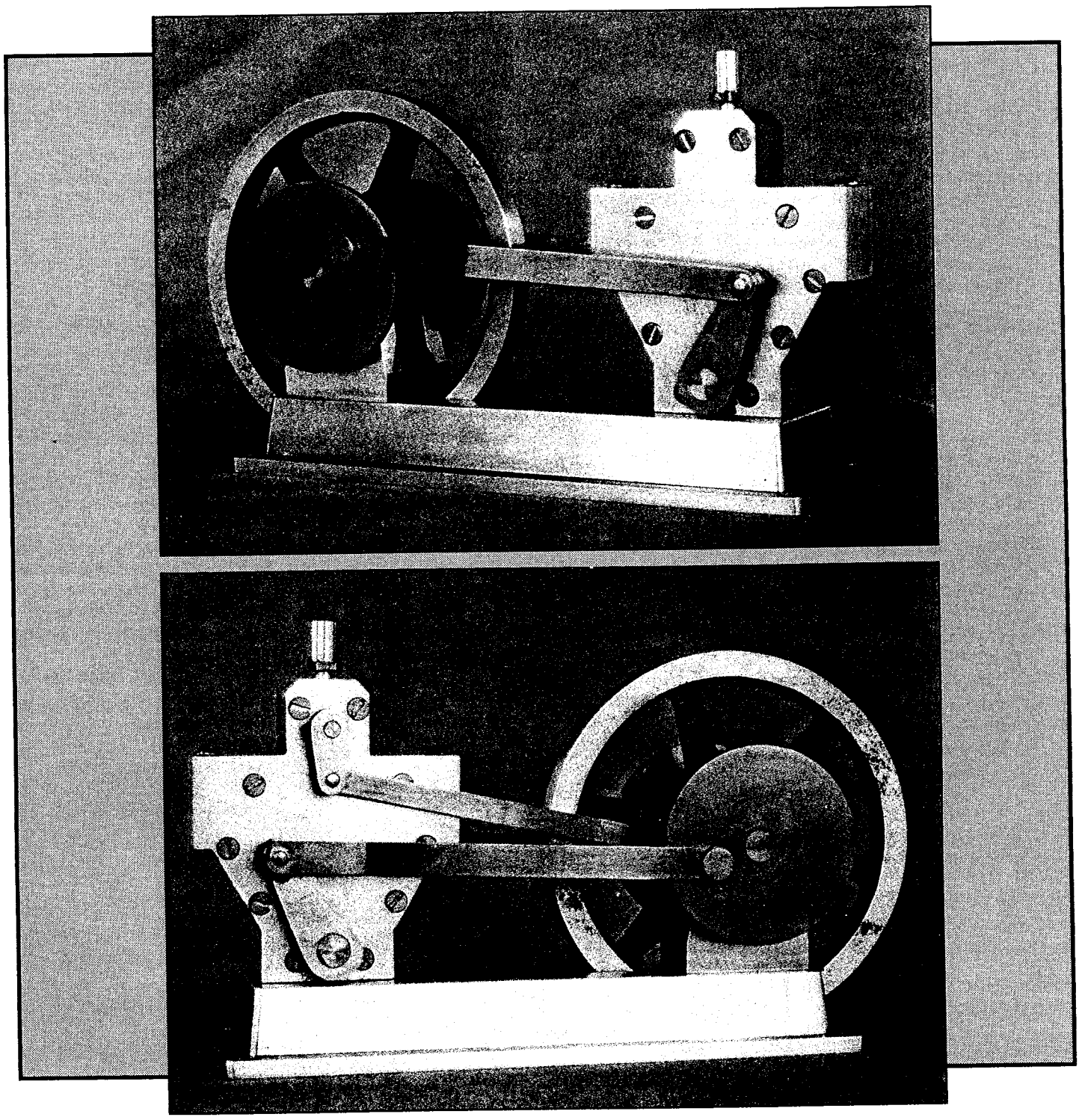
CHAPTER

20

Take a look at this pistonless

Kimble Engine



The suggestion for this engine came from Basil Moored of Cadillac, Michigan, and it makes an interesting project. Miniaturizing it was a bit of a problem. Here it is more of a compressed air engine than Live Steam, but it is a good conversation piece and fun to show off. Some will say it is over-simplified but it was hard to find room for stuffing boxes, etc. Close fits at the shaft openings with some lubrication makes a fair seal on compressed air. It ran fine on as little as 5 pounds of air and slow enough to see the action. This is not intended as a hard working engine, but you may make changes to suit your ideas.

The drawings show most of the details, so only some passing remarks will be made on problems that came up during design and construction.

On the **BASE**, make the optional 1/16" bevel the last operation. In that way you have square surfaces for layout and machining.

When making the **FLYWHEEL**, lay out and drill all 24 holes before turning. Scribe lines tangent to the holes; saw and file the spokes to shape, then center in the 4-jaw using a center test indicator and turn and bore.

The engine **BODY** and **VANE** (what do you call them? It isn't a cylinder nor is the vane a piston) are critical in thickness. When all is done, the Vane should be about 1/2 thousandths free between the two covers. When making the Vane and **VANE SHAFT**, try for a very close and square fit at the "mortise and tenon." Keep the Shaft flats in the same plane and parallel to the Vane so the position of the Arms indicate the position of the Vane hidden inside the Body. Don't pile on too much solder. It will interfere with the Vane movement.

The **VANE SPRING** is a cut-and-try job. The general proportions are shown. You may make several before you're satisfied. It should only be strong enough to hold the seal against the bore with a minimum of drag.

When making the **CRANK DISKS**, **VANE ARMS** and **CONNECTING RODS**, in each case clamp the two together so spacing between the holes is identical. The Right Hand and Left Hand form for the Arms and the disks make it possible to assemble with the set screws on the outside for easy access. On the Vane Arms, especially, spot the set screws carefully at 90 degrees from the Arm centerline.

