



### Rudolph Diesel: "An engine to benefit mankind ...."

Thermal engineer and inventor Rudolf Diesel was born in 1858 to a Bavarian-German couple living in Paris. Theodor Diesel eked out a living for his family by operating a small leather shop. The young Rudolf was an outstanding student, and had made his first model of a steam engine for powering wagons in 1870, just before a war between France and Germany caused the French to quickly put all German families en route to England. London was deep into the Industrial Revolution with its great sprawling mills and factories, but child labor was pouring into the city and the young Rudolf could find no work. However, a great opportunity came for the boy when his father's cousin and her husband invited him to live with them in Augsburg, Germany, where the husband was a teacher at one of the best schools of the day. Rudolf Diesel was a diligent student and a quick learner; by graduation time he had made the highest grade average in the school's history, and had won a double scholarship to the Munich Polytechnical Institute. While working toward more graduating honours, Rudolf was a student of the famous professor and inventor, Carl von Linde, a thermal engineer who was well known for his ice-making machinery. Teacher and student also became very good friends, and in later years, Von Linde was to help pave the way by providing employment and encouragement for the young inventor.

There were several years of successes and failures, but Diesel remained confident that his rational heat engine would eventually benefit all nations and all people. It was no simple invention, and it had to work with great precision and accuracy. The engine was running during the late 1880's, but it still had the drawbacks of tremendous weight and the need for a better fueling system; the latter led to his invention of the atomized fuel injection pump.

*"In time engine fuels may decide the fate of all nations; that is why the ability to use many different kinds of engine fuels is so very important . . . . ."*

*"The use of vegetable oils for engine fuel may seem unimportant today, but in the course of time such oils may become as important as petroleum now is."*

*"When all burnable things on earth have been used, we must have engines which run by sun power."*

*Rudolf Diesel in New York, 1912*

By 1895 the hard working inventor was resigned to the fact that his engine would not be easy to start in the foreseeable future. But once a Diesel engine was started it would keep running a long time - days, weeks, months or even years at a "run". It would be a great advantage for powering ships and generators, pumping water, and powering oil pipe lines.

When the manufacturing model of Diesel's engine was ready for

is not disposed so that fuel flows to injection pump by gravity, a feed or lift pump (see lower left on drawing) is included to draw fuel from tank and supply it to the injection pump. Also, note leak off pipe (top of drawing) which takes a small quantity of diesel fuel back to the tank to lubricate the moving parts of the atomizer.

production in the 1890's, it was greatly in demand. Shops and factories in at least a dozen countries were clamoring for the right to manufacture the new engine. At the end of 1896, Diesel, for the first time in his life, found himself with plenty of money. By 1902, Diesel engines were powering electric plants throughout Europe.

The inventor found a special challenge in the transportation industries; big ships were being powered by diesel. Later, it would be locomotives and eventually, aeroplanes . . . . .

Trying to make a workable fuel from easily available substances in the various countries where the engine was used was one of Diesel's main interests. Fuel, he had realized from the very beginning, would decide the real value of his engine. He had used kerosene, gasoline, benzene, and commercial alcohol. But these were very expensive and Diesel wanted to use crude oils. Efforts also ran through such things as the oil and tar taken from soft coal. In Scotland, Diesel engines were being fueled successfully with oil extracted from shale rock. At the Paris Exposition in 1900 the Otto Company exhibited a Diesel engine which ran on peanut oil!

### World-Renowned

Diesel was a welcome guest in many parts of the world, and was in great demand as a lecturer. During a special trip to the United States in 1912, he and his wife were overwhelmed with hospitality. His brilliant invention, his kindness, humble demeanor and being a great patron of the arts made him a beloved figure wherever he went.

The diesel engine was a great power but there still remained the job of cutting down the high cost and the weight. However, the advantages were greater than the drawbacks; in the U.S., great companies such as Allis-Chalmers, Worthington Pump, Fairbanks-Morse, and Winston Engines (now a part of General Motors) were beginning to adapt Diesel power to their needs. In Germany and throughout most of Europe, Diesel engines were generating electricity, powering factories, shops and pipelines, and proving to be the most effective marine engines. At that time, Germany was leading in reducing the weight and increasing operating speeds. This trend foretold that Diesel engines would eventually drive airplanes, trucks and autos. Diesel-powered submarines were being used by the German and French navies. Daimler-Benz proceeded to develop Diesel engines for autos and trucks.

In his youth, Diesel had declared that he "would build an engine to benefit mankind by reducing hard labour and making life better for workers". That "benefit" was a major concern throughout his life, and the latter years of his life were saddened by the storm clouds that hung over Europe.

"He loves peace," said Charles Parsons, Britain's most famous ship designer. "He had planned that his engine was to be used as an instrument of peace. Now every principal power of Europe is seeking to use it for war."

And Diesel commented to an old school friend: "I keep feeling the deadly breath of war that threatens all of Europe. It could be a world