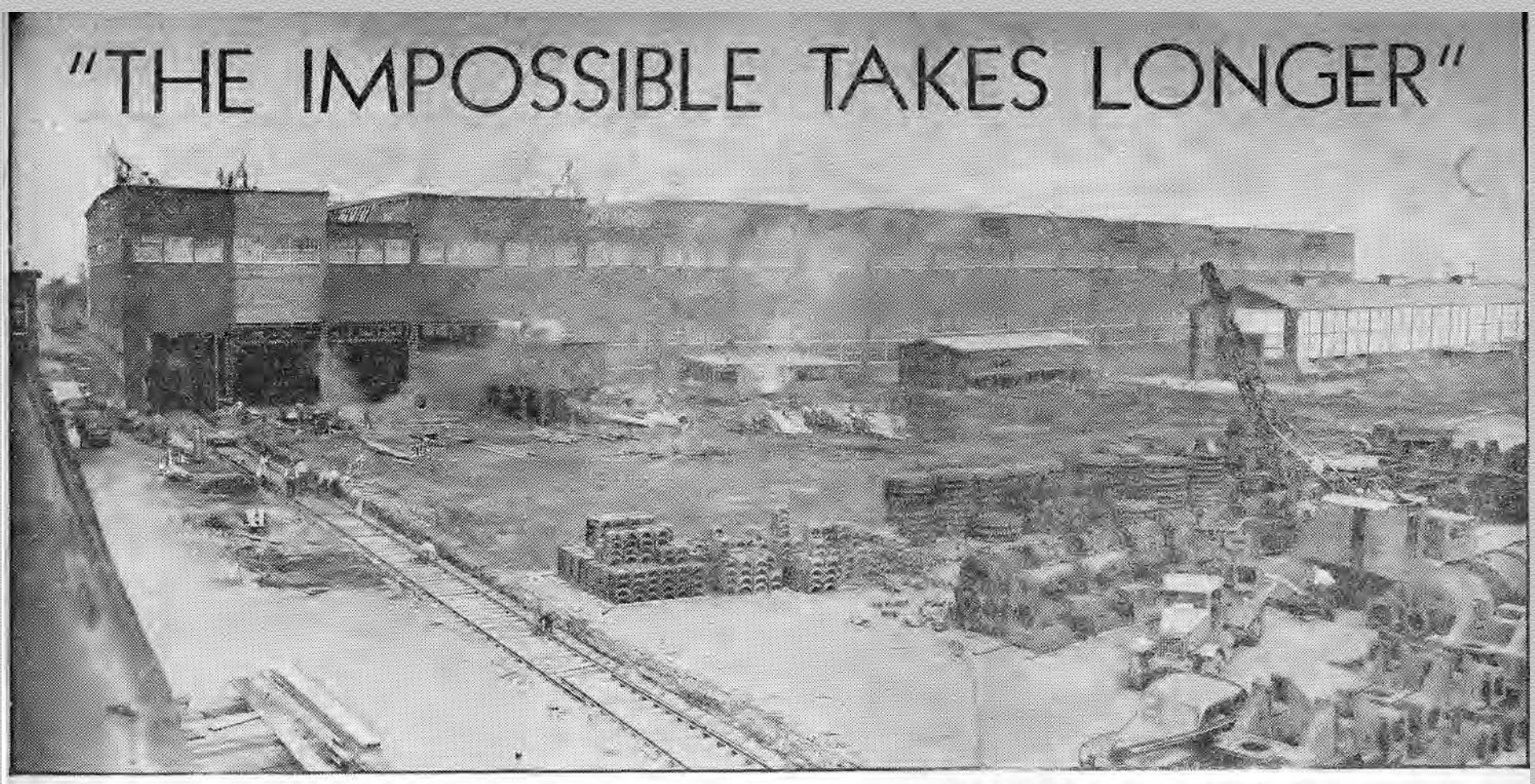
"THE IMPOSSIBLE TAKES LONGER"



New wooden plant buildings and rows of ships' engine castings are a sample of America's production-line offensive. —UP photo

By Jonathan Waldo

PART of the income of the Joshua Hendy Iron Works, a year and a half ago, was $1100 from the sale of pears. That happened because the Hendy plant was located in a 34-acre orchard in Sunnyvale.

