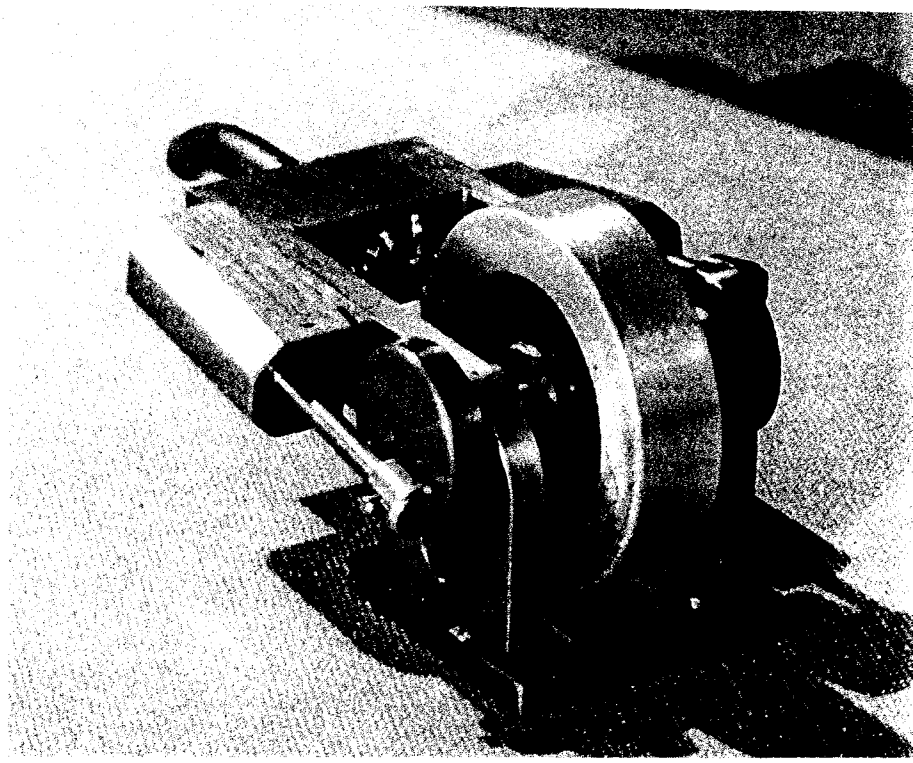
CHAPTER

# 9 H Twin



This horizontal twin, in a way, suggests a miniature *Tangye*. It is mostly of brass because of the soldering.

Starting with the **FRAME**, make two side pieces about 1/16" oversize on all edges. Mill the top edges and the 7/8" ends true and square. Apply layout dye to one piece and lay out the rest of the Frame and the 2-56 screw at **X** and another at **Y**. Clamp the two pieces together with top and end in good alignment. Drill through at **X** and **Y** with a #50 drill. Tap one Frame 2-56. Enlarge the holes in the other Frame and countersink for the 2-56 x 1/4" flat head screws. Fasten the two pieces together and mill the rest of the outline squarely to the layout lines. Layout, drill and ream for the 1/4" O.D. bushings and for the 3/32" pivot holes. Lay out, drill and tap four 2-56 holes for the Foot. Separate the two pieces. Drill out the tapped holes at **X** in the one Frame and countersink for 2-56 flat head screws. Note — make right hand and left hand Frames when countersinking. Drill out the holes at **Y** to about 1/4". A clean drilled hole looks better than an unused bolt hole.

Make the **PORT BLOCK** and the **FOOT** of brass as shown. This calls for squareness and accuracy to preserve the Shaft alignment at assembly. Coat the ends of the port block and the bottoms of the side Frames with a light coat of solder. Coat the side Frames at the port block area and the Foot piece where it meets the side Frames with soldering flux. Assemble with 2-56 screws and insert close-fitting pins across through the 3/32" and 1/4" holes to help keep the Shaft alignment. Apply heat at each joint and tighten the screws when the solder melts. If you have the right amount of solder, a neat tiny fillet will be formed in the corners.

Make the **DRILL JIG** and **LOCATING PIN** of steel. Insert the Locating Pin. Insert a 3/32" x 1-1/8" rod in the pivot holes and the 3/32" jig hole. Holding the jig edge **Z** against the 1/8" Locating Pin, drill the #57 starter hole in the Frame. Turn the jig over to make the other port hole. Do the same on the opposite side of the Frame. Note — on the upper hole, drill halfway from each side. Do not drill all the way through from one side. The exhaust holes are 5/16" deep from each side. Apply layout dye to the port end of the assembly and to the bottom of the port area. Pick up and transfer the upper hole centerline to the end and then locate the 3/16" steam connection; drill and tap. Transfer the lower hole centerline to the bottom of the block. Locate and drill two 1/16" exhaust holes.

Make two **CYLINDERS** from clean and accurate 3/8" x 3/8" x 13/16" brass blocks. Lay out the center of the 1/4" bore offset as shown and prick punch. Do the same for the 3/32" Pivot Shaft. Chuck in the 4-jaw and center for the 1/4" bore, using a center test indicator. Square up the bottom with a boring bar. On the last boring, cut before reaming, make an undercut at the bottom for reamer runout. Do not leave a shoulder for the Piston to strike. Chuck again, this time for the pivot valve face. Add a small bit of metal under the jaw at the bore-end of the Cylinder. Check for squareness in the chuck. Face, undercut and drill for the 3/32" pivot pin.

Make the two brass **PIVOT PINS** 17/32" long. Drill the cross holes for the spring retaining pin. Make a close free-fitting aluminum pin to enter the 1/4" bore of the Cylinder. Apply a thin coat of flux to the end of the 3/32" pin and the pivot hole. Cut about 1/32" or less piece of 1/16" low-temperature silver solder and lay it up against the Shaft and apply heat with a propane torch. Heat the entire Cylinder until the solder melts and flows down around the shaft. Using too much solder will leave a mound that will prevent the Cylinder from seating. The solder will not stick to the aluminum.

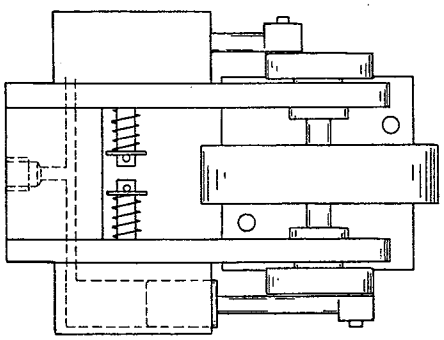
For the **PISTON** and **ROD**, chuck a piece of 5/16" rod in the 3-jaw with about 1-5/8" projecting. Centerdrill for the tailstock center. Start the cuts far enough in that the end with center can be cut away later. Use the Cylinder as a gauge for a close fit. Keep each Piston with its own Cylinder. Make parting cuts to length. Mill the crank end to 9/64" and make the 1/16" pin hole. Insert a Piston into its own Cylinder. Place the drill jig over the 3/32" pivot and run a close-fitting 1/16" pin through the jig and the eye in the Rod. Drill the #57 port hole in the Cylinder.

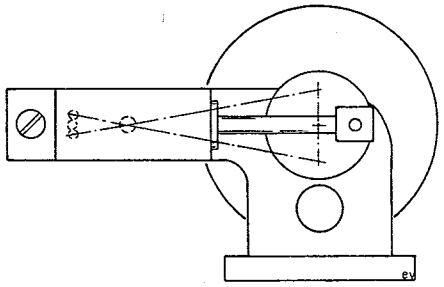
Make the **SHAFT** and **CRANK DISKS** as shown. Set the 1/16" crank pins with Loctite.

The **SPRINGS** on this model are about the dimensions shown. They came from the odds-and-ends drawer and seem just right for this job.

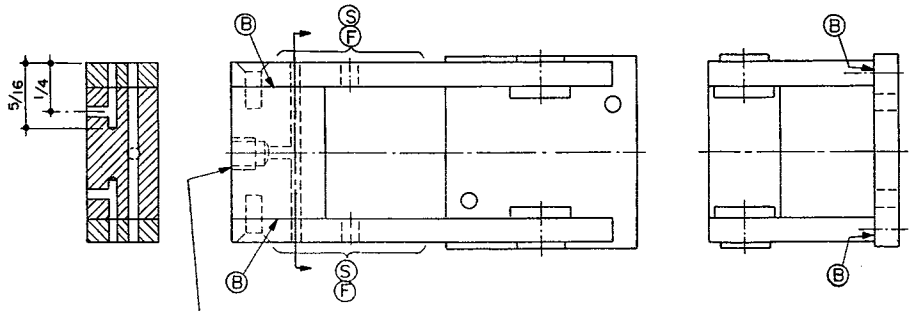
The **FLYWHEEL** is simply 1-1/4" O.D. x 5/16" wide fitted with a setscrew. The pressure of the screw is transmitted to the Shaft by a loose pin in the tapdrill hole.

This is a pretty well balanced engine and it runs fine on as little as 5 to 10 pounds of air.

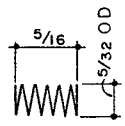




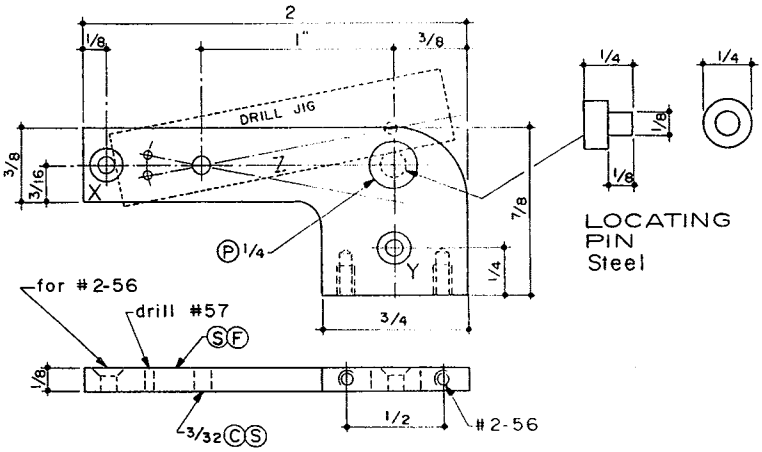
H TWIN




FRAME ASSEMBLY
see text

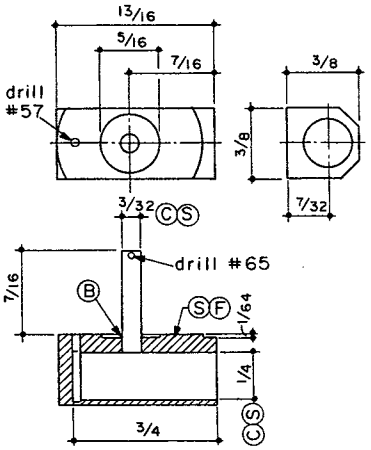



SPRING
Steel
.020" WIRE
2 Required

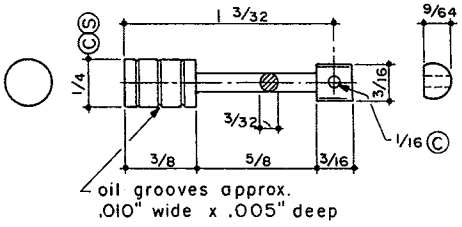



LOCATING
PIN
Steel

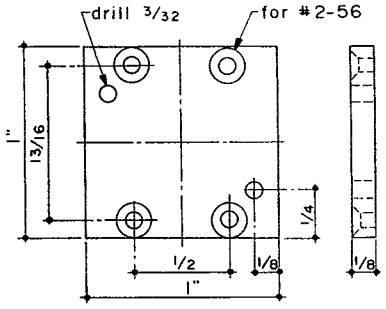
FRAME
Brass, 2 Required
1: RH and 1: LH see text



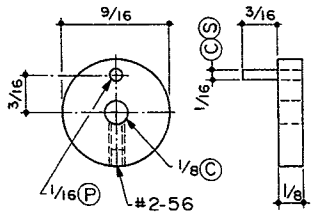

CYLINDER
Brass
2 Required



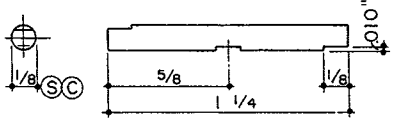

PISTON AND ROD
Brass
2 Required



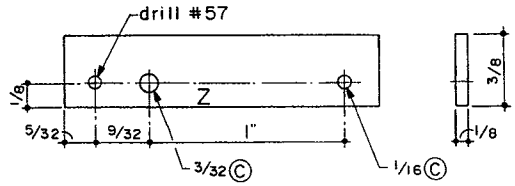

FOOT
Brass



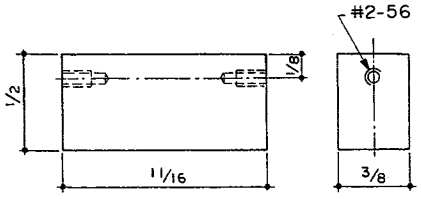

CRANK
Brass
2 Required



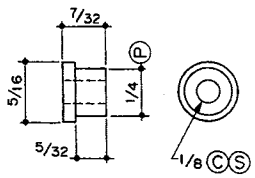

CRANKSHAFT
Brass



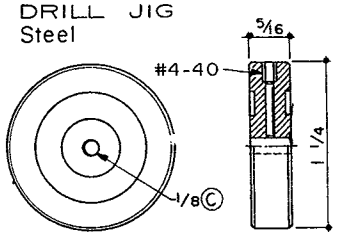

DRILL JIG
Steel




PORT BLOCK
Brass




BEARING
Brass
2 Required




FLYWHEEL
Brass