Decapod Locomotives, Canadian Pacific Railway.

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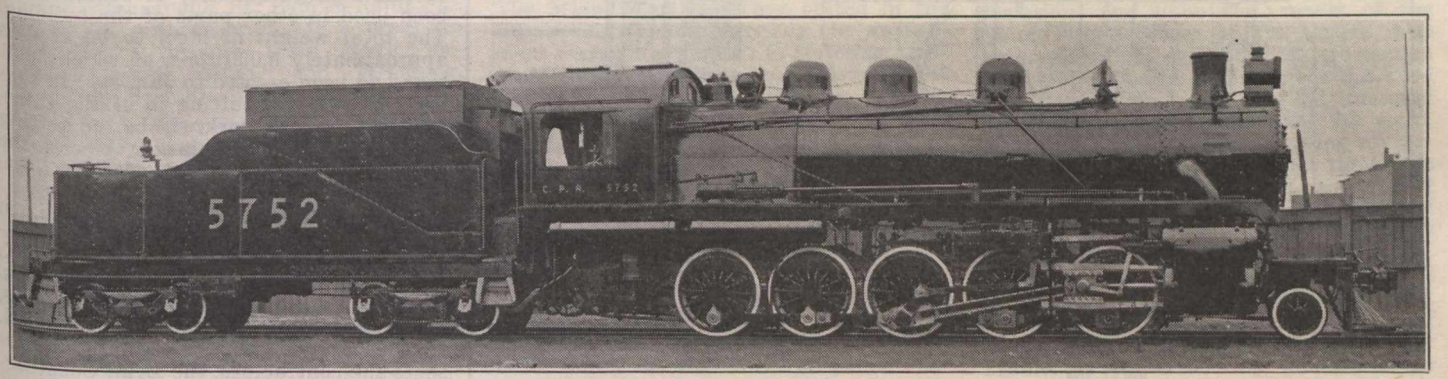
The question of economic and efficient locomotives is one which claims the attention of motive power officials and railway executives probably more at present than at any time in the history of railroading, and what is desired is an engine with maximum tractive effort that can be got over its division with the least possible delay. With this end in view it is imperative that a locomotive should be as simple as possible, both to operate and repair, and that its details should be made as fool proof as possible.

The subject of this article is the Decapod type of locomotives rebuilt recently at Angus shops, Montreal, from Mallet 0660 type, which had been until recently working on hill service in the Rockies. It was necessary, owing to demand of large power of this kind, to convert these locomotives with the least possible delay, and 30 days from the time the order was given, sketches were completed and work was under way in the shops. The first locomotive was turned out in another 20 days.

In a design of locomotive such as a decapod, with long driving wheel base it is necessary to introduce flexibility in order to insure proper tracking and minimize flange wear. For this reason the leading driving wheels on this locomotive were arranged to give 1 in. side play between shoes and driving box flange. See fig. 1. Incline planes have been applied over the leading driving wheels, in order to centre them when running on straight track, and the resistance due to weight applied to incline planes, provides guiding power when the locomotive is entering a curve.

With the application of the above to a pair of driving wheels it is necessary to provide flexibility to the side rods, in order to eliminate any undue strain to crack pins and rods. The design of flexible side rod connection is illustrated by fig. 2, from which it will be noted that it is a universal joint in its entirety, the crank pin being one axis of movement, and the brass, being turned on a vertical axis, provides for side sway of the rod. With this arrangement of joint, it is possible to provide a perfect lubrication to the crank pin and it is also simple to machine and maintain in the locomotive house. The arrangement of driving wheel and side rods described above can be applied to any locomotive, with minimum outlay, where trouble is experienced due to flanges cutting.



