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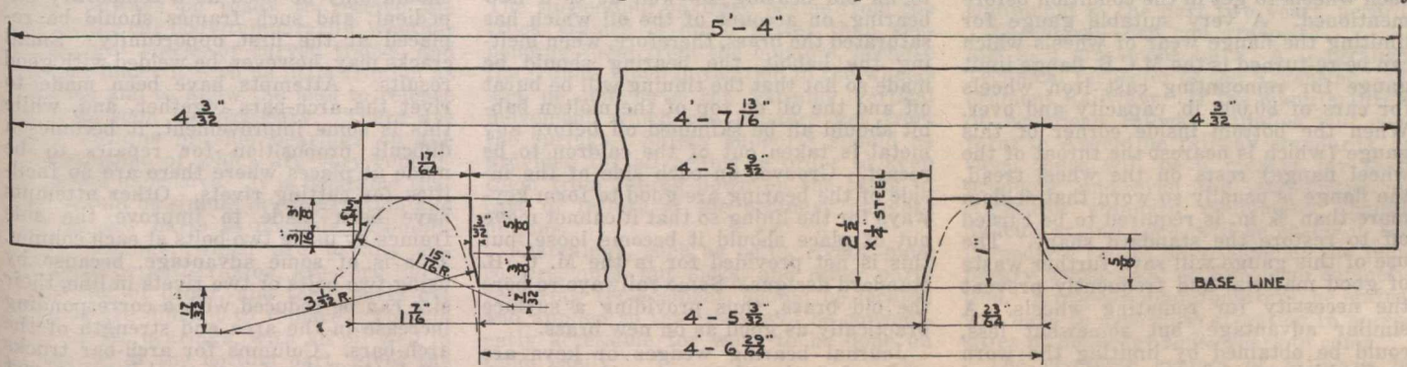
Railway Car Trucks.

By L. Brown, Supervisor, Angus Car Shops, Canadian Pacific Ry.

A car truck is mechanically a small 4 or 6-wheel car under each end of a railway car and carries the latter as a dead load by means of two swiveling center plates connected by a center pin or king bolt. The purpose of the truck is to enable short wheel bases to be used in connection with long car bodies. In England such trucks are called bogies.

Trucks form an important part of railway car equipment. Their weight is approximately one-half that of the body or one-third of the total weight of the car. If they are good, almost any kind of car has a reasonable chance of reaching its destination safely, but when they fail, the result is usually a train wreck with serious loss. They are located near the ends of the cars, so that they will be



near the draft gears, and one of the ideals for a draft gear would be for it to pivot directly over the center of the truck. The farther the draft gear is away from the center of the truck, the more strain is placed on the truck laterally, and consequently there is more danger of derailment. The trucks in further relation to the car body are as the supports of a bridge are to the superstructure, but they are also required to be capable of moving forward and backward, rotate horizontally under the superstructure, adjust themselves to uneven tracks and withstand severe strains from heavy loads, high speeds and sudden stops.

The usual construction of trucks consists of two or more pairs of wheels, each pair being connected together by an axle, and the axles are held together by a frame, which carries springs and other parts on which the car body rests. The wheels have smooth rolling surfaces and they are kept from sliding down inclined track rails by the friction caused by their own weight and by the load they carry, and are prevented from slipping off the rails sideways by their flanges, which engage with the inner edges of the rails. The larger the diameter of the wheel, the less revolutions there are at the journals and the better the bearing on and against the track rail. The materials of which wheels are usually made are cast iron for freight cars and steel for passenger cars. Cast iron wheels are much cheaper than steel wheels and give excellent service under heavy loads running at moderate speeds, but they have not the tenacity to withstand shocks like those made of steel. The treads of cast iron wheels are chilled while in the molten state of casting, which gives them a harder wearing surface than the best steel has. The hubs are soft like ordinary cast iron and can be easily bored to fit the axles. Steel wheels are usually made by being forged, but some are cast. Some makers of light cast wheels endeavor to get a hard wearing tread as in the cast iron wheels by mixing manganese in the molten steel, in such a way that it will appear in the tread but not at the hub. The forged wheels are made with thicker treads, so that they can have their wearing surfaces renewed repeatedly, and this to a considerable extent offsets their larger cost when new. Tires which can be replaced by other tires after they are worn out are largely used on steel centers, and in some cases on cast iron centers. The usual method of securing tires is to bore them about one thousandth smaller in diameter than the outside of the centers and then by heating so expand them that they will fit over the centers and tighten on them as they cool. If the tire is shrunk on much tighter than mentioned, the steel is too much strained and is liable to break or the tire becomes loose in service.

The wheels are mounted on the axles by hydraulic pressure of approximately 10 tons for each inch of wheel seat diameter, thus making them rotate with the axles, which is very different to the method used on small vehicles, where the wheels usually rotate on axles which are fixed. The distances apart at which wheels may be mounted on axles is limited to a total variation of one-eighth of an inch, which makes it necessary for very careful work to be done, not only when mounting, but also when making flanges, boring hubs and aligning axles.

The M.C.B.'s standard mounting and check gauge for wheels is used in two ways: by measuring from the back of one flange to the throat of the other, when mounting; and by measuring between the backs and over the throats of the two wheels, when checking, after they have been in service. The method of measuring when mounting is correct, but the method of measuring when checking wheels in service is open to question because it allows wheels to be out of gauge, according to fig. 9 on pg. 69 of the M.C.B. rule book. The rule book may be wrong in stating so positively that wheels are out of gauge if more than 4 ft. 6 29/64 in., because wheels when mounted to this dimension exceed it as soon as the treads start to wear. The distance of 4 ft. 6 29/64 in. is a standard dimension and if wheels do not exceed it when mounted, they ought not to be condemned for exceeding it in service, as long as they are within the limits intended by the check gauge. That the check gauge does the work it is intended to do is not apparent when wheels which have been correctly mounted are condemned as soon as the treads start to wear, because on account of its design it condemns the wheels when it cannot touch the treads of both of them and that this is wrong is proved by the fact that a large proportion of wheels in service are running safely which would be condemned by the gauge if it was tried on them; also, the gauge cannot measure on worn wheels the distance of 4 ft. 5 3/32 in. at the original base line, as required by fig. 9, on pg. 68 of the rule book. Worn wheels are intended to be limited by the wheel defect gauge, and the purpose of the check gauge should be limited to providing that wheels which were correctly mounted shall not be condemned by it, unless they move from their original location in relation to each other. This purpose can be accomplished by a gauge of the same limiting dimensions as the present gauge, but stopped by the apex of the wheel flange instead of by the tread. In cases of derailment the blame is very liable to be unjustly put against the wheels by the present gauge.

A wheel wearing hollow will cause the flange of the opposite wheel to continually wear itself away against the inner edge of the track rail. A wheel with a sharp flange is dangerous, because of the greater liability for the flange to break off and also to mount the rail and cause a derailment. Sharp flanges are principally caused by wheels of unequal diameter being mounted on the same axle. The treads of the wheels are coned, and the