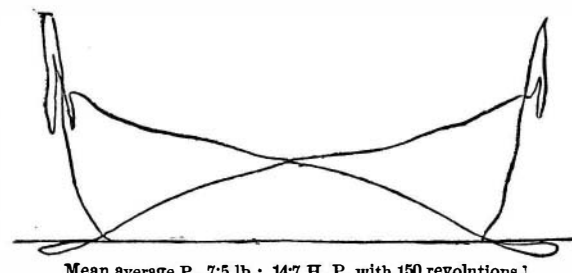
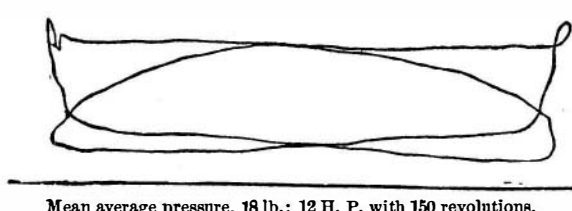
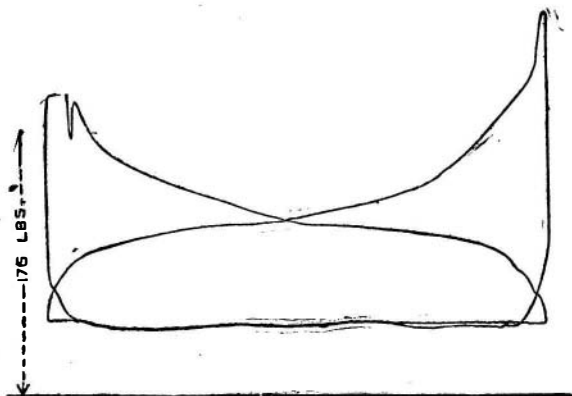


ECONOMICAL TRIPLE COMPOUND SEMI-PORTABLE ENGINE.

At the Nottingham show, Marshall & Co., of Keighley, exhibited a triple expansion semi-portable engine, we believe the first of the type made, and as it is non-condensing, its performance from an economical point of view is not without interest. The accompanying illustration is from *The Engineer*. The tabular statement gives particulars of the engine.

Boiler	I. H. P. 38.5	I. H. P. 40
Length of barrel	6 ft. 2 in.	—
Diameter of barrel, ext.	2 ft. 6 3/4 in.	—
Width of fire box, out.	2 ft. 7 1/2 in.	—
Length of fire box	3 ft. 6 in.	—
Height of fire box from grate.	2 ft. 10 in.	—
Area of grate before trial	6.3 sq. ft.	—
Area of grate at trial	5.7 sq. ft.	—
Tubes, number	38	—
“ diameter outside.	2 in.	—
“ length	6 ft. 3 in.	—
“ steel	—	—
Heating surface, fire box	34 sq. ft.	—
“ “ smoke box	4.1 sq. ft.	—
“ “ tubes	120.0 sq. ft.	—
Total	158.1 sq. ft.	158.1 sq. ft.
Per square foot of grate	27.72	Trial 27.72
Area through tubes	1.252 sq. ft.	—
Ratio of area through tubes to grate.	0.19	—
Pressure lb. per square inch	150	175
Engine :		
Diameter of cylinders	5 1/4, 9, 15 1/8	5 1/4, 9, 15 1/8
Length of stroke	14 in.	14 in.
Revolutions per minute	145	150
Time of running	4 hours.	2 hours.
Water :		
Total quantity used	2,080 lb.	1,140 lb.
Evaporated per lb. of coal	9.4	9.8
Amount drawn from jacket	157 lb.	84 lb.
Per I. H. P. per hour	14.12	14.25
Temperature of feed from 55° through coil of pipes into S. B.	—	—
Coal :		
Total quantity used	220 lb.	116 lb.
Per I. H. P. per hour	1.506	1.45
Per square foot of grate	9.64	10.1