The two **BEARINGS** are mounted on the Base and lined up in the cross-slide milling attachment for boring and reaming for the Shaft. Mark each so they can be returned to the spot where they were machined. The Bearings on the model shown are fairly hard aluminum, though brass is perhaps more durable.

To plug the 1/16" holes called for in the **BODY** in operation 4, a small piece of aluminum was chucked and turned to about .065" diameter for about 1-1/2 times the required length and then carefully filed to a taper that entered the hole about half way. A very light dab of Loctite was applied and the pin driven in, cut off and filed flush. Note that the pins mentioned in operation 10 must dress flush in the valve bore.

The **VALVE** is a fine, close-fitting turning job. The steam passages were done with an indexing setup.

TIMING this engine takes a bit of patience. Assemble the engine omitting the Front Cover (Valve Shaft side), the front Vane Arm and Connecting Rod. Just snug up the set screw in the rear Crank disk.

Mount the Valve Arm loose on the Valve Shaft with the Eccentric Strap in place. Rotate the Valve until the marks on the end line up with one or the other port marks on the Body. Hold in that position and rotate the Flywheel until the Arm is in the same extreme position. Snug up the Valve Arm set screw. Now 180° rotation of the Flywheel should show the Valve lined up with the other set of scribed lines. If it doesn't quite match, divide the difference and give it a try and tighten the set screw. Scribe the line **C** across the Arm and Shaft.

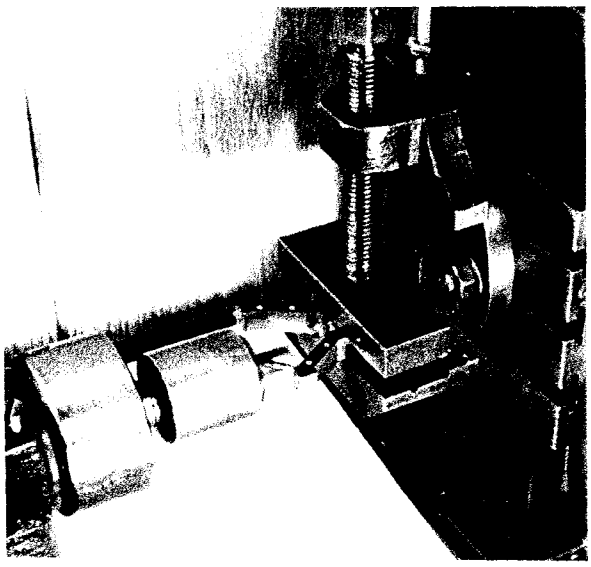
With the Valve at one extreme, rotate the rear Crank Disk until the Arm and Vane are verticle at midstroke. Tighten the Crank Disk set screw. Now, when the Vane is vertical, the Valve should be at one end of its stroke with full steam flowing to the Vane as shown in the assembly drawing.

Make sure there is a coat of light oil on the Vane and inside the Body. Remove Valve Arm and assemble Cover to Body. Remount Valve Arm, lining up with the mark on the end of the Valve Shaft. Add Vane Arm, Connecting Rod and Crank Disk and snug up set screws. Rotate the Flywheel. If it turns free, seat the set screws. If there is a bit of binding, juggle the Disk and Arm slightly to match the opposite Arm and Disk until the engine turns free.

Add a few drops of light oil in the air inlet before attaching the air line. If all is well, the engine will run good on as little as 5 to 10 pounds of air.

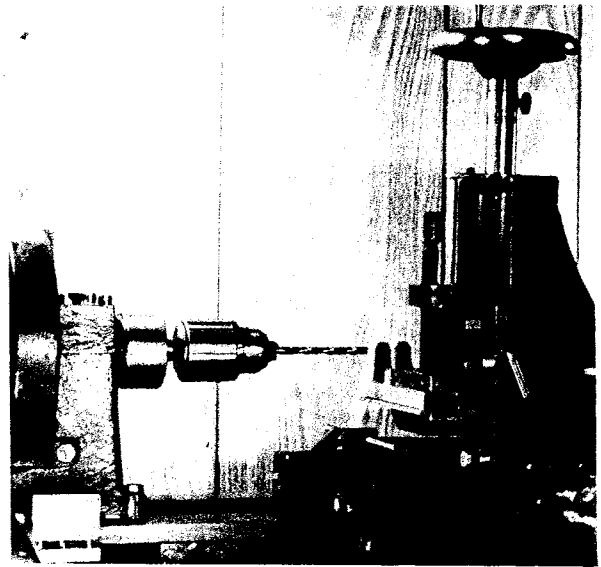
No attempt has been made to control the exhaust.