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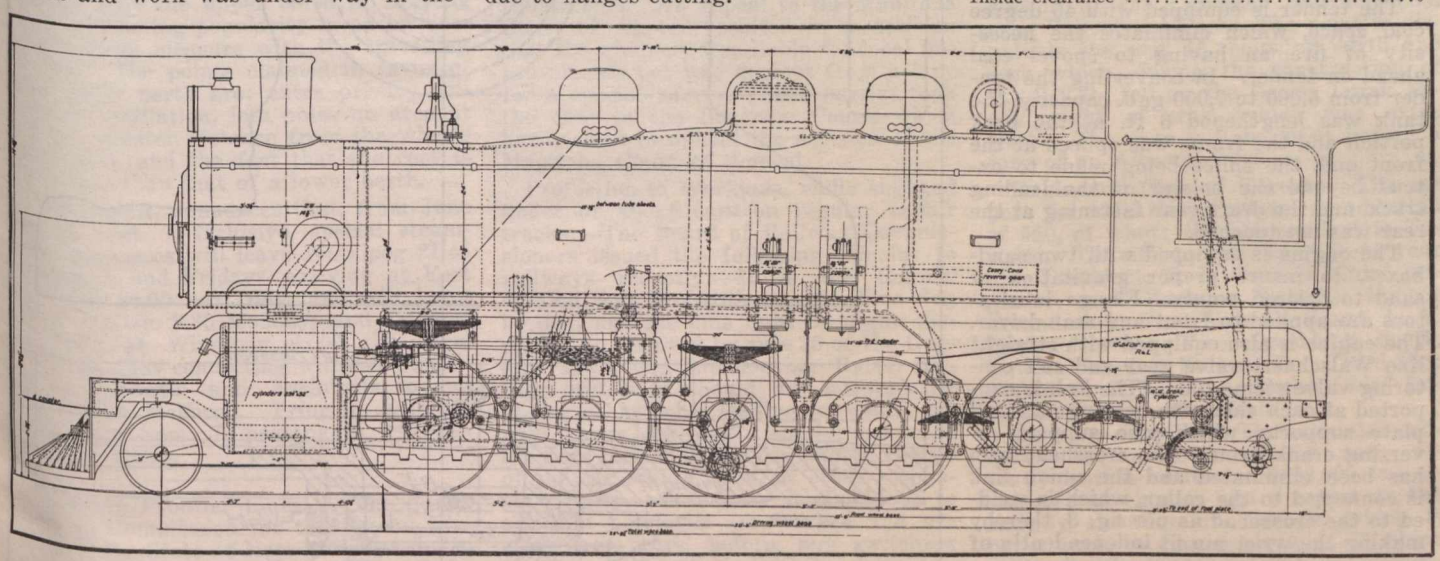

Fig. 2—Decapod Locomotive, Canadian Pacific Ry. Erecting Plan.

Another important feature of this design of locomotive, "which of necessity has long overhang beyond trailing driving wheel," is the location of the drawbar pin on the engine. It will be noted from the general arrangement in fig. 2, that this pin is located as close to rear driver as possible. This was done to reduce to a minimum the flange pressure of rear wheels when backing into curves.

GENERAL DATA.

Tractive effort	61,500 lb.
Weight in working order	243,000 lb.
Weight on drivers	220,000 lb.
Weight on engine truck	23,000 lb.
Weight of engine and tender in working order	403,000 lb.
Total engine wheel base	29 ft. 9½ in.
Driving wheel base	20 ft. 8 in.
Rigid wheel base	15 ft. 6 in.
Wheel base, engine and tender	66 ft. 10⅝ in.

RATIOS.

Weight on drivers, tractive effort	4.26
Weight on drivers÷tractive effort	4.26
Total weight÷tractive effort	4.7.
Tractive effort x dia. drivers÷heat surface	973.
Evaporating heating surface÷grate area	43.56
Firebox heating surface÷tube and flue heating surface per cent.	7.6
Weight on drivers÷heating surface	71.7
Cylinder volume, cubic feet	16.04.
Heat surface÷cylinder volume	191
Grate area÷cylinder volume	3.68

CYLINDERS.

Kind.	Simple.
Diameter and Stroke	23½ x 32

VALVES.

Kind.	Piston.
Diameter	14 in.
Greatest travel	6½ in.
Steam lap	1 in.
Lead	¼ in.
Inside clearance	0

WHEELS.

Driving over tires	58 in.
Thickness of tire	3½ in.
Driving journals, main	10 x 14 in.
Driving journals, others	9½ x 12 in.
Engine truck wheels, diameter	31 in.
Engine truck axles, diameter	6 x 10 in.

BOILER.

Style, Radial stayed firebox, with cross stays, and conical course.	
Steam pressure	200 lb.
Outside diameter of first ring	64⅛ in.
Firebox length and width	10 ft. x 5 ft. 10⅞ in.
Firebox plates, thickness	⅜ in. crown, 5/16 in. sides