The Lateral Motion Driving Bo

A Device That Enables the Locomotive to Adjust Itself to Curvature

By W. G. GREENE

DAY after day, modern locomotives are running from one section of the country to another with comparative ease. Over the varying grades they go and when they hit a sharp curve we often wonder what keeps them on the track and how they are able to withstand the heavy stresses that must be encountered.

The remarkable improvement in track and roadbed in recent years has seen a corresponding improvement in the design of the locomotive as it affects track structure.

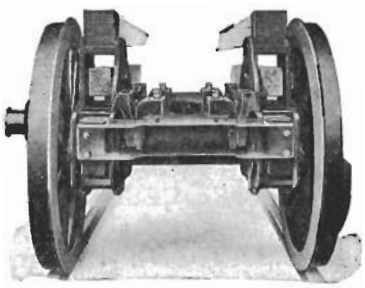
Years ago, attempts were made to improve the tracking of long wheel base engines by setting driving wheel tires at different distances from the center to divide the guiding effort among the different driving wheels. Even flangeless tires were used to a large extent with this object in view. These efforts were a recognition of the need of relieving the track from the stresses arising from the long rigid driving wheel base of big modern locomotives having four or more pairs of drivers.

As time went on, maintenance expense continually rose. Rails as well as the tire flanges were slowly worn away by the constant strain. Frequently the stresses exerted on the tire flanges were double the static load on the wheels.

The locomotive's running gear parts also suffered due to the stresses resulting from passing driving wheels coupled together in a rigid, unyielding wheel base through curves.

In overcoming these destructive stresses, little progress was made until the development of the Lateral Motion Driving Box.

By means of this device, the length of the rigid wheel base is reduced and lateral motion is provided for one or more driving axles. When the locomotive passes through a curve or heavy lateral thrusts results from the driving wheels impinging against the track, the lateral motion axles will



deflect with a pre-determin constant resistance, thus distributi the lateral thrust over several pa of wheels instead of being conc trated on a single pair. This re tance holds the lateral motion axl in normal central position. The d structive shocks between the whe flanges and rail that are inherent wi either a rigid wheel base or a fr floating axle are also eliminated.

The important results accomplishe by the Lateral Motion Driving Bo are far reaching, despite its compar tively simple construction, consisti as it does of nothing more than rocker fulcrumed on suitable lu cast on the inside of the driving bo The horizontal member of this rock which extends toward the wheel an rests on top of the driving box su ports one leg of the spring saddl The verticle members of the rock extend down one on each side of th axle and when in normal positio with the engine on a straight tra the lower end of these rockers are i free contact with the face of a wed which works in the guide cast on crosstie bolted rigidly to both rig and left frame members. In norm position these rockers do not wor

s the weight of the leg of the spring addle is carried by the driving box nd the horizontal arm of the rocker interposed between these parts. Then the locomotive enters a curve deflects from its normal straight urse so as to cause the front axle which the lateral motion driving x is applied, to move over in a teral direction, the driving box of e outer side of the curve will be oved inward by the wheel hub. This turn moves the rocker in the same rection causing the lower end of e vertical member to exert a thrust ainst the crosstie. This thrust ises the horizontal member and nsequently the leg of the spring addle resting upon it, against the nsion of the spring. The resistance fered by the spring, acting downrd through the saddle leg on the of the rocker, exerts a correonding thrust against the adjusting edge face in the crosstie, forcing e box back to its normal position. hile this is occurring the axle slides rough the box on the opposite side nd the lateral motion device remains its normal position. The purpose the adjusting wedge is to provide eans for taking up any wear which ccurs between the contact surfaces.

The demonstrated usefulness of teral Motion Driving Boxes on 2-2 locomotives has led to their use Mikado type locomotives where ey are applied as a means of conolling hub, box and tire wear. The sults have fully justified expectaons. The Driving Boxes so equipped from shopping to shopping without king up lateral; flange wear is reced more than 50 per cent over that exactly similar engines not equipped, and there is no cutting or grinding of flanges in passing through curves.

The accompanying chart illustrates different tire contours showing the flange wear with and without the Lateral Motion Driving Box. These tire contours were taken from Mikado locomotives in the same class and operating in the same service.

The locomotives with Lateral Motion Driving Boxes after eighteen months' service showed so little wear at the hub face of the driving boxes that no attention was required at this point. These engines are in daily service over a 140-mile division of a large eastern railroad where numerous curves are encountered.

In the case illustrated, application of this device reduced tire wear by 64 per cent and enabled hub plates to run over two shoppings.

This distribution of tire wear and consequent reduction on the first pair of drivers lengthens the life of all tires due to the practice of turning all wheels to the diameter of the smallest wheel which is generally the first driver. It is also obvious that such a reduction in the wear on locomotive tire flanges and driving wheel hubs must mean a corresponding reduction of wear on rail and tie. Therefore, the application of the Lateral Motion Driving Box has a beneficial effect on the track and roadbed as it reduces wear on the rail head, thereby increasing the service life of the rail; reduces the tendency of the rail to tilt, thereby lessening the mechanical destruction of the tire directly under the rail base —a common cause of tie renewal and damage; reduces the labor and cost of track maintenance, and in consequence, traffic interference; reduces the possibility of derailment, thereby increasing track safety; stops the "nipping" of the leading drivers in rounding a curve on a tangent track and makes the forward drivers assist in steering the engine; permits additional pair of drivers without increasing the length of the rigid wheel base, thereby allowing locomotives with long driving wheel base to operate on curves that otherwise they could not take. In other words, the Lateral Motion Driving Box puts the rigid wheel base of any engine into the class below it in lateral pressure against and wear on the rail head.

The last mentioned advantage of the Lateral Motion Driving Box is especially applicable to the switching type of locomotive. Eight-wheel switchers are replacing six-wheelers all over the country. Every railroad would use them were it not for their long rigid wheel base. They pull more and are in every way more suitable to meet the expanding demands of terminal work except in the one particular that they cannot take the same curves as the six-wheel switchers. This limits their range of use and increases the cost of maintenance because of flange and hub wear. The Lateral Motion Driving Box removes this limitation. It enables an eight-wheel switcher to go anywhere a six-wheel switcher can go.

Today, curves are no serious handicap to a locomotive. A lateral device has been provided that enables the modern locomotive to adjust itself readily to the conformation of the curve and greatly lessen flange, hub and rail wear.

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