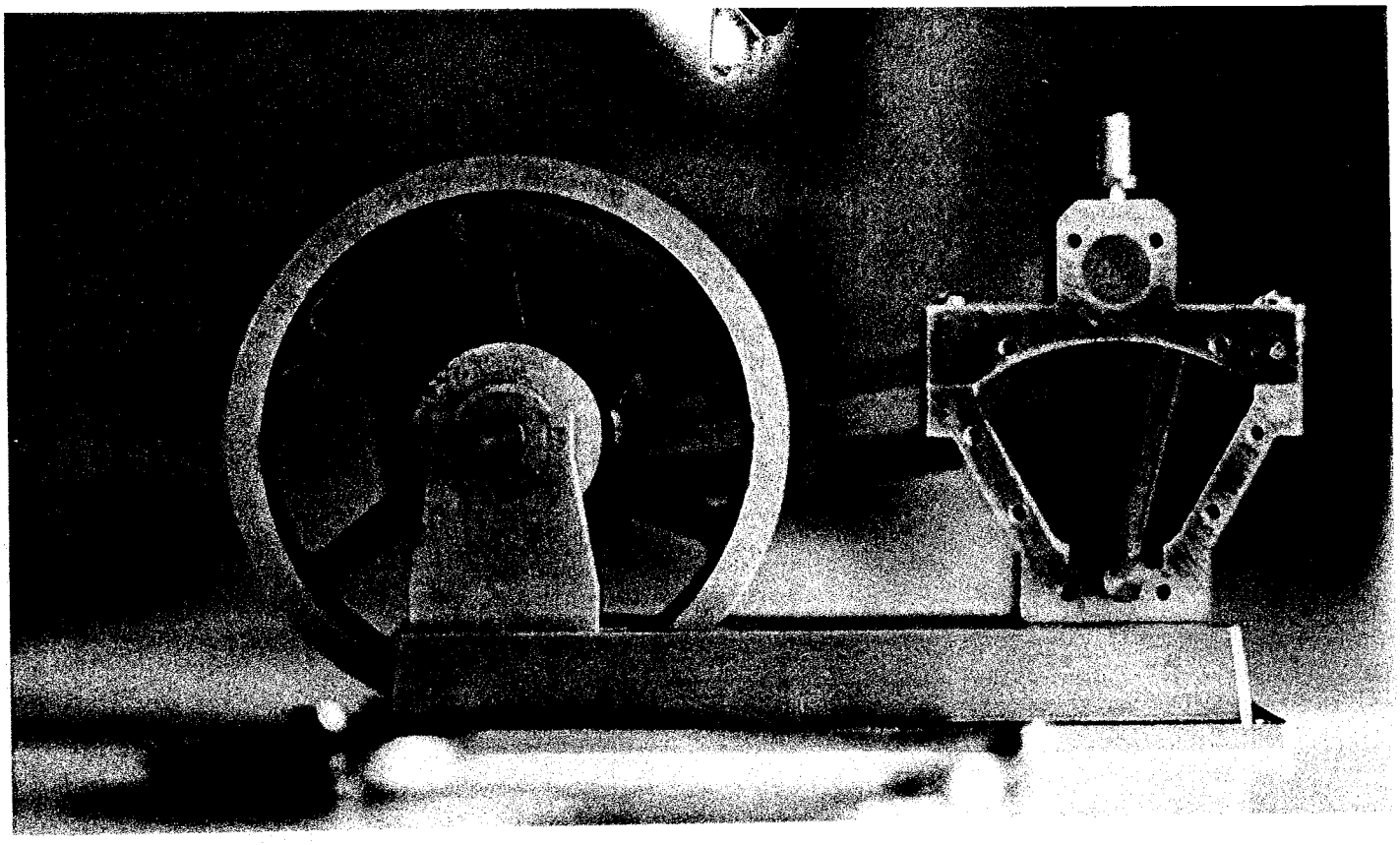
You should have a lot of fun building and operating this unusual engine for your friends for many years to come.



Milling the Engine Body (**left**) as shown in Step 9 on the drawings.

Boring for the Crankshaft (**right**) in the Bearings mounted on the Base.

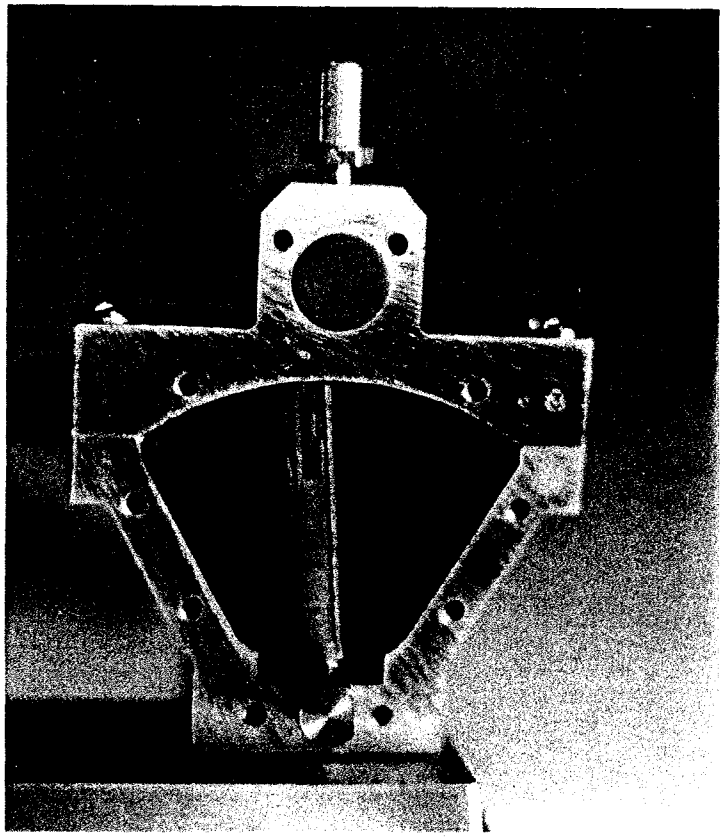




THE KIMBLE STORY

by William C. Fitt

with lots of help from Chet Sperry



A view of the Engine with the Vane exposed is shown on the opposite page.

A detail of the Seal with its Spring (above), and its location in the completed Vane (right)

When **MODELTEC**er Basil Moored stopped in one day to ask if we could copy a tattered old flyer about a steam engine, we asked if we could make a few extra copies for our files. It was an unusual engine shown in a copy of the flyer printed in reduced size on the facing page. We explained that Elmer Verburg would surely be interested in this engine and so we sent him a copy. As is typical of these events with Elmer, he soon called to say that he had built the engine and had it running! The plans and instructions for building one of these intriguing projects is given on these pages.

Since the Kimble engine was built in Kalamazoo, Michigan, we checked with **MODELTEC**er Chet Sperry of that city and he collected some material about the firm for us.

J. Emory Kimble was born in Brady Township, Kalamazoo County, Michigan, on November 16th, 1850. He left the farm home at the age of 20 and entered the grocery trade with his father in Vicksburg, Michigan, but sold the business in 1873. Emory then began operating one of the first steam threshers in Kalamazoo County and was involved in that operation for four years.

