Stanley Steam Racer

The Stanley steam racer, illustrated on page 150, which is recognized as the fastest self-propelled vehicle ever produced in the world, is described as follows:

The wheel base is 100"x54". The rear or driving wheels are 34" diameter, 3½" cross section. Front wheels 34" diameter by 3" cross section. The tires used were the regular G. & J. Standard clincher tires.

Wire-spoke wheels, the tires being bolted to the rims with eight tire bolts and so perfectly balanced with counterweights that there was no vibration when the wheels were making upwards of 1,200 revolutions per minute. The running gear was the same as that used on the Stanley touring car, with the exception of the wheels, and those had wire instead of wooden spokes. The body of the car was built entirely of wood and mounted on four full elliptic springs, the springs being placed on the inside of the body so as to reduce the air resistance to a minimum. Ball bearings of the two-point type with ¾" balls were used in the running gear.

The body was 16 ft. long and 3 ft. wide at the widest part, pointed in front and terminating at the rear in a circle with 8" radius, tapering to that width and to the point in front with cycloidal curves, or curves with constantly diminishing radius. The bottom of the car was perfectly straight and smooth and has a clearance of 10½. The sides are vertical to a height of 18", and from that line the removable top is oval, curving both transversely and longitudinally. The largest cross section including the wheels amounts to 9 sq. ft.

The power plant consists of a boiler 30" in diameter and containing 1,476 tubes 33/64" outside diameter and 18" long and contains 285 sq. ft. of heating surface. The steam was superheated by passing it through tubes surrounded by the contents of the boiler and through coils of pipe in the fire box, to a temperature of about 700 Fahr.

The engine was the two-cylinder, double-acting type, with cylinders 4½" bore by 6½ stroke, Stephenson link valve gear and D slide valves. The bearings on crank shaft, crank pin and eccentrics were ball bearings of the two-point non-adjustable type, and the crosshead also was provided with a ball-bearing slide, thus greatly reducing loss by friction.

The engine makes 350 revolutions to the mile while the 34" driving wheels make 600 to the mile. Linked up as the engine was in forward gear, the cut-off was about 1/3 stroke and the mean effective pressure about 1/2 the steam-chest pressure. The engine, therefore, develops 6 H. P. for each 100 revolutions per minute and each 100 lbs. steam-chest pressure. The boiler will furnish steam for 50 H. P. continuously and more than twice that amount for three or four minutes.

The arrangement of parts of the power plant is as follows: The boiler is placed just back of the center of the body, the water tank between that and the rear axle. The engine was geared to the driving axle by spur gear and is placed horizontally at the rear of the axle, so that the driving force of the engine tends to lift the front axle and transfer the load to the rear axle, thus giving the greatest possible traction to the driving wheels.

In making the record of 28⅕ seconds to the mile the power developed was probably about 120 H. P. The engine made 745 revolutions per minute.

The total weight of the car without water and fuel is 1,675 lbs. The motor, including boiler, engine, tanks, pumps, etc., weighs 835 lbs., or about one-half the total weight. In the long races a boiler pressure of 500 lbs. and in the short races 900 lbs. was carried. The highest steam-chest pressure was 350 lbs. That would give a direct thrust on the driving wheels of about 400 lbs.

The owners found in their experiments at Ormond that a speed of a little more than 100 miles per hour could be maintained continuously, or at the rate of 35 sec. to the mile. The five miles that the machine covered in 2 min. 47 sec. was at a 33⅜ clip. That was in a race.

Turbines Proving Economical

Although the steam turbine is older than the Christian era, its development has been exceedingly slow and many obstacles have hampered its application since modern inventors demonstrated that as a power medium it is not inferior to good reciprocating steam engines. The earliest known steam turbine was described by Hero of Alexandria in the second century, and was doubtless then an old invention of little practical value. Attempts to make it a practical engine were made about 1624 by Branea, an Italian; in 1650, by Somerset, an Englishman; then it was neglected for over two hundred years until, in 1853, Tournaire, a French engineer, indicated lines on which the turbine might be made a successful steam motor. This exercised powerful influences and directed the attention of De Laval, a Swedish engineer, and Parsons, an Englishman, whose labors brought forth the modern steam turbine.

This form of steam motor has received much attention from American engineers, and Professor Curtis, of New York, has invented some very valuable improvements. The steam turbine is becoming, on this side of the Atlantic, a favorite form of motive power for electric generating plants, while in Europe its favorite scope is in marine work. British steamship owners have taken the lead in the introduction of turbines for ship propulsion and they displayed great enterprise in this line, for not a few turbines were applied to steamers when the engineering world still believed that turbines would be more costly to operate than reciprocating engines.

A large pleasure steamer with turbine engines was placed on the Clyde three years ago and she gained great popularity through her high speed and freedom from vibration. Since that time turbine marine engines have been growing rapidly in favor in British waters. A series of most virulent attacks on the turbine has been made by German engineering writers, but they were characterized more by spleen than by the statement of facts, and have apparently exercised no influence on public opinion. There are already several large transatlantic steamers provided with turbine power, and one company has on the stocks two huge steamers calculated to make 25 knots (28.7 miles) an hour.

A very interesting and valuable report has just been made public by the Midland Railway of England concerning the economical working of new turbine steamers that have been in service this season. This railway maintains lines of steamers to Ireland and to the Isle of Man, and in both services have a turbine steamer running which is practically identical with other vessels on the same route propelled by reciprocating engines. The Antrim and Donegal are the old boats, and the Londonderry and Manxman the turbines.

During the season's service the Manxman made an average speed of 23.4 miles an hour on the same amount of coal required to propel the Antrim 22.5 miles. For the same power there was 115 tons less weight of machinery, and the expense of minor supplies was less. But the smaller fuel bill is the important item the engineering world has been working for.