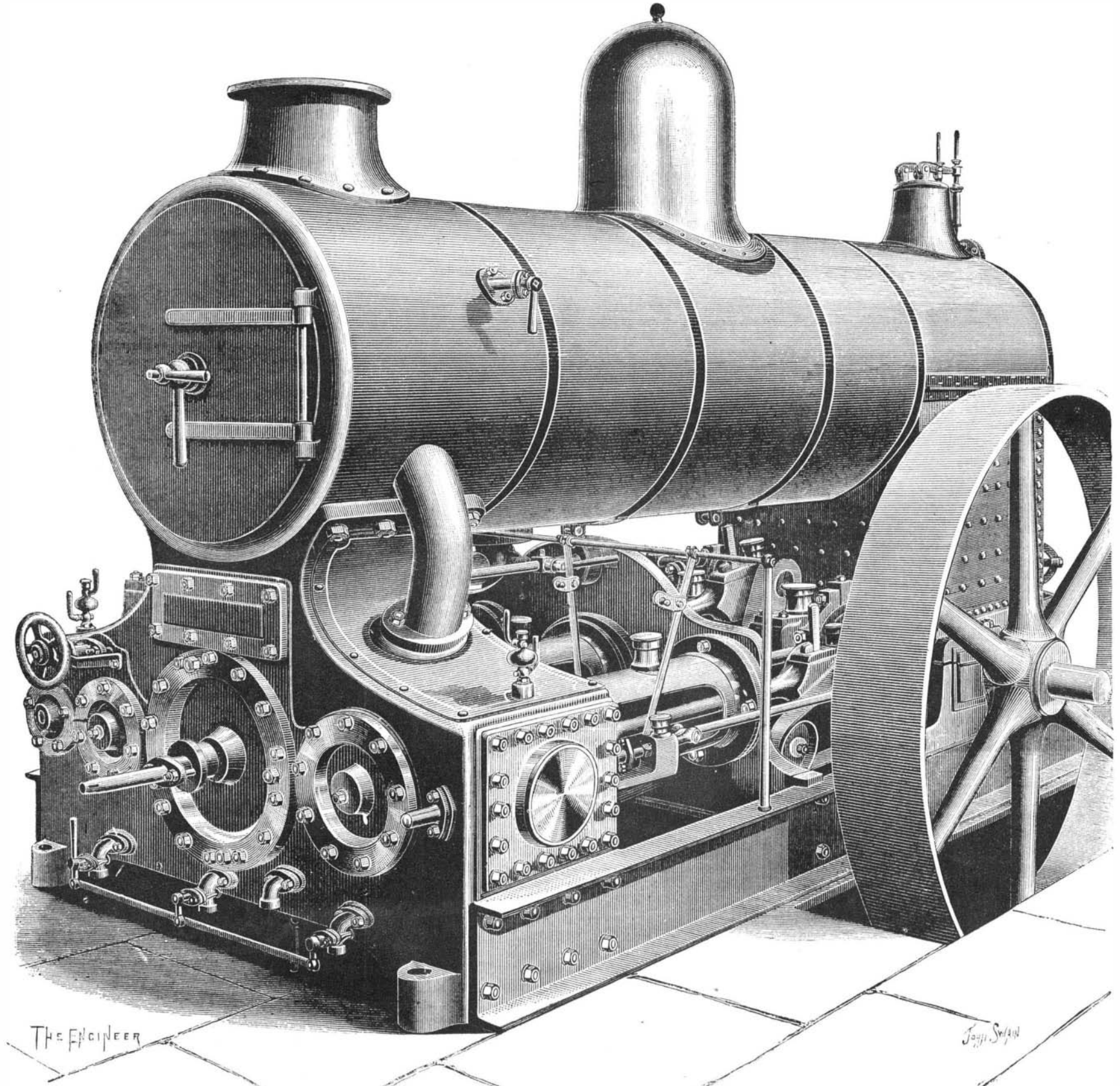


We also give three sets of diagrams. The curious looping at the beginning of the stroke in the low pressure cylinder is, perhaps, partly due to a bad connection between the crosshead and the indicator drum. The looping at the toe is due to the steam having been expanded below the atmospheric line.

Vegetable Wax.

Japan wax is obtained from a tree, *Rhus succedanea*, which is found in Japan, China, and throughout the East Indies generally. In the Japanese language it is called *haje* or *haze*. The tree commences to bear fruit when five or six years old, and increases its product every year, till at fifty years a single tree will produce 350 pounds of berries, from which 70 pounds of wax can be obtained. The wax is formed in the middle of the berry, between the seed and the skin, like the pulp of a grape. It is extracted by boiling the berries in water, and allowing it to cool, when the wax separates out in a solid cake. The specific gravity of this wax is 0.970, and its melting point 131° Fah. It is largely used, either alone or mixed with tallow, by the Chinese in the manufacture of candles. The principal port of export is the city of Osaka, whence, in 1876, nearly 2,000,000 pounds of the wax were shipped to London.

THE new 6 inch gun, throwing a 100 pound projectile, and penetrating 13 inches of plating at 1,000 yards, is a gun of sufficient power to deal with almost anything built or building. It may fail to penetrate the strong patch, but it may knock any other part of the ship, and most of the men, to pieces. Mounted on the broadside, under armor, in a small port pierced in a turret which the gun itself rotates, training 120 degrees, and firing eight rounds a minute, with a crew of three or four men only, and weighing but five or six tons, announce in their faces the death of the turret and the barbette.—*Broad Arrow*.



ECONOMICAL TRIPLE COMPOUND SEMI-PORTABLE ENGINE.