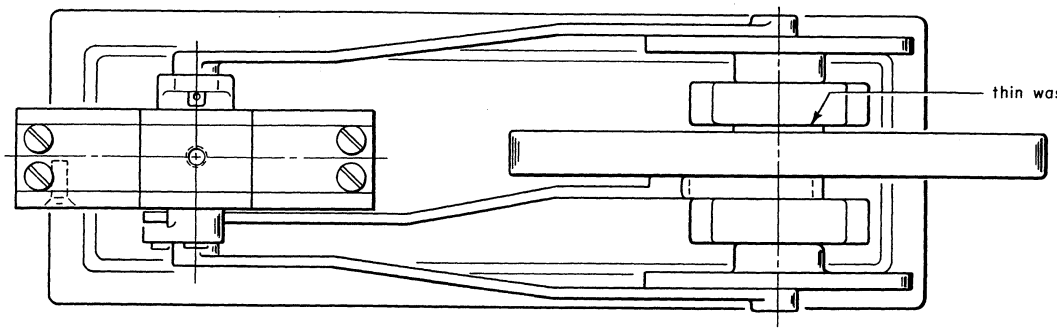
He then invented a separator and manufactured that in partnership with J. K. Wagner and John Fleming under the name of the Kimble Manuafcturing Company. That business was eventually sold to a Mr. den Blyker and, with Mr. den Blyker, Emory Kimble was engaged for a time in the manufacture of threshing engines.

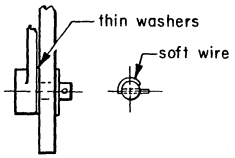
He invented the accolating piston engine known as the Kimble Engine which was manufactured by the Comstock Manufacturing Company of Comstock, Michigan, near Kalamazoo. This is the engine which Elmer Verburg's model is patterned after. The engines were made in sizes from 2 to 45 horsepower. In 1898, they enlarged their quarters to handle expanded orders, including shipments to Mexico, Norway, Belgium, Russia and Hawaii . . . and a large shipment to Dallas, Texas. The plant was a building 60; x 100' with a basement in which was located a gas plant that produced lighting for the building. On that level was also a boiler for heating the plant and for testing the engines . . . and a water wheel that operated the machinery in the plant. "By taking a half turn on the lever that opens the gate to let the water in on the wheel, all of the machinery was started. Everything runs in such smooth motion that it is musical to listen," according to the writer of an early twentieth century history of Comstock. On the floor above, manufacturing of the engines was carried on, employing 20 workmen and turning out about 25 engines per month. The firm had its own foundry in separate buildings to provide the castings for their engine production.

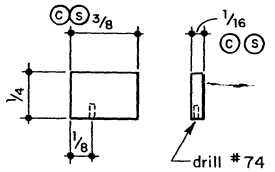
Apparently never idle, Emory next designed and built the Jewel automobile engine which was manufactured by the C. H. Dutton Company of Kalamazoo. (The C. H. Dutton Company was still using a 75HP Jewel engine to run the machine shop line shaft when Chet Sperry went to work there in 1941. The Jewel I.C. engine was later replaced by electric motors but the line shaft still propelled the machinery in the shop until they closed their doors about 1960!)

Later, Mr. Kimble designed the Gem automatic engine for the Clark Manufacturing Company of Kalamazoo and, still later, invented the governor made by the Eclipse Governor Company of Vicksburg. The Eclipse Governor Company was formed in 1892 as a co-partnership with J. E. Kimble, Ransom Kimble and Dr. McKain which carried on the operations until 1899. At that point a stock company was formed to operate the businesses with J. E. Kimble as President, his wife, Frankie, as Vice President and their son, Roy, as Secretary and Treasurer.

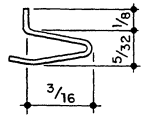
Records of the final days of the Kimble story seem to be lost in antiquity but, through the interests of Basil Moored, the ingenuity of Elmer Verburg and the inquisitiveness of Chet Sperry, the inventive prowess of J. Emory Kimble will be recorded for future generations.



