Articulated Locomotive With Tender Motive Unit.

A radical departure in locomotive design has been produced in the new articulated 2-8-8-8-2 locomotive completed recently for the Erie Rd. It is called the triplex compound, or centripede type, and, as the name implies, goes beyond the Mallet articulated type by the addition of a third motive unit, made possible by placing another pair of cylinders and another group of driving wheels under the tender, the latter being articulated with the front two sections. It is said to be the largest and most powerful locomotive ever constructed, having a theoretical tractive effort of 160,000 lbs., exceeding the tractive effort of 115,000 lbs. of the Virginian Mallet, which, up to the production of this new type, held the record.

The six cylinders are all the same size, 36 by 32 ins., and as large as the clearance limits will permit. The pair on the central unit are the high pressure, the pairs on the front and rear units being the low pressure, the locomotives working compound, as this was considerably more feasible than working triple expansion, on account of the excessive size of the low pressure cylinders for such a locomotive. The right high pressure cylinder exhausts into a receiver, which supplies the front pair of low pressure cylinders, and the left hand high pressure cylinder exhausts to the rear pair of low pressure cylinders, in a similar manner, giving a cylinder volume ratio of 2 to 1, the usual ratio existing for compounding locomotives.

The boiler is of unusual size, at the front end being 94 ins. diam., and at the dome ring, 108⅛ ins. diameter, the barrel having a taper course. The firebox is made quite shallow to sit over the rear three of the central pairs of 63 in. drivers. The boiler centre line is 10 ft. 7 ins. above the rail, requiring a very short dome for clearance considerations, 13 ins. high and 33 ins. diam. For similar reasons, the sand box, instead of being one dome, forms two comparatively small ones, 2 ft. either side of the centre line. The firebox is radial stayed, and is 162 ins. long by 108 ins. wide at the mud-ring. The grates extend forward 120 ins. to a Gaines brick wall, forming a combustion chamber at the forward end. The Schmidt superheater is the largest ever applied to a locomotive, and has 53 elements, with 1,584 sq. ft. of superheating surface.

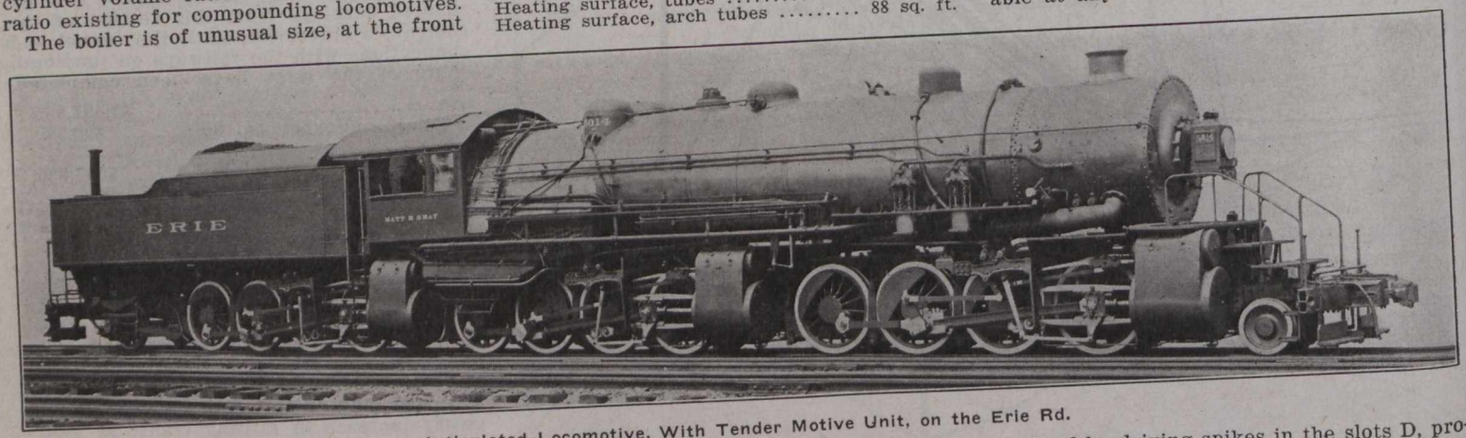
Steam passes to the high pressure cylinders through outside pipes, with a ball and sliding joint. Front and rear receiver pipes, with ball and sliding joints, transmit the steam to the low pressure cylinders. The front cylinders exhaust to the stack, while the exhaust from the rear ones passes through a feed water heater, and then out by a short, vertical pipe at the rear end of the tender. All the valves are 16 ins. diam., and are controlled simultaneously by a power reverse gear.

The frames are vanadium cast steel, 6 ins. thick. The front spring equalization is continuous, as is also the middle unit, only without cross connection, while on the rear unit, the first and second drivers are equalized together, each side independently, while the third and fourth drivers are equalized with the trailing truck.