Now the company is out of the fruit business. Last year the pear trees were cut down and sold for cordwood. Ten acres of new plant space has replaced the trees. The former orchard now yields an all-year crop of steam engines for Liberty ships.

The Hendy plant is in itself a good small-scale picture of America in production. It is a small plant become big in a few months. For World War II they are producing the same triple-expansion steam engines that they made for World War I. The difference is that in the last war they produced their quota in 25 months; this time they are making the same number of the same engines in 25 days. Before the end of 1942 they will be producing in 11 days of World War II what they made in more than two years of World War I.

Those figures, of course, are being matched in different fields all over the country. I visited the Joshua Hendy Iron Works to take a look at America at war.

A Mr. William Becker offered to take me through the plant. Mr. Becker is the young man whose duty it is to get press representatives past the guards, see that their brains are stuffed with information and not lopped off by traveling cranes.

JOSHUA HENDY was a New England blacksmith who came West seven years after the gold rush. He was not interested in the diggings, but set up a forge in San Francisco, where he built up a brisk trade in mining tools and machinery. In time his three nephews came into the blacksmith business with him. During the next 50 years the Joshua Hendy Iron Works turned out everything from horse-drawn fire engines to Victorian scroll-work.

When San Francisco was burned in 1906, the Hendy blacksmith shops were destroyed. Someone in the family owned an orchard in Sunnyvale, and there the iron works was rebuilt. The Hendys built an impressive office building, of heavy dark stucco with arches—the "mission style" of 30 years ago. Behind this neo-Spanish creation towered their high wooden shop buildings. There they built mining and irrigation equipment and turned out machine tool job work.

World War I gave the Joshua Hendy firm a contract for triple-expansion steam engines for cargo vessels, the same engines, by the way, that the shops are turning out today. The Hendy heirs kept the business going until the depression, when the banks took over on a receivership.

Just as U. S. war production was getting under way in November, 1940, the Joshua Hendy plant was picked by a group of West Coast industrialists for a big defense production job. Mr. Charles E. Moore, head of a large San Francisco machine tool agency, headed a corporation that took over the plant. Stockholders and directors in the new Hendy organization were men who were variously engaged in large-scale defense work, including the fabulous Henry Kaiser.

THE Hendy plant today has its main offices in the old mission style building, which has been supplemented by wooden annexes. The plant buildings behind, all painted an ugly freight car red, are the same as three years

I was marched through the main gate past four or five guards and into the personnel office. A man was interviewing job applicants. The inner office, which was plastered with "Serve in Silence" signs, was crowded with desks and girls. One sign announced "The Difficult Things Can Be Done Right Away, the Impossible Will Take a Little Longer." Right away I was given a green tag for my lapel, with my name on it and the note that it expired at 4 p. m.

We walked past more guards and down the incline into the yard. The first door we passed was the coffee kitchen, with rows of coffee pots, cans of milk and bins of sugar. The coffee kitchen is one aspect of the Hendy plant routine that is out of favor with other employers. Pots of hot coffee are kept in the plants at all times, and the workers are served free. The 2100 plant workers drink up about 100,000 cups of coffee a month.

What we were about to see was the making of engines for Liberty ships. Those are the ships that President Roosevelt christened "ugly ducklings," and that are listed by the Maritime Commission as EC-2s.

THESE Liberty ships, as the President indicated, do not have the sleek lines of a grayhound. They are slow, running from 12 to 14 knots at best. They are built with two ideas in mind: To carry 10,500 tons of cargo, and to be stamped out like doughnuts.

It is because they have to be built rapidly that the Liberty ships move slowly in the water. The fast C-2 freighters are equipped with turbines; the Liberty ships are powered with triple-expansion steam engines. At Hendy, where turbine production will shortly begin, it is estimated that 15 triple-expansion engines can be turned out in the same time that it takes to make a turbine.

Turbines are not yet in production. In two or three months they will be under way. The plant where they will be turned out is a vast, empty cavern with three acres under its roof. The painters had just finished spraying white over the insides.

"Three weeks ago," Mr. Becker remarked, "there wasn't any building here." Speedy construction is attained by building the high walls in flat sections, then hoisting them into place and bolting them together. An enormous amount of time and expense has been saved by making all plant buildings of wood, thus dodging priority problems.

Practically all the plant space at the Joshua Hendy Iron Works today is devoted to setting a record in turning out the triple-expansion Liberty ship engines.