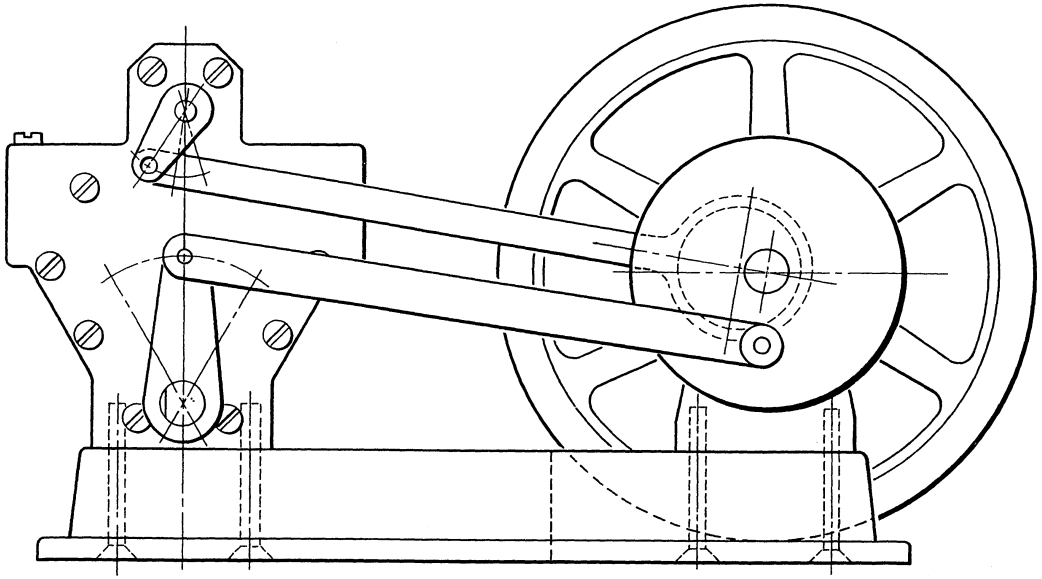


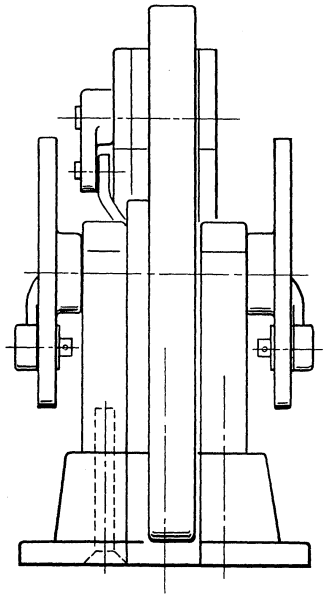


SEAL
Brass



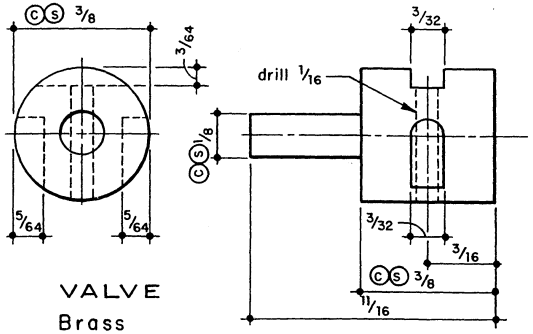
SPRING
Stainless Steel
.016 wire



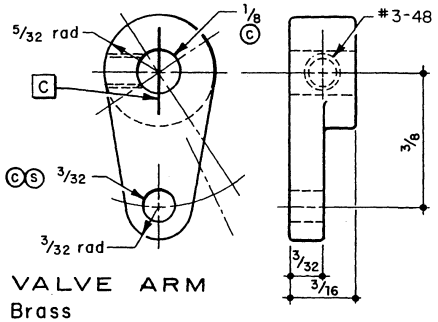


KIMBLE ENGINE

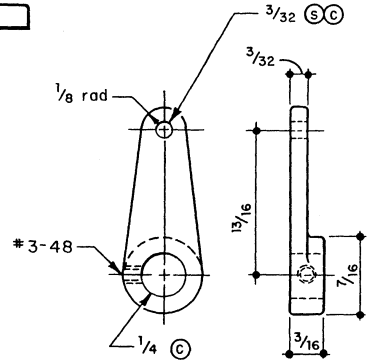
C	close fit
S	smooth
B	braze or solder
F	flat
P	parallel



