

horn to rear of butt, to 25 ins. instead of 21¼ ins. as at present. Allow 2 ins. clearance between slot reinforcements on inside of bar instead of 1¾ in. as at present. Increase thickness of key from 1½ in., present standard, to 1¾ in., and increase ribs supporting reinforcement inside bar from ¾ in. to 1 in. Key should be stronger at its elastic limit and ultimate than the knuckle and have slightly greater strength than the weakest part of the coupler head. Heat treat keys and study condition of keys in service to determine best allowable bearing stress and arrive at proper distance through slot. Increase width of butt end from 5 in. to 6 in., beginning taper same as at present.

The following tests of the A and B couplers will be conducted under the direct supervision of your committee: Dynamic and static; angling and coupling; jiggling and lock-creeping; and service machine.

DYNAMIC AND STATIC.—Several will be subjected to the present standard M. C. B. tests—strike, guard arm, jerk, pulling, separate knuckle strike and jerk, and other tests. From these tests a set of specifications and tests will be developed for future purchases of the standard M. C. B. coupler after its adoption.

ANGLING AND COUPLING TESTS, will be made on a machine specially built for determining the greatest possible degree of horizontal angling between two couplers and for testing coupling operations between them when in line or at any angle.

JIGGLING OR LOCK-CREEPING TESTS will be made on a machine specially built to impart vibrations and lock-creeping conditions to couplers under tension, and determine if the locks will creep, and, if so, the reliability and efficiency of the lock-to-the-lock or anti-creep device or feature embodied in the coupler.

SERVICE-TESTING MACHINE, FINAL tests will determine to what extent the changes made were a benefit and will give final results on the durability and efficiency of operating parts and give information as to what may develop in the general trial in service and can be compared with same.

FOUNDRY GAUGES FOR THE STANDARD M. C. B. coupler.—Interchangeability of parts of same design of coupler by different manufacturers will be arranged for; should the number of experimental couplers ordered for service trial exceed 5,000. Your committee will, in conjunction with the coupler manufacturers, design and adopt the necessary gauges and practices for this contingency.

HEAT TREATMENT AND ALLOY steels.—It is generally acknowledged that the present coupler is inadequate in strength to meet the ever-increasing demands placed upon it. This suggests the use of heat treatment and also alloy steels. Experiments show good but as yet uncertain results. It is desirable to design the standard M. C. B. coupler on the basis of the present commercial steel.

Report of Committee on Car Trucks.

The Master Car Builders' Committee, J. T. Wallis, General Superintendent of Motive Power, Pennsylvania Rd., chairman, and of which J. Coleman, Superintendent Car Department, G. T. R., and L. C. Ord, Assistant Master Car Builder, C. P. R., are members, reported in part as follows:

LIMITING DIMENSIONS FOR CAST Steel Truck Sides for 80,000, 100,000 and 140,000 lbs. Capacity Cars and Revision of Specifications.—To establish limiting dimensions, the following were governing factors: Relation of centre line of draft gear to the bearing surface of the body centre plate largely established the height of the centre plate of the truck bolster from rail; with this as a base the height from top of rail to top of truck bolster (underside of truck centre plate) was fixed at 26¾ ins., with empty cars for all capacities. The establishing of the vertical height from the bearing surface of the truck centre plate to the top of spring cap (or underside of bolster resting on spring cap), fixed at 8¾ ins. for all capacities; this is correlated to the maximum height of side frame from rail, established at 31 ins. Vertical height from top of spring cap (or underside of bolster) to top of side frame is made up of the depth of bolster, amount of clearance between top of bolster and underside of top member of side frame and depth of top member, the dimensions of the latter being dependent upon the capacity. Adopting use of the M. C. B. truck springs C for 80,000 lbs., D for 100,000 lbs. capacity and a five cluster spring made up of coils the same as D, giving a uniform spring height for the three capacity trucks and all springs can be built up from the same unit coils, establishing the height from top of spring plank (or bottom of lower spring cap) to top of rail, of 10½ ins. A minimum of 4 ins. is necessary as a safe clearance between bottom of side frame and top of rail with new wheels, bearings, etc., leaving 6½ ins. as maximum total for thickness of spring plank and depth of bottom member of side frame, which latter is determined by design and capacity de-

sired. The widths of bolster openings are governed by the capacity and the width of spring base required, which also controls the wheel base. The cross section of the top and bottom members of the truck side is determined from the capacity and governed by allowable stresses for members made of cast steel and controlled by the specifications and tests.

