

by H. C. Meloy, chairman. This was an interesting report and covers various improvements relating to apparatus used by the railways which have been brought out since October, 1910. These are described under the following classifications: Axle lighting equipment; storage batteries; lamps, shades and fixtures; fans; motors and generators; controlling devices; wires and wiring devices; transformers and rectifiers, and instruments. The report includes special articles which have been prepared by the different electric manufacturing and supply companies relating to their recent improvements. One of the most interesting is that on the use of forced ventilation on car motors which has been tried on a large scale on the Pennsylvania's Long Island Railroad cars. The use of forced ventilation enables the motors to be operated at a much higher continuous rate than would be possible without it.

At the afternoon session on Wednesday there was presented a report of the committee on shop practice, by C. J. Causland, chairman, and we publish in this issue a liberal abstract of the report. The session on Wednesday concluded with a paper on insulation, by K. R. Sternberg.

The further programme of the convention includes the report of the committee on specifications, a paper on The Light for Safety, by F. R. Fortune, and reports of the committees on train lighting practice and on illumination. The programme for the last day includes routine business and election of officers, closing with a paper on Industrial Trucks, by T. V. Buckwalter. A further report of the convention will be published in a later issue.

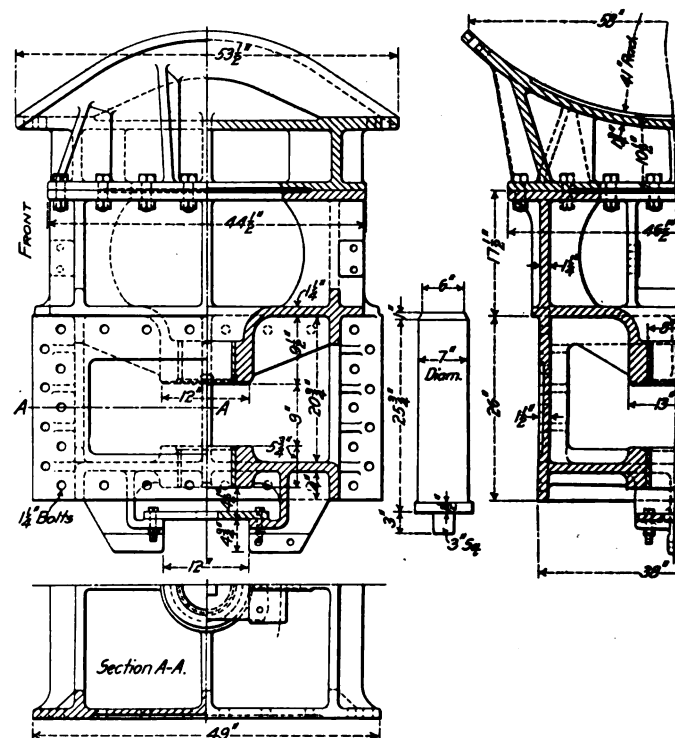
Among the exhibits were the following:

- Adams-Bagnall Company, Cleveland, Ohio.—A-Bolite flaming arc lamps, train ventilating fans.
 Adams & Westlake Company, Chicago.—Train lighting fixtures.
 American Pulley Company, Philadelphia, Pa.—Pulleys and bushings.
 Benjamin Electric Manufacturing Company, Chicago.—Arc lights and train lights.
 Central Electric Company, Chicago.—Okonite Wire and products, D. & W. material, Invincible renovator, Diehl car fans, Columbia train lamps.
 Consolidated Railway Electric Light & Equipment Company, New York.—Generating sets, circuit breakers and train lighting system.
 Crouse-Hinds Company, Chicago.—Full line of condulets and panel boards.
 Cutler Electric & Manufacturing Company, Philadelphia, Pa.—I. T. E. circuit breakers, 4-panel board, remote control.
 Edison Storage Battery Company, Orange.—Edison storage batteries for train lighting.
 Electric Storage Battery Company, Philadelphia, Pa.—Storage batteries for train lighting.
 General Electric Company, Schenectady, N. Y.—Generating sets, dynamos, train lighting turbine parts, circuit breakers, fans and mercury arc rectifiers.
 Gould Storage Battery Company, Depew, N. Y.—Generating sets, Gould storage batteries, switchboard and control.
 Holophane Company, Newark, Ohio.—Full line of reflectors.
 Jefferson Glass Company, Follansbee, W. Va.—Lighting glassware.
 Kerite Insulated Wire & Cable Company, New York.—Full line of Kerite wire and cable.
 J. Lang Electric Company, Chicago.—Panel boards and Lang induction motor.
 National Electric Lamp Company, Inc., Cleveland, Ohio.—Headlight lamps and train lighting lamps.
 New York Leather Belting Company, New York.—Leather belting.
 Niagara Lead Battery Company, Niagara Falls, N. Y.—Train lighting, storage batteries and signal storage batteries.
 Nungesser Carbon & Battery Company, Cleveland, Ohio.—Carbon specialties and full line of dry batteries.
 Oneida Steel Pulley Company, Oneida, N. Y.—Pulleys and shafting.
 Pass & Seymour Company, Inc., Chicago.—Special porcelain sockets and full line of sockets.
 Pyle-National Electric Headlight Company, Chicago.—Pyle-National headlight and complete plant.
 Safety Car Heating & Lighting Company, New York.—Generating sets, gas sets and train lighting fixtures.
 Sangamo Electric Company, Springfield, Ill.—Switchboard, watt-hour meters and meters of various kinds.
 United States Light & Heating Company, New York.—National storage battery for car lighting, axle generators, regulating panels, lamp regulators and assortment of spare parts.
 Western Electric Company, Chicago.—Interphones and train lighting lamps.
 Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.—Lights and lighting specialties.
 Willard Storage Battery Company, Cleveland, Ohio.—Storage batteries for train lighting.

The government of Peru has entered into a contract with the Arthur Koppel Company, Berlin, to build the first section of the Paita-Maranon Railway. The approximate cost of this work is estimated to be \$5,000,000, to be met by the issue of 6 per cent. government bonds.

MALLET LOCOMOTIVES FOR THE SOUTHERN PACIFIC.

The Southern Pacific Company recently received twelve Mallet locomotives from the Baldwin Locomotive Works, Philadelphia, Pa., which will be used in passenger service on the Sacramento division of the Central Pacific. Eastbound there is a continuous ascending grade from Sacramento, Cal., to Summit, a distance of 105 miles. The total rise is 7,000 ft., and the maximum grade is 116 ft. per mile for about 40 miles. Since 1907 the passenger service on this division has been handled by ten-wheel locomotives built to the Associated Lines standards. They weigh 203,000 lbs., and have 160,000 lbs. on the driving wheels. The tractive effort is 34,700 lbs., and two engines are required to handle a 500-ton train on the 116-ft. grade. Each of the new Mallet locomotives will replace two of the ten-wheel engines and under ordinary conditions, the double heading of passenger trains will be avoided. The general design of the new locomotives follow that of the Mallet freight locomotives with 2-8-8-2 wheel arrangement, which were described in the *Railway Age Gazette*, April 30, 1909, page 933, and have



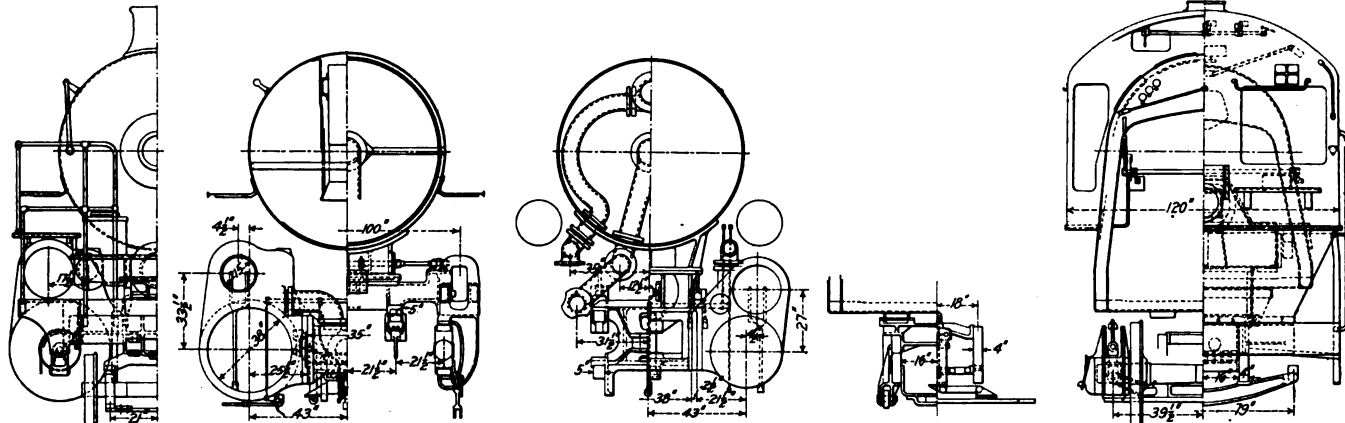
Cast Steel Saddle for Mallet Locomotive.

been in successful use on this division since 1909. A number of modifications have been introduced, however, and these include some features which are new to the practice of the builders.

The boilers of the new Mallet engines are of the separable type, with the dome placed a short distance ahead of the firebox. An internal dry pipe conveys the steam from the dome to the intermediate combustion chamber. This chamber contains right and left hand steam pipes of the ordinary construction, which communicate with short horizontal pipes leading to the high pressure steam chests. The high pressure exhaust is conveyed to the smoke-box through a horizontal pipe located in a large flue which traverses the feedwater heater, and is carried to the flexible receiver pipe. The injector piping is arranged so that the feedwater enters the heater on the bottom center line and leaves it on the top center, thus causing the water to circulate through the entire heater. The hot water enters the boiler proper on both sides, at a distance of 35 in. from the front tube sheet. Check valves are placed at both the heater and the boiler inlets.

The steam distribution to all cylinders is controlled by inside admission piston valves, which are of the built-up type 15 in. in diameter. The valves are operated by the Walschaert valve gear, and are set with a lead of 5/16 in. The exhaust

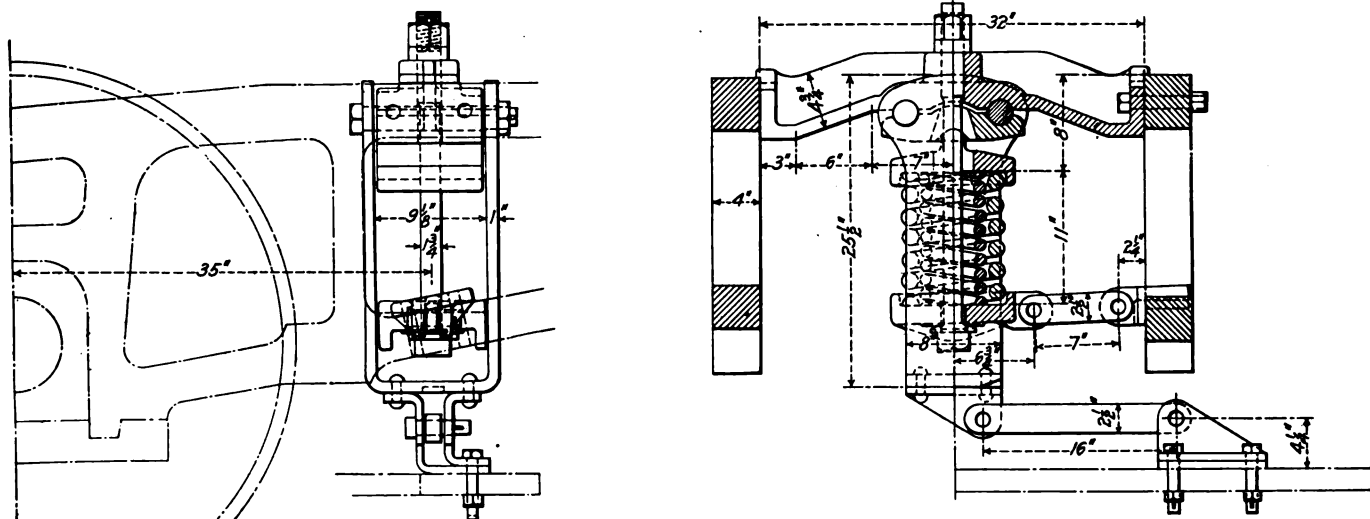
and bronze gibs, and these bear on the tops of the guides only. The high pressure cylinders are secured to the saddle by a slab frame 26 in. deep and 2 1/2 in. wide, which is interposed between them. This slab is spliced to the main frame by 21



Sections of Mallet Locomotive.

clearance of the high pressure valves is 1/4 in., and of the low pressure 3/8 in. No by-pass valves are used, but a large relief valve is tapped into the steam pipe leading to each cylinder. Special attention has been given to the steam distribution, and

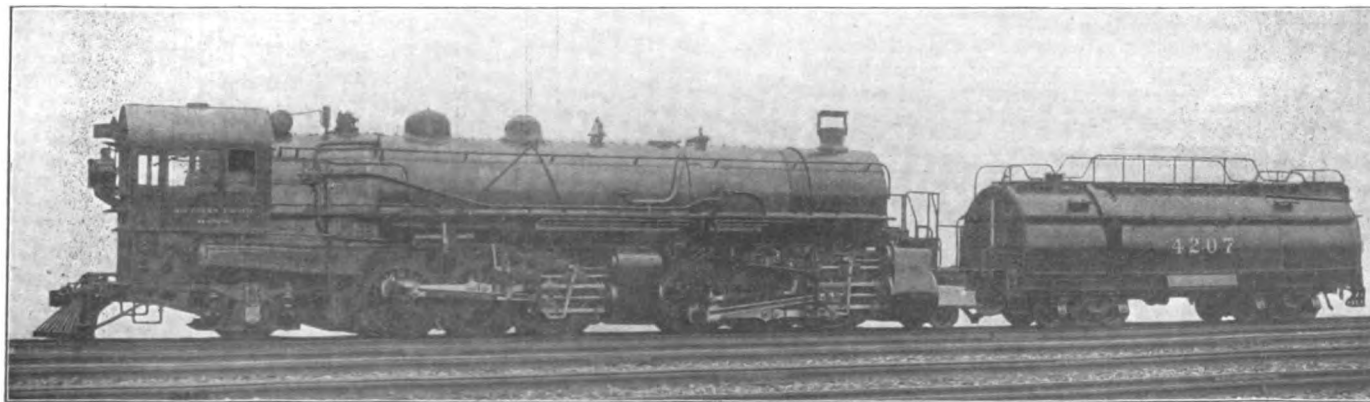
bolts 1 1/2 in. in diameter, and by two vertical keys, driven in a parallel key-way, with their tapered faces in contact. The same plan is used for keying the frames to the cylinders and saddle. The saddle itself is of cast steel, and is composed of



Centering Device for Trailing Truck.

to providing ample sectional areas in the steam and exhaust piping. The low pressure pistons have extension rods which are supported on crossheads at their outer ends, the guides for these crossheads being carried by the cylinder heads and the cast steel bumper beam. The crossheads have cast steel bodies

two sections. The lower section extends the full depth of the slab frames, and supports the hinge pin, which is 7 in. in diameter. With this arrangement the separate crossie heretofore used to support the lower end of the hinge pin is combined with the saddle casting and the cylinders, frames and saddle are