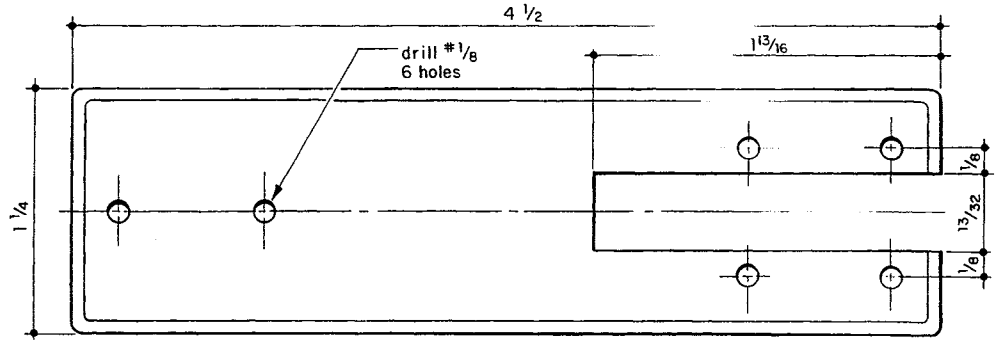
VALVE
Brass

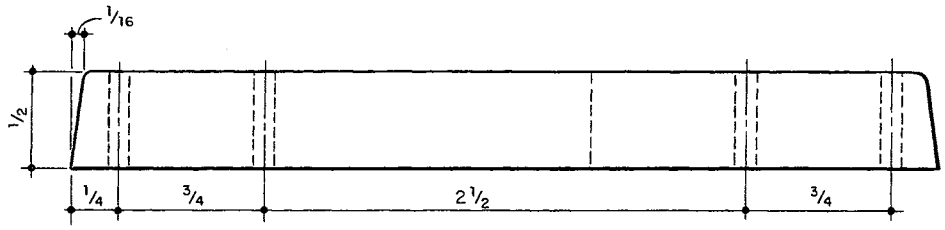


VALVE ARM
Brass

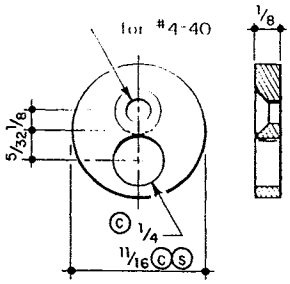


VANE ARM
Brass or Steel, 2 required:
1 right hand and 1 left hand

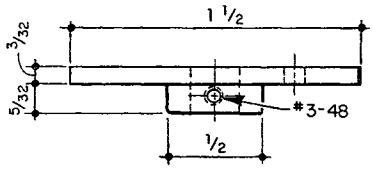


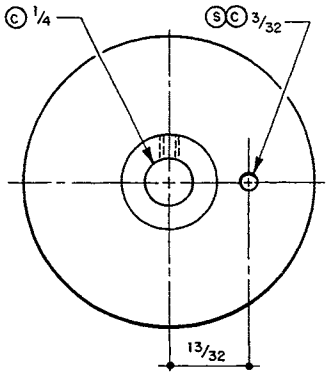


BASE
Aluminum or Steel

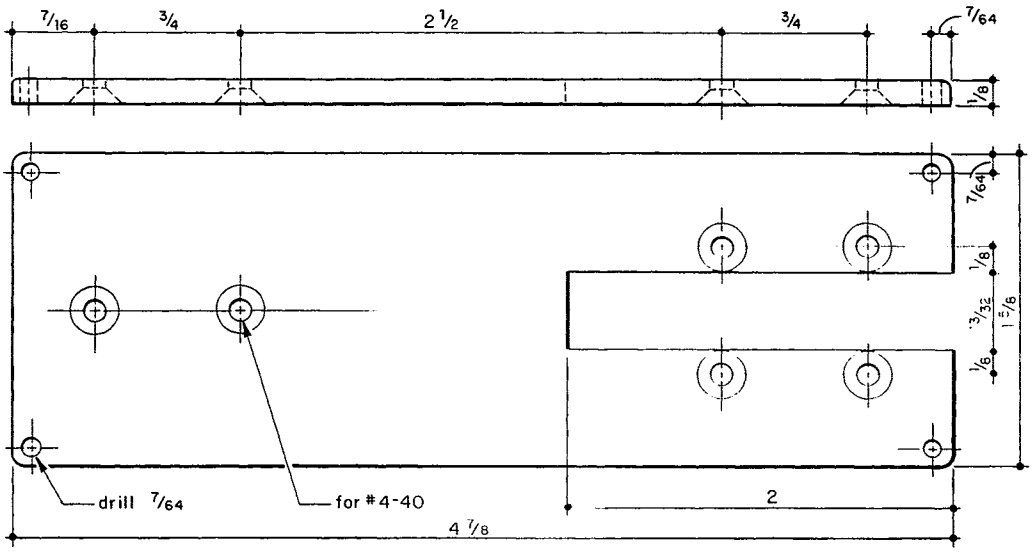


ECCENTRIC
Steel

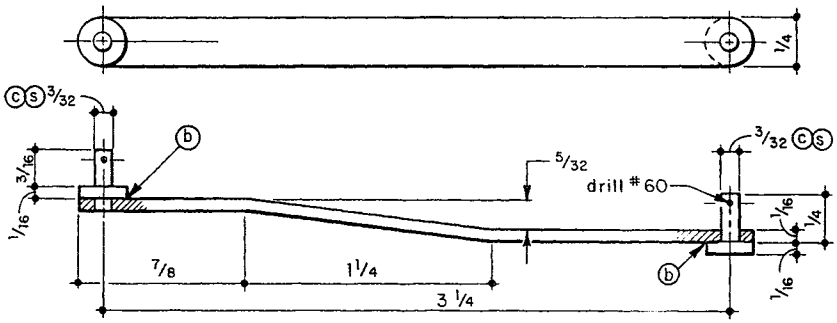




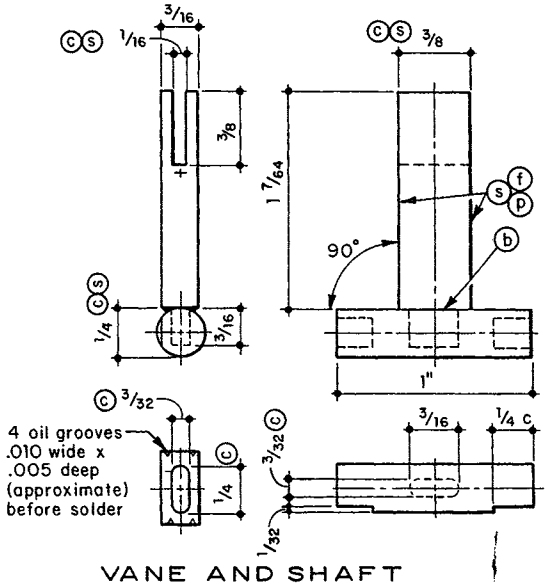
CRANK DISK
Steel, 2 required:
1 right hand
1 left hand