A feed water heater supplies water at 200 degs. Fahr., being forced into the boiler by two single acting pumps, one on each side of the locomotive, and driven from the cross-heads through simple levers. In addition, the locomotive is equipped with two injectors. Following are a few of the principal dimensions:—

Tractive effort, compound	160,000 lbs.
Weight on leading truck	32,050 lbs.
Weight on first group of drivers	250,000 lbs.
Weight on second group of drivers	254,300 lbs.
Weight on third group of drivers	257,300 lbs.
Weight on trailing truck	59,400 lbs.
Total weight on drivers	761,600 lbs.
Total weight of locomotive and tender in working order	853,050 lbs.
Wheel base, each group	16½ ft.
Wheel base, total driving	71½ ft.
Wheel base, total locomotive and tender	90 ft.
Cylinders	36 by 32 ins.
Valves, diam. and type	16 in. Piston
Valve gear	Baker
Driving wheels, diam.	63 ins.
Leading truck wheels, diam.	33½ ins.
Trailing truck wheels, diam.	42 ins.
Working pressure	210 lbs.
Tubes and flues, length	24 ft.
Tubes, No. and o.d.	326—2¼ ins.
Flues, No. and o.d.	53—5½ ins.
Heating surface, tubes	6,418 sq. ft.
Heating surface, arch tubes	88 sq. ft.
Heating surface, firebox and combustion chamber	380 sq. ft.
Heating surface, total	6,886 sq. ft.
Heating surface, superheater	1,584 sq. ft.
Heating surface, total equivalent	9,262 sq. ft.
Grate area	90 sq. ft.
Tender water capacity	10,000 U.S. gals.
Tender coal capacity	16 tons

The locomotive was built by the Baldwin Locomotive Works, the designs being evolved by that company in conjunction with the railway company.

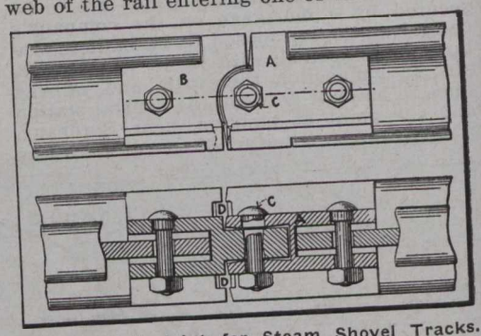


Articulated Locomotive, With Tender Motive Unit, on the Erie Rd.

Flexible Rail Joint for Steam Shovel Tracks.

The track on which steam shovels operate needs considerable flexibility to adapt itself to the irregular surface upon which it is laid. The track is in short sections, usually spliced in the usual way, but the splices do not allow for longitudinal bending in a horizontal plane. If the splice joints are bolted tight they do not allow for lateral movement, and there is likely to be breakage or distortion, but if the bolts are left loose enough to allow lateral play, the track may be insecure and lead to derailment, especially as the joint may be covered with mud or water.

A special rail joint for this particular service has been used for several months on the Panama Canal, and after satisfactory results with the first lot, a sufficient number was ordered to equip ten steam shovels, each shovel track (in 6 ft. lengths) having 22 joints. The device is shown in the accompanying illustration, and it will be seen that it consists of two steel castings, bolted to and projecting beyond the rail ends. One casting A is of H section, the end of the web of the rail entering one of the recesses,



Flexible Rail Joint for Steam Shovel Tracks.

while the other receives the end of the casting B, bolted to the other rail.

Each casting is secured to its rail by a single bolt, while a third bolt C, through the engaging portions of the castings, forms a pivot allowing for longitudinal flexibility. The outer or projecting ends of the H casting are curved laterally, as shown, thus allowing for lateral flexibility. In case this lateral movement should be undesirable at any time, however, it may be prevented by driving spikes in the slots D, provided for the purpose.

This joint is the invention of P. J. Thull, of Culebra, Panama Canal Zone, who was a steam shovel operator on the canal.

Locomotive headlights of the following kinds and numbers were reported recently as in use on locomotives on U.S. lines:—Electric arc, 22,120; electric incandescent, 632; acetylene, 2,904; and oil, 42,213. This was ascertained in connection with proposed legislation requiring greater candle-powers in headlights. The railways object to this legislation on the ground that with more powerful headlights the concentration of such powerful rays often has the effect of confusing the engineman, or causing him to misinterpret signals, rather than to prove of real assistance to him.

Steel and steel underframe cars to the number of 12,798 were reported in service in the U.S. on Jan. 1. Of these, 8,863 were steel and 3,935 steel underframe. On the same date there were in service 44,560 wooden cars, which shows a retirement of 3,566 such cars in the previous two years. The charge to operating expenses under the classification of accounts of the Interstate Commerce Commission, assuming a value of $4,000 per car replaced, will be $178,240,000.