The beginning of the engines—the raw material for the power of our Liberty fleet—is an ugly pile of junk. Piled out in the middle of the yard, it looks like something that even the scrap is recognizable. There are countless old engine blocks. There are twisted rods and bent steel plates. Canted against the block of an ancient Ford at one end of the heap I noticed a piece of iron scrollwork that spelled out the words "Home Comfort." Over the whole pile is an orange coat of rust.

This metallic potpourri, mixed with pig iron and small amounts of alloy, is melted down in the foundry. The foundry is dark and dirty looking. Its floor is a soft black powdery material, called black facing sand. Deep pits are dug in this sand, which is 10 to 12 feet deep, and the larger molds are set down under the floor level, where the weight of earth acts as a retaining wall.

Every afternoon the molten metal is poured from huge buckets into the molds. When the metal is cool and hard, the molds are excavated, lifted out by cranes and hauled off to an adjoining shed, where the molds are broken away from the castings. The job of cleaning the castings and breaking the molds with compressed air hammers is a noisy and disagreeable one. As the molds break off, you can see great pock-marked dirty gray shapes that have the rough outlines of gears or rods or cylinder heads for finished motors.

These rough castings then move on small flat cars—there are railroad tracks crisscrossing through the whole plant—into the shops. The enormous machine shops are the body of the Hendy Iron Works.

WE HIT plant 1A, where the largest rough castings are sent, at the quietest time of the day. It was the only time all day that I saw anyone sitting down. The occasion was the 20-minute lunch period. Each of the three shifts on the 24-hour schedule has a like meal period. The men were munching sandwiches around the bases of huge gray machines. Some of the men looked very dapper in bright red felt hats.

When we went back to 1A after lunch the noise had not increased perceptibly. The roof is high, with lots of windows and white paint on the inside. There was no clatter and bang, only a gentle hum of machine tools at work.

We first came abreast of a monstrous mechanism with a pair of towers that looked like the Bay bridge on a 20-foot scale. Mr. Becker said it was a planer. Down in its bowels are cutting points that act like a carpenter's plane, except that they do their planing on steel. A big flat bed, 12 or 15 feet long, swings slowly back and forth between the towers. This particular planer was occupied with smoothing a steel surface that would become the bed for another planer. Machine tools can make more

Other massive shapes were described to me as turret lathes, radial drills and milling machines. They were all variously occupied in cutting shavings off steel to leave a smooth, glistening surface. In the center of the shop were a row of monsters that looked like Hollywood's idea of a machine shop. I couldn't quite see what they were doing, but they are called horizontal boring, drilling and milling machines and cost about $80,000 each. They are as high and as wide as a two-story house. On one of their numerous flanks is a panel of buttons. In this case the machinist is a highly skilled laborer who knows which buttons to press.

Beside each of these large tools a machinist was standing. I was interested. in watching these men work, because they have long been listed as bottleneck No. 1 in our manpower. On the West Coast, particularly, skilled machinists are not common, because the bulk of machine tool work has been done in the East or around the Detroit automobile region.

MACHINISTS are not produced quickly. It takes four years of apprenticeship to turn out a skilled journeyman, who then earns the minimum pay of $1.15 an hour. Union rules state that there can be no more than one apprentice to each seven skilled men in a shop. At that rate it takes a shop with 28 journeymen to turn out an average of one new machinist a year.

The way that this rule is circumvented in times of labor shortage is by

training "specialists." In the course of an ordinary apprenticeship, a man theoretically learns enough so that he can step up to any machine tool, whether it makes watches or engines, and make it behave. A specialist is a man who takes only a few months' training, and takes it entirely on one machine. He can then operate that machine and that one alone. Base pay for a specialist is $1.11 hourly where that of a journeyman is $1.15. However, the specialist will probably not rise so high over the base pay as the journeyman. The amount of extra pay, over the minimum, that a man may earn is based on skill, not seniority. A good man may earn as high as $1.80 an hour and, with overtime, $100 a week is not uncommon.

As I walked past the machines, this looked like good pay for easy work. Most of the men were leaning against their machines, resting on their elbows, or occasionally pressing a button. Once a phase of work is started, there is nothing to do until it is finished, barring mechanical failures.

Of course the catch lies in getting the job started. The great rough hunks of metal have to be cut down to perfection—in many cases to one one-thousandth of an inch tolerance. The machinist receives from the crane operator a piece of cast steel with a few cryptic chalk marks on it. What he gets paid for is the know-how that will make his machine turn it into a perfect cylinder head.

