A Jacksonville, Florida Historic

Mechanical Engineering Landmark . . .

1917 Reynolds-Corliss Reciprocating Steam Engine and Water Pump

PRINTED IN HONOR OF THE OCCASION OF ITS
DESIGNATION AS A JACKSONVILLE, FLORIDA HISTORIC
MECHANICAL ENGINEERING LANDMARK BY THE

Northeast Florida Section

The American Society of Mechanical Engineers

22 FEBRUARY 1976
During the period 1914 and 1917 Jacksonville undertook a water supply improvement program. Two Corliss steam engine driven water pumps were installed. The first five million gallons per day pump, manufactured by Epping-Carpenter Company, was installed in 1915 and was operated until its removal in 1956. The second pump, the ASME Historical Landmark, was developed by American engineering pioneer Edwin Reynolds at the Allis Chalmers plant in Milwaukee. The landmark was installed during the year 1917 in the Jacksonville Main Street water pumping plant located at Main Street and Hogan Creek in downtown Jacksonville, Florida. The cover photograph shows the plant with the Reynolds-Corliss steam driven pump located in the original building on the right. Steam engine operation was discontinued in 1956. This Allis-Chalmers Reynolds-Corliss engine driven pump remains today in this plant as a mechanical engineering landmark.

The Reynolds-Corliss engine is a unique landmark because the pioneer engineering work of Edwin Reynolds during the last quarter of the nineteenth century was undoubtedly the predominating influence in the development of the reciprocating steam engine in America. Corliss' basic patent was issued in 1849 and exclusive rights to manufacture engines embodying his patents expired in 1873. By 1878 the world famous Reynolds-Corliss engine went into manufacture. Reynolds designed a valve mechanism which had several distinct advantages over the releasing gears previously employed. The leverage of the releasing mechanism was constant so that the reaction on the governor was the same at all points of cutoff. The gear was more quiet and could run at much higher speeds. By 1885 more than 500 had been sold and this created a furor in American industry.

The ASME History and Heritage Program is dedicated to the preservation of noteworthy mechanical engineering landmarks such as the Reynolds-Corliss engine located in the Jacksonville Main Street pumping plant because it represents an era in our Country's history which should be retained for future generations to observe. The photographs show the "landmark" arriving in Jacksonville and being transported by "horsepower" and "manpower" in the year 1917. Other pictures show the erection on its present foundation together with details of the engine itself.

No landmark machine is without human significance, and Edwin Reynolds was a giant in his time. By 1890 the Society of Mechanical Engineers was devoting entire sessions for study of the engines produced by Edwin Reynolds.
MANPOWER PLUS HORSEPOWER MOVED HEAVY PUMP FRAME IN 1917.
ALLIS CHALMERS 5 M.G. PUMP BEING BROUGHT TO SITE.

MAN BRAKES HEAVY PUMP FRAME WHILE MULES REST 1917.
FOUNDATION BEING PLACED FOR ALLIS CHALMERS PUMP.
VIEW LOOKING SOUTH WITH EPPING-CARPENTER PUMP IN BACKGROUND. JUNE 1917.

EPPING-CARPENTER PUMP INSTALLED.
INSTALLED AND OPERATING IN APRIL 1915. THIS PUMP HAD A CORLISS ENGINE.
BOTH PUMP AND ENGINE HAVE BEEN REMOVED FROM PLANT.
OUTSIDE VIEW OF BOILER ROOM.
NEW PUMPING STATION GROUND BEING PREPARED IN 1914.

VIEW LOOKING DOWN ON FLY WHEEL, VALVE GEARING AND CONNECTING RODS TO CORLISS ENGINE.
VALVE GEARS ON ENGINE.

OLD NORTH AERATING BASIN - 23 JUNE 1914.
WITH FREE FLOWING ARTESIAN WELL IN CENTER.
Edwin Reynolds

He opened the door to new progress in iron and steel

Development of the Reynolds-Corliss reciprocating steam engine and the steam driven blowing engine with metal valves by Edwin Reynolds — for more than 30 years unquestioned dean of America’s engineers — revolutionized the iron and steel industry. The engine’s radical and sound design was speedily acclaimed and adopted, and before the turn of the century A.C. reciprocating steam-driven blowing engines were almost universally used in the rolling mills and blast furnaces of the nation’s steel mills. Later they were supplemented and superseded by the A.C. gas-driven blowing engine, then steam turbine-driven axial and centrifugal blowers.

As the iron and steel industry today girl itself to reach the new production highs our economy demands, Allis-Chalmers is well prepared to help iron steel and meet its goals. That’s the way Reynolds would want it to be.

