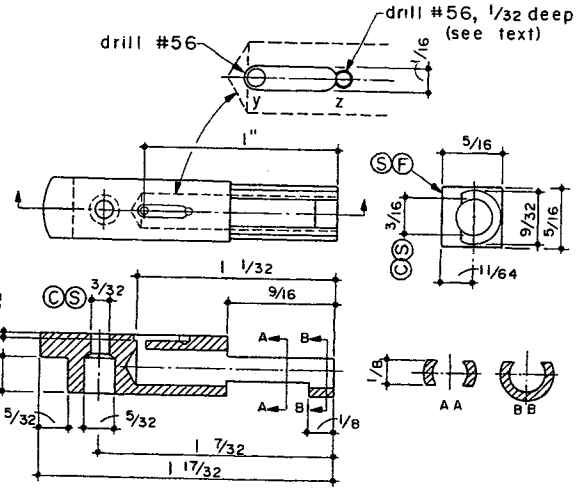
The **STEAM CONNECTION** is an adapter for 3/16" aquarium tubing.

Complete the assembly, lubricate and make a trial run on 5 to 10 pounds of air.

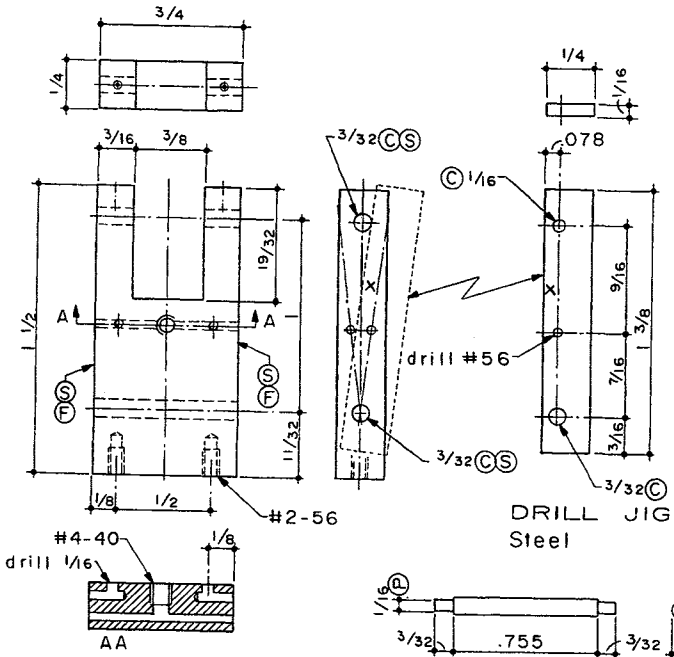
This is a smooth running, high-speed engine, since it has good balance.



V TWIN



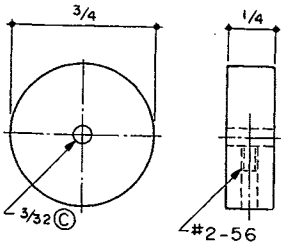
CYLINDER
Hard Aluminum
2 Required



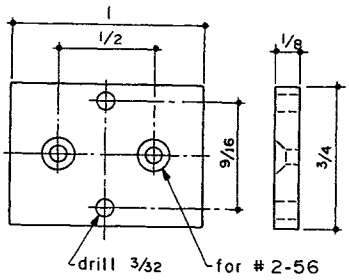
DRILL JIG
Steel

COLUMN
Aluminum

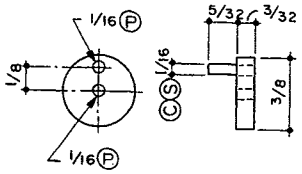
CRANKSHAFT
Steel



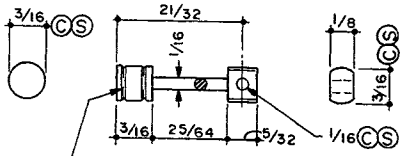
FLYWHEEL
Steel



FOOT
Aluminum

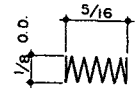


CRANK DISC
Steel
2 Required

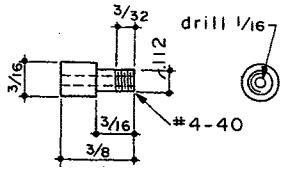


Oil grooves approx.
.010 wide x .005 deep

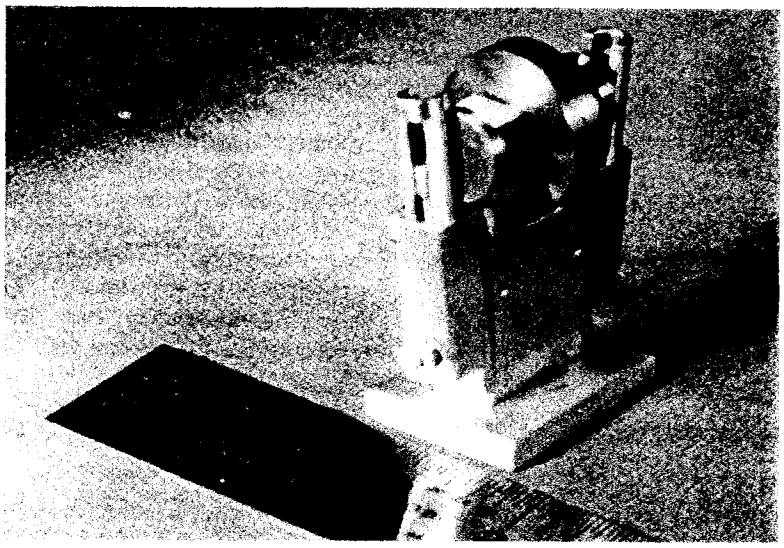
PISTON AND ROD
Brass
2 Required

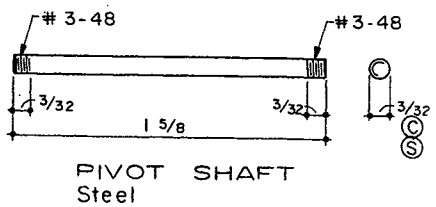


SPRING
.015 Wire
Steel
2 Required



STEAM CON.
Brass





PIVOT SHAFT
Steel

safety first

double-check your set-up