All machine tools, of course, are not big. When we went on into plant 1 we saw tools no bigger than a sewing machine. The size of the tools are geared to the sizes of the pieces they work on. The actual working parts—the cutting edges—are like the point of a paring knife hidden in the depths of the big machines.

I made the mistake of reaching to the floor to pick up one of the shiny, curly steel shavings that drop off the lathes. I left the shaving behind, but carried away a couple of blisters. The heat that is generated in the cutting process is enormous. The particular virtue of tungsten carbide, the ultra-hard material from which the cutting points are made, is that it doesn't lose its edge from that heat.

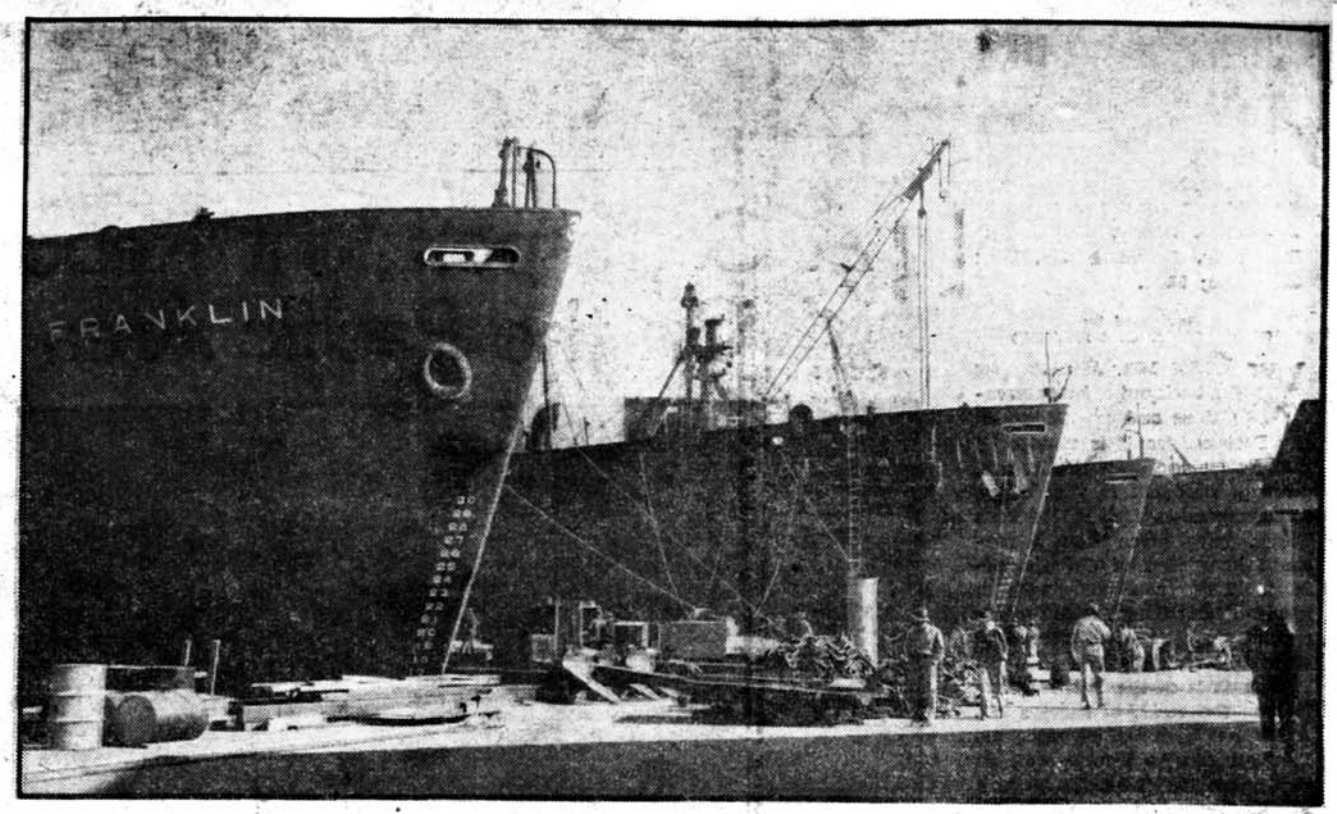
BEFORE I finished my tour of the plants I discovered that the red felt hats on some of the men were not just Sunnyvale versions of Esquire. They denoted the crane operator's helpers—the men who load big pieces of machinery onto the swinging hooks of the overhead cranes. The red hats are for visibility—so that the crane operator will see that they are clear before lifting or dropping his load.

