

power is conveyed from the engines to the drive wheels by means of a horizontal shaft, in sections, each section provided with a universal joint & expansion couplings, forming a flexible shaft, which is rigid in revolution, but flexible in all other directions. On this flexible shaft are steel pinions pressed & keyed, on which engage the steel gear rims, which are bolted to the right hand drive wheels of each truck; the horizontal & crank shafts are connected by means of the universal couplings, which have proven reliable & efficient. The engines, all being on the right side, are firmly fastened to the boiler in an upright position, which secures to the cylinders the least possible wear. The piston rods are solid & have rings sprung in which correspond to the best practice of locomotive construction. The piston rods are of steel. The links & parts connected thereto are of forged steel or Norway iron case hardened. The connecting rods are of forged iron; the ends at the cross head are forged solid & cut out to receive the brasses, while the crank end has the strap securely fastened with turned steel bolts, making a strong & substantial connecting rod. The boxes are of the best composition metal & well fitted. The crank

shaft is of forged iron, & having three pins set at 120° each insures a regular & steady motion while running, & renders it impossible to get more than one pin on the centre, which is a great advantage in a locomotive. The slides are bolted to the engine frame & bored out to receive the cross head, & are adjustable. The engines are self-contained & cast in one piece, which insures the cross head & cylinder being in line. The cross heads are made of steel castings with bronze gibbs. The trucks are all built of iron & are strong & substantial; the truck beams are built of steel channels strongly bolted together. Heavy I beams are used in the engine frame. The engines, boiler, tank & cab are all securely attached to frame. The cab is of neat design. The engines and machinery, all being on the right side of boiler & mostly in front of the cab, are at all times under the eye of the engineer. The equilibrium is gained by setting the boiler to the left of the centre of the frame, & the cylinders & most of the machinery being on the right side makes the locomotive in perfect balance. The valve & link motion are of the most improved kind & design; the fittings & trimmings are of the same kind & are what are used on all first-

class locomotives. Boiler is covered with asbestos cement & wood lagging on outside & cased with planished iron.

Following are the general dimensions :—

Gauge	4 ft. 8½ in.
Fuel used	Bituminous coal
Average total weight in working order (about)	207,500 lbs
Length of engine and tender	58 ft. 10 in.
Extreme length above rail	14 ft. 3 in.
Total wheel base of engine and tender	43 ft. 10 in.
Driving wheel base	43 ft. 10 in.
Driving wheels (12)	40 in. diameter
Journals	7 in. dia. x 8 in. long
Cylinders (3 in number)	15 in. x 17 in. stroke
Boiler, type of	Wagon top
Working pressure	180 lbs. per sq. inch
Material in barrel	steel
Thickness of do	½ in.
Diam. at front end	56 in. outside
Tubes	2 in. O.D.
Number of tubes	224
Length between tube sheets	11 ft 10½ in.
Firebox length	7 ft. 0 in.
" width	4 ft. 1-9 in.
" depth	6 ft. 1¾ in. at front end. 5 ft. 10½ in. " back "
Total heating surface	1,554 sq. ft.
Tube	1,407 "
Firebox	147 "
Grate area	28.8 "
Wheels steel tyred and steel gear rims attached having	
41 teeth, 2½ pitch.	
Pinions on shafts are steel and have 20 teeth.	
Tender capacity, coal 6 tons, water about 2,900 Imperial gallons.	

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