Each truck side shall be tested in a suitable machine to the following loads for different capacity trucks:

Car Capac., Lbs.	PROOF TESTS.			
	Initial Load, Lbs.	Load, Lbs.	Max. deflec., Ins.	Max. set, Ins.
80,000	20,000	110,000	0.15	0.01
100,000	25,000	125,000	0.15	0.01
140,000	35,000	175,000	0.15	0.01

After applying initial load, reduce load to 5,000 lbs. and set deflection instrument at zero; apply the requisite proof load and measure deflection; reduce load to 5,000 lbs. and measure the set. Truck sides shall not vary more than 3% above or 2% below what has been determined as the normal weight of the casting.

Truck sides shall conform to the weights given below:

Car Capac., Lbs.	WEIGHTS, Lbs.		
	Min.	Norm.	Max.
80,000	*415	*425	*445
100,000	490	500	520
140,000	645	660	685

* Estimated.

CAST STEEL TRUCK BOLSTERS FOR 80,000, 100,000 and 140,000 lbs. Capacity Cars.—Bolsters are designed for removable centre plates, as it simplifies the manufacture and permits the use of a drop forged centre plate. The side bearings are adjustable, as the side bearing clearance diminishes more or less on all types of cars with service and it is difficult and expensive to maintain side bearing clearance on cars of steel construction with metal body and truck bolsters unless adjustment is provided for. Provision has also been made for the use of roller or other anti friction side bearings by establishing a uniform slope of 1 in 28, in that portion of the top plate of bolster where these side bearings will be

located. The bolsters shall not vary more than 3% above nor 2% below the normal weight of the casting, and they shall conform to the weights given below:

Car Capac. Lbs.	WEIGHTS, Lbs.		
	Min.	Norm.	Max.
80,000	*660	*675	*700
100,000	735	750	780
140,000	*855	*875	*910

* Estimated.

As the pressed steel bolsters (built up type) are in general use, designs are presented, which are interchangeable with the cast steel bolsters, and which would provide an alternate standard. Gauges have been designed with tolerance for gauging the bolster as well as to provide for interchangeability.

SPREAD OF SIDE BEARINGS, CENTRE to Centre, on Various Capacity Freight Cars from 60,000 to 100,000 lbs.—The committee has not been able to decide on the proper distance for spread of side bearings on 100,000 lb. cars and those of less capacity. In view of the fact that there are comparatively few 140,000 lbs. cars in the country, the committee recommends a spread of 50 ins. centre to centre, on cars of this capacity and believe that it would be wise to make the same recommendation in regard to other capacity cars.

CLEARANCE OF SIDE BEARINGS.—The clearance of side bearings depends on the spacing or spread of the side bearings. The following side bearing clearance for new cars is recommended:

	Min.	Max.
Per side bearing	¼ in.	5-16 in.
Total (one truck)	½ in.	¾ in.

CONSTRUCTION OF CENTRE PLATES For Standard Freight Cars.—The present standard centre plate with 100 square in. bearing area has been generally adopted with slight modifications on 80,000 and 100,000 lb. cars, and the performance under cars of 80,000, 100,000 and 140,000 lbs. has been satisfactory. A change in the over all height of the centre plates as well as the rivet spacing is necessary to make these centre plates applicable to cars of steel construction and to the bolsters recommended. It is essential that the centre plates be made of either steel castings or drop forgings; the latter are preferable as they can be more accurately manufactured and have smoother bearing surfaces, the cost being slightly in favor of the drop forging.

SPRINGS FOR TRUCKS.—The cast steel truck side limiting dimensions and the bolsters for the 80,000, 100,000 and 140,000 lb. freight cars have been designed to accommodate the springs shown on sheet M. C. B. H of recommended practice, as follows:

C for 80,000 lb. cars; D for 100,000 lb. cars; and five double coil cluster, made up of coils the same as D, for 140,000 lb. cars. This enables the same design outside and inside coils to be used for all three capacity trucks by varying the combination of number of coils and using the different design of spring caps according to capacity.

STRENGTH OF ARCH BAR TRUCKS as Compared with Cast Steel Truck Sides.—Cast steel truck sides, conforming to the modified M. C. B. specifications, are superior to the arch bar truck sides.

Gauges for 6 in. by 11 in. journal boxes have been designed.

Report of Committee on Damage to Freight Car Equipment by Unloading Machines.

The Master Car Builders' Committee, P. F. Smith, Jr., Superintendent of Motive Power, Pennsylvania Rd., Chairman, reported as follows: Much interest has been taken in the recommendations made last year, by railways owning machines, by in-