Red hats are particularly necessary in plant 1, which, with many of its machines, was part of the original Hendy works. That is because six overhead cranes are skittering up and down in the rafters, lifting and depositing potentially lethal burdens on all sides. When the new corporation took over the Hendy business, they knocked out the end of the old plant 1 and extended it to about a quarter-mile length.

We threaded our way between men and tools and piles of steel shapes down to the lower end of this plant—the new end. That is the general direction of movement of everything in the plant, since this is the assembly section. Here the assorted parts come in off the machine tools, parts are delivered from subcontractors, and the completed ships' engines take shape.

One engine was standing in the middle of the floor, with men swarming over it. Strange shapes that I had seen in the tour through the plant suddenly took on meaning and function. In 24 hours, a machinist said, the engine would be running. They don't actually put steam into it, but turn it over with a small "jacking engine." It is like turning over an automobile engine with a fast crank. After this demonstration, the men who tighten up the bolts in the assembly loosen them again. The engine is dismantled, packed into crates, loaded on five flatcars and routed to a shipyard.

THE Hendy works are producing more Liberty ship engines than all other manufacturers in the Nation. Since it started only a little over a year ago as a strictly small-time operation, I was curious to see the man who directed this rapid expansion.



Liberty ships are stamped out like doughnuts.

We drank some company coffee on the lawn just inside the gate while we waited for Mr. Charles Moore to get out of conference. Mr. Becker described his boss as "an unbelievable man." Mr. Moore, now 47, went to work at 14 as a machinist's apprentice. After he had served as a journeyman for a while he decided that what he needed was education. So he startled a Los Angeles high school principal by presenting himself, aged 22 and height six feet six, as a high school freshman. At the end of a year of hard work he completed the four-year course for a diploma. Concurrently, he took evening courses in college mathematics.

Mr. Moore got out of high school in time to go into the army as a private in World War I. He was picked as likely material for officers' school, and finished the war as an officer and ordnance instructor.

He did not go back to his machinist's bench after the war. Instead, he put on a white collar and became an agent for a manufacturer of machine tools. His agency grew to be one of the largest on the Pacific Coast. When World War II broke out, he spent a period in and out of Washington as a dollar-a-year man. He went to England with the Harriman commission as a machine tool expert, and got a good look at their tools and factories.

Moore makes a good machine tool salesman and a good plant boss because he can step up to any machine in the shop and press the right buttons.

MOORE'S office is dark-paneled and old-style. He was out when we went in, and we looked at the pictures on the walls—a portrait of a triple expansion steam engine, a couple of Liberty ships with Hendy engines, an architect's conception of the Hendy plant drawn up before speed and not art became the watchword. Behind Moore's desk was a picture that looked like a graduating class. It was the new staff of guards at the plant, in uniform assembled.

I was looking at it as Mr. Moore strode in, dwarfing everything in the room. He has a square, blond, Scandinavian look. As he lowered his six and a half feet into the chair he nodded toward the picture. "Sixty guards. More guards now than there were employes in the whole plant when we took over."

He seemed a little excited, and exploded almost immediately. "Government red tape! We could get somewhere here if little people weren't always giving us their little suggestions! We're doing a real job for them—but this interfering!"

