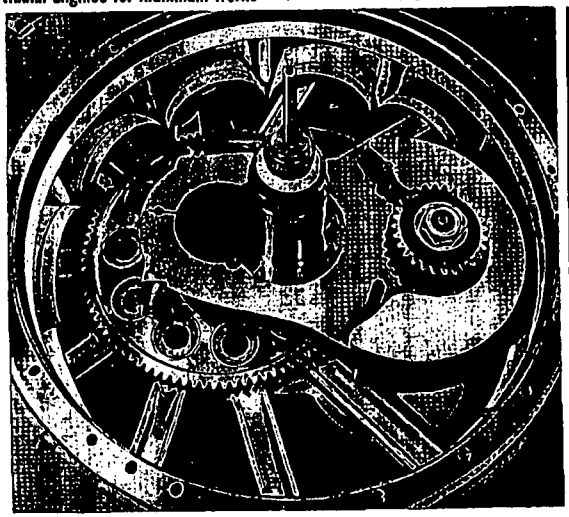
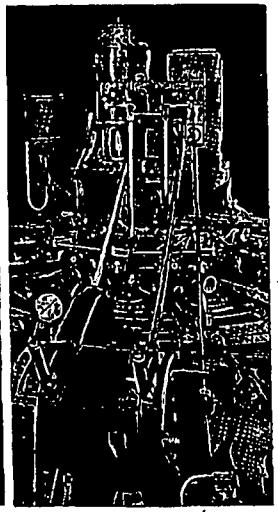
Radial Engines for Aluminum Works

(Continued from page 95)



CONNECTING-ROD ASSEMBLY of unique design eliminates master rod, provides complete balancing. Stationary gear on cover, not shown, meshes with upper pinion



CONTROLS are dual, providing for operation with either gas or oil as fuel

As shown in the photo above, the engine has 11 cylinders of 14-in. bore and 16-in. stroke. At 400 rpm it develops 1800 hp or 1250 kw. Operating on the 2-stroke cycle, it has a motor-driven centrifugal scavenging blower mounted on the floor, at right rear in the photo, under the main platform. The blower motor and the other auxiliaries operate on 25-cycle ac from slip-rings on the dc generator. This arrangement permits quick starting without an outside power source and also without need for excessive interrupting capacity. Since the blower motor requires about 100-kw input, the net capacity of the set is 1150 kw. (See also pp 138, 172.)

The exhaust header can be seen just below the operating platform encircling the engine. Another straight manifold, which is not visible, supplies the scavenging air to the cylinders. Headers above and below the cylinder heads are for cooling water. Auxiliaries—water and oil pumps, etc—under the main platform cannot be seen in the photo.

Radial design with the generator below produces a balanced engine requiring a relatively simple and inexpensive foundation, low headroom and comparatively little floor space. The unit is about 12 ft in diameter across the cylinder heads and about 15 ft high from the base to the top of cylinder assembly.

Engine crankshaft is vertical, with the crank at the top and the generator below in the coolest zone. Engine and generator shafts bolt together just below the engine; generator shaft has a steady bearing at the base. This prototype unit has concrete supporting piers; the sets for the aluminum works in Texas will have cast-iron supports.

The cylinders bolt to a central frame consisting of a single casting having a central hub that carries the lower crankshaft main-bearing bushing and a thrust bearing that supports the crankshaft and generator load. A cover bolted to the top of the frame carries upper main-bearing bushing; mounted on this cover are the governor, fuel pumps and control mechanisms. Cylinders have ports for inlet and exhaust; there are no valves.

Method of attaching connecting rods to the crankpin is unique and eliminates the master rod often used in radial designs. As shown in the photo above, the connecting rods have a bronze bushing at the crankpin end. Pins connect rods with a master gear assembly. Counterweight shown carries two pinions: one below (not visible) which meshes with the master gear, and another above on the same shaft, which meshes with a stationary gear fastened to the cover and not shown. The master gear does not rotate, but its gyratory action causes the pinions to "walk" around it, rotating the counterweight. All bearings, including the mains, are bushings; there are no split bearings.

Mechanical lubricators force-feed the cylinders; all other parts are lubricated by a circulating pressure system. A motor-driven rotary lube-oil pump takes its suction from the sump tank and discharges to the lower main bearing. Oil then enters a drilled passage in the shaft and is distributed to crankpin bearings in the master gear, to the pinion bearings and to the upper main bearing. Drilled passages in the connecting rods supply oil to the wristpins. Aluminum alloy pistons are oil cooled.

Units of this design will be built as oil diesels, spark-ignition gas engines, and dualfuel engines capable of operating with either oil or gas fuel on the diesel cycle. The engine shown at East St. Louis was built for use of both oil and gas, with dual controls (see photo above). The 80 engines on order are for gas, with spark ignition.

5,000,000 Youngsters Need Our Help Now

THE bumper wartime crop of babies, about 5,000,000 larger than the population experts expected, is reaching school age.

At school these youngsters should find a good education awaiting them. That is their most cherished American birthright.

But unless something is done quickly, millions of these children will be cheated. They will crowd into classrooms already run on double shifts. They will move in with children who are now sitting two in a single seat. They will read germ-loaded books mangled by a generation of use by grimy hands.

I

So the continuing crisis in American education is given a new twist by unexpected pressure on school plant and equipment.

The U.S. birthrate has jumped by leaps and bounds. Instead of declining in the '40s, as the experts expected it would, the rate climbed from 17.9 per thousand in 1940 to 21.5 in 1943. It jumped to 25.9 in 1947, an increase of 45 percent since 1940. Result—by 1956 elementary school attendance in the United States is expected to jump from 18,200,000 to more than 23,400,000, an increase of about 5,200,000, or more than one-fourth.

The rush has already begun. It will pick up speed next fall.

Now, while this pressure has been building up, our public schools and their equipment have been running down—first through inevitable wartime neglect, then because inflation and material and labor shortages made it difficult to catch up.

If we are to give this bumper crop of youngsters the break they deserve—and reach the educational standards the nation needs—we must speedily do a major job of educational rehabilitation and expansion.

II

Some headway has been made in overcoming the teachers' salary crisis.

Teachers' salaries are improving. Pay problems were driving good teachers away from their posts in droves not long ago. But in the year since the 57th editorial in this series emphasized that crisis, the average teacher's annual salary has increased about $300—from $2250 to $2550.

True, increases vary enormously from state to state and from town to town. In a few states the average increase has been $500; in some less than $100. But, for the nation as a whole, last year's increase put teachers about even in the race with the cost of living. After taxes, their salaries have risen 68%, and the cost of living 67%, since 1939. In terms of pay increases, however, they are not nearly as well off as are industrial workers, whose average weekly wages after taxes have risen 108% since 1939. They are far behind farmers, whose net income is now four times what it was in 1939. And teachers had notoriously low salaries to start with.

A great deal more needs to be done in raising salary standards to put our school system on a firm footing. There are still about 100,000 teachers, nearly 12% of all public school teachers, who hold temporary or emergency credentials. They cannot meet