Reynolds was hired in 1877 by Edward P. Allis to be superintendent of machinery at the E. P. Allis & Co.’s Reliance Works. He later became vice president, general superintendent and a director. When the Allis-Chalmers Co. was formed in 1901 he became chief engineer, a role in which he embodied many of his original functions. But whatever his title, his sheer genius as an engineer led him and the company down paths of development and service to industry which were virtually uncharted in those times.

American industry in the years of the Chalmers Co. — a professional career was only a few decades removed from a largely handwork economy — was an economy in which Reynolds had his roots.

Born in 1831 in Mansfield, Conn., the world of young Reyn old was one in which there was little to stimulate a man to engineering. At 16 he became a machinist’s apprentice and after three years he took a journeyman’s tour of lower New England shops, took a year before George Corliss took them down paths of development and service to industry which were virtually uncharted in those times.

American industry in the years of the Chalmers Co. — a professional career was only a few decades removed from a largely handwork economy — was an economy in which Reynolds had his roots.

In four short years Reynolds was named superintendent of the Corliss Works — and in those days “superintendent” meant almost everything or anything.

Six years later, when Reynolds answered an advertisement by Allis

Seated at his desk in the Reliance Works, Edwin Reynolds appeared as he was extreme ly dynamic.

Reynolds’ Innovations Were Many

In 1878 came blowing engines for blast furnaces and Bessemer converters at the Joliet (Ill.) Steel Co. and Edgar Thompson Steel Works at Pittsburgh, now part of U. S. Steel. These engines were built with steel valves instead of the leather valves commonly used and they proved to be the most economical ever applied up to the time for this service. They revolutionized construction of blowing engines and air compressors.

The ‘90’s also saw development of girder frames for Corliss engines and wrought iron frames for engines whose size was too great for girder frames.

In 1883 two pumping engines for the City of Allegheny (now part of Pittsburgh) presented another innovation. The engines were of the vertical, three-cylinder, compound type, with the cylinders at floor level on the base plates, and the crank shaft and flywheels overhead. The pumps were single-acting, outside-packed plunger type, each plunger being directly connected to the piston rod of the steam cylinder. These engines marked the first departure from the conventional municipal type which used some form of working beam or bell crank. The principles applied here later were employed in other pumping engines.

Next year saw the construction of the largest centrifugal pump in America at the time. Built for the City of Milwaukee, it had a capacity of 700,000 gallons a day against a 15-ft head. The 12-ft diameter pump impeller was driven by a tandem-compound Reynolds-Corliss engine directly connected to the vertical pump shaft.

In quick succession came a 40 by 60-ft vertical rolling mill engine which operated at 110 rpm, driving at the Jollet Steel Co. the finishing rolls of the first continu ing mill in America. The equipment operated at the exceptionally high piston speed of 110 ft per second. This innovation opened the door for a healthy rolling mill engine business.

Pump was Forerunner

Then came hoisting engines, steam stamps and screw pumps. The screw pump, used at low head to flush out the Milwaukee river, was the forerunner of the screw-type hydraulic tunnel developed later. Other developments were electric cranes — the first in America in 1881, heavy duty engine frames, and by 1892 engine-type generators.

Prior to 1892, driving of electric generators from engines of Corliss or other slow speed types was done by belts to line shafts. But so successful were two hori zontal, cross-compound generators with the generator spiders mounted directly on the driving shafts that the Allis practice became general.

He Had Soft Spot Too

The equipment was built for the Narragansett Electric Co., of Providence, R. I.

Before leaving the story of Reyn olds we cannot overlook his development of the angle compound steam engine. He built an engine for lighting the Columbian Exposition in Chicago in 1893 and also a 5000-horsepower engine, along with a Bullock (later Norwood Works) generator for supplying all the decorative lighting at the St. Louis Exposition in 1904.

In order to provide power for transportation in New York City alone, 47 Allis engines were in stalled in three power plants. The aggregate horsepower was over 320,000, with the largest of the engines rated 12,000 hp each. Other engines were installed in power plants all over the world.

Reynolds time became consulting engineer for Allis-Chalmers, but as his health failed he became less active, retiring in 1906, three years before his death. The big new West Allis Works was in operation before he died, and although he never under stood the responsibilities, he never headquartered in West Allis.

Prior to the end of his career his desk remained at the original Reliance Works — a reminder that this devotee of the new had a soft spot in his heart for the old. The desk was a gift from the ASME and was made of carved Honduras mahogany.
Edwin Reynolds posed for this picture in his office in Old Reliance Works. The handsome carved desk of Honduras Mahogany was a birthday present to him from The American Society of Mechanical Engineers of which he was president at the time. The 1902 Reynolds-Corliss Engine Catalogue reproduced the picture.