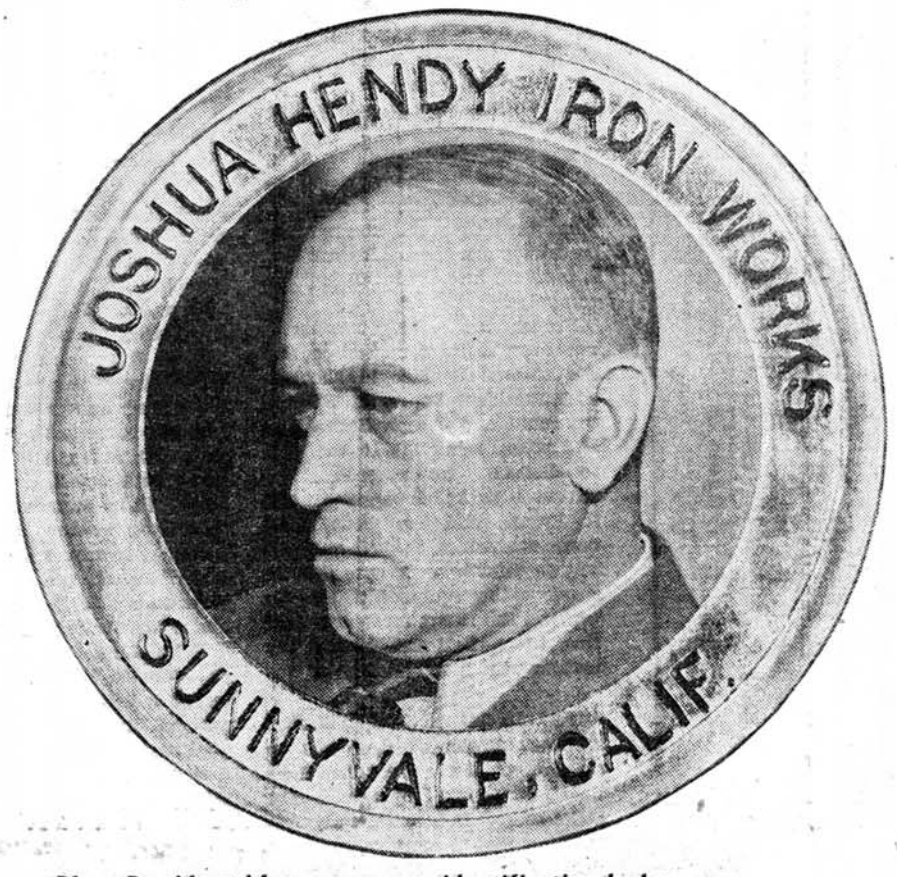
The job that Moore is doing began when, a year and a half ago, he took an order for 12 triple-expansion engines. A few weeks later Washington called and asked that 24 more be delivered within the same time. "I told them I might as well make a hundred more as 24 more," Moore explained. "So they told me to go ahead with a hundred. And our orders have been doubled and added to and increased again. We are still expanding to about double our present capacity."

I asked how he arranged to convert quickly a small plant to turning out a constantly increasing number of engines in a hurry.

"First you get your list of parts. Here's the list." He pointed to a volume about five inches thick. "This lists every one of the separate parts that is needed for that engine. The Maritime Commission gives it to us.

"Then I call in the head of the planning division, and the chief engineer, and a few others. We have to figure out what we can make ourselves, and how fast, and how many men we'll need and how much extra space. Then we figure where we'll need new plants and where we can find machines—I've bought up old machines from everyone who would sell one. Then we decide where the scrap and iron is coming from, and how much subcontracting we'll have to do, and then make sure that they'll get their priorities. Well, then you build engines. Just suppose you made a bookcase for your home, for instance, and someone ordered a thousand of them to be delivered next week. Same thing. Just make arrangements."

The plant production, he said, had been ahead of schedule right along. By the end of this year, some 2,000,000 tons of cargo shipping will have gone out with Hendy engines; at the end of 1943, 6,500,000 tons. By the same measure, Hendy engines powered only a little over 100,000 tons in World War I.



Plant President Moore wears an identification badge.

ONE OF THE PROBLEMS of the current expansion is, Mr. Moore explained, the shortage of skilled labor. He would like to get around the shortage by "upgrading" skilled labor; in other words, letting a skilled man start the work and supervise two or more machines, while less trained men acted as watchers during the long hours of mechanical cutting. However, the union asserts that its basic principle is "one journeyman to one machine," which ties up a lot of skill.

"I'd like to say something here," Mr. Moore leaned forward and spoke tensely. "It's my own idea. It's the way I see this picture.

"We'll win the war. Of that there's no question—we'll win. The question is, how much is it going to cost—not in money or materials, but in lives. Is it going to cost us a hundred thousand boys to win this war, or is it going to cost us a million? The longer our boys stand out there with only guns in their hands, the higher the price we pay. The quicker we can put those boys inside tanks and planes, the cheaper it will be. These engines, here, are going to carry those tanks and planes. We have to put them out fast.

"Remember my idea," he called, as we walked out the door. "The cost of the war is measured in lives, not dollars!"