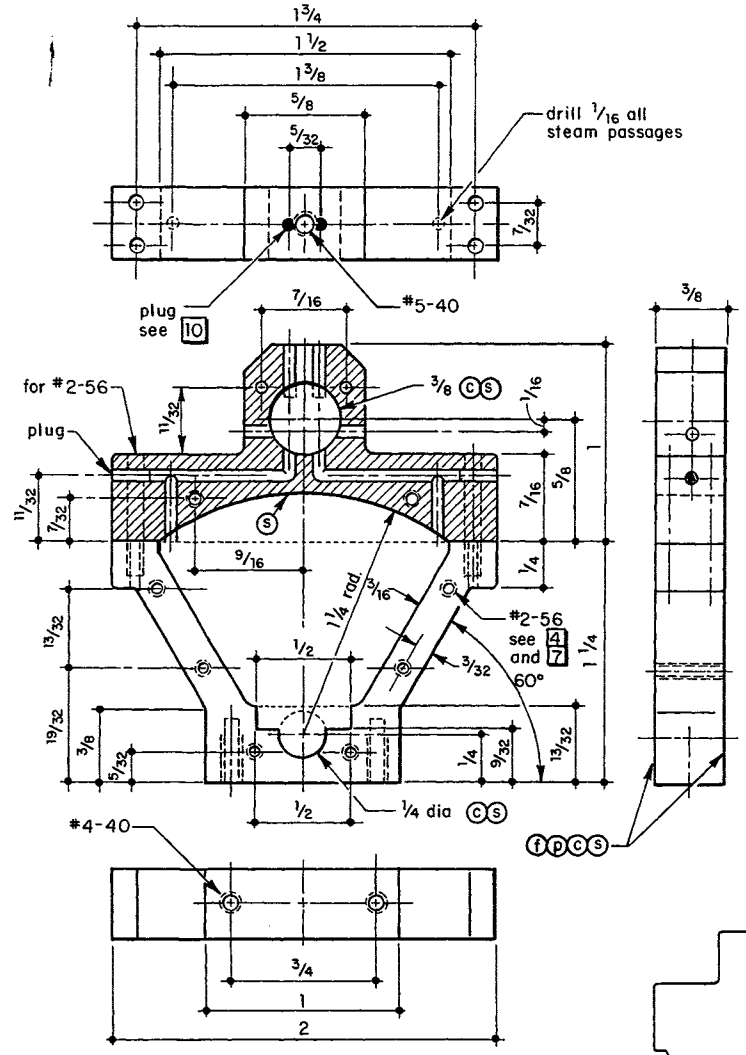
SUB-BASE
Aluminum or Steel



CONNECTING ROD
Brass, 2 required

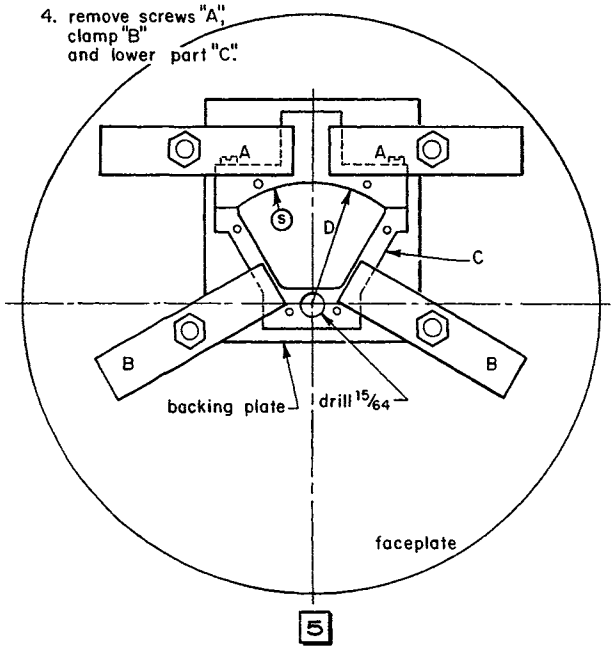


VANE AND SHAFT
Brass

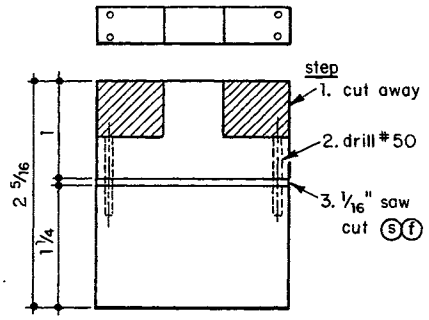


ENGINE BODY
Brass or Aluminum

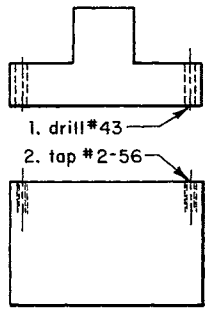
1. bolt body together
2. center body on faceplate
3. drill 15/64
4. remove screws "A", clamp "B" and lower part "C".
5. turn radius D until you reach 1 1/2" dimension shown on 10



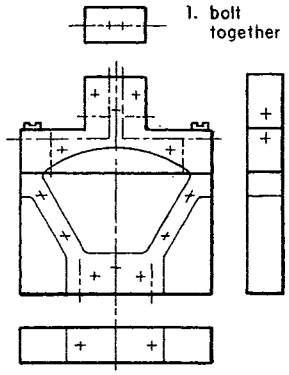
5



OPERATION 1

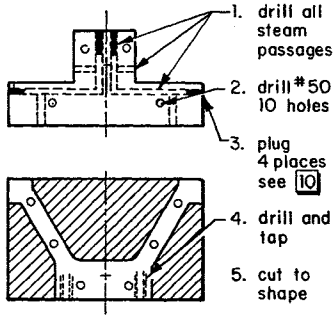


2

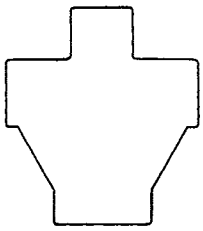


2. layout all centers and outlines

3



4

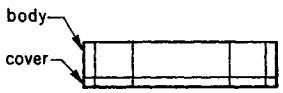


make 2 covers 3/32" thick aluminum or brass.

must be smooth and flat.

scribe around body for shape.

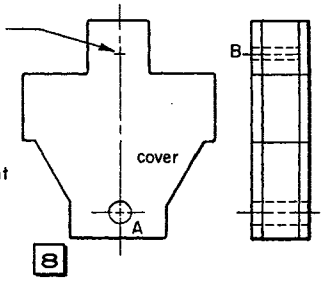
6



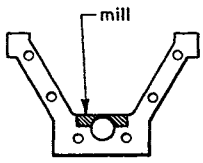
1. clamp together
2. drill #50, 10 holes and drill 15/64 each cover
3. tap body #2-56
4. drill cover #43 and countersink.

7

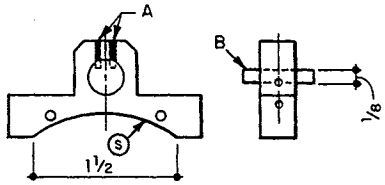
1. layout valve center
2. bolt covers to body
3. ream 1/4" at "A"
4. remove rear cover
5. drill #33 thru front cover and body, ream 1/8" at "B"



8

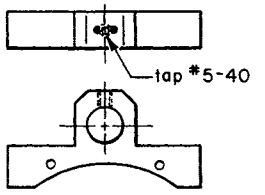


9

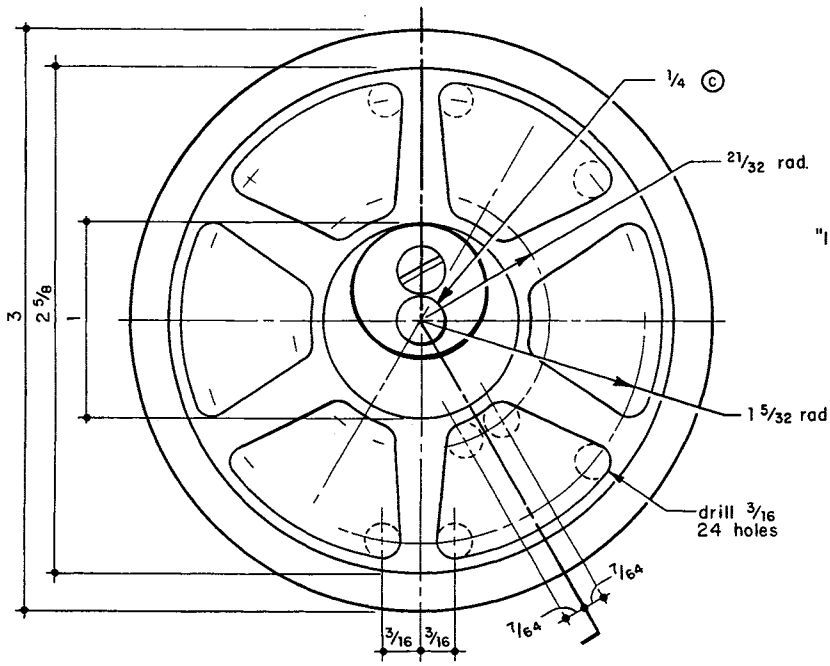


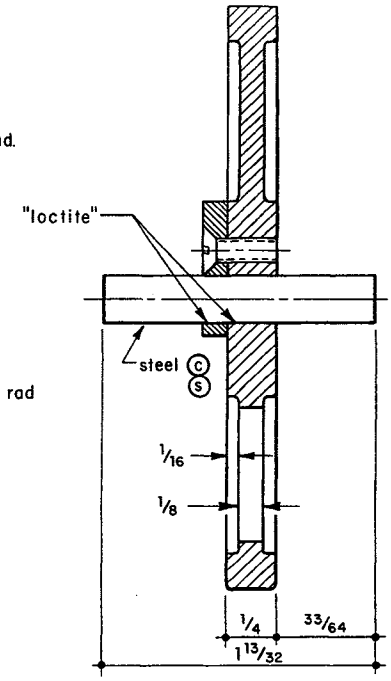
1. tightly plug holes "A" deep enough to dress flush when valve bore is reamed
2. center in chuck or faceplate indicating off close fitting pin "B"
3. bore and ream for valve

10

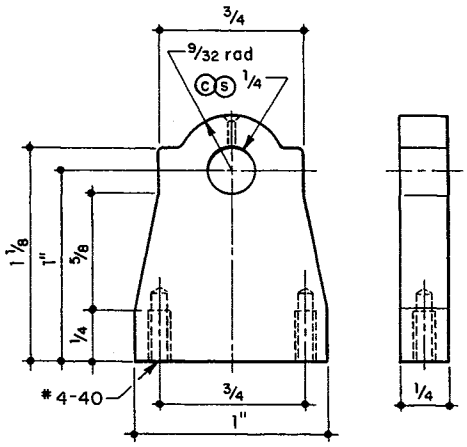


11

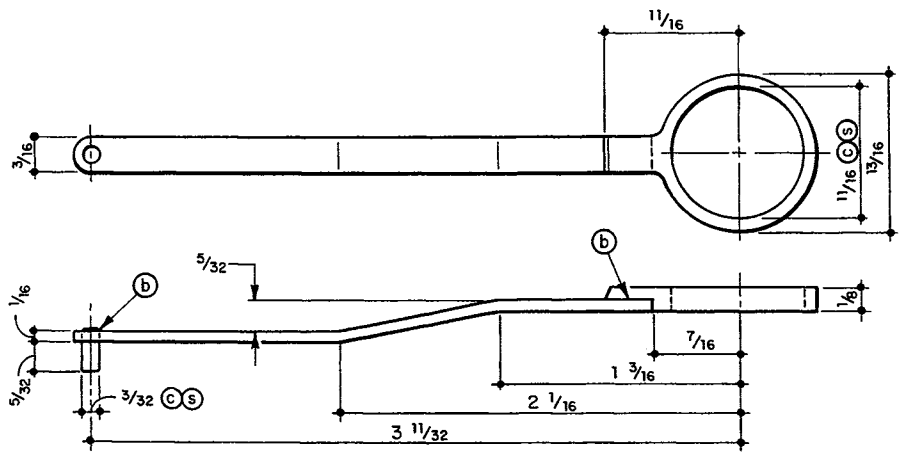




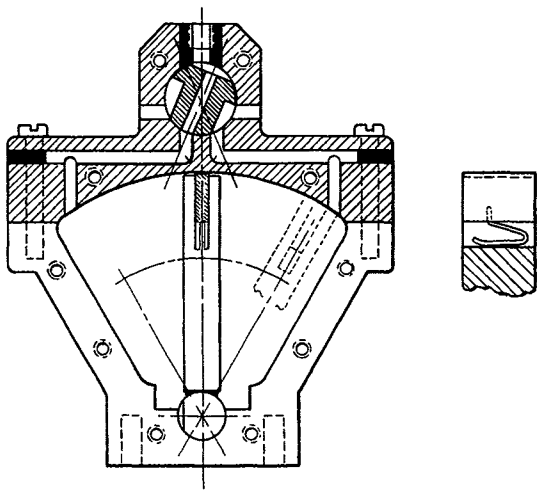
FLYWHEEL AND ECCENTRIC
Aluminum or Steel

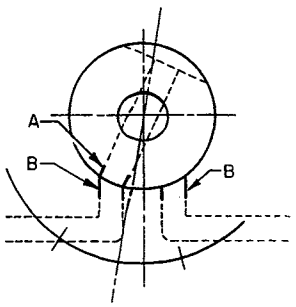


CONNECTING ROD
Brass, 2 required



ECCENTRIC STRAP
Brass





PORT SETTING

scribe lines on end of valve at "A" and face of body at "B" indicating location of ports. when valve timing is set scribe line "C" across shaft and arm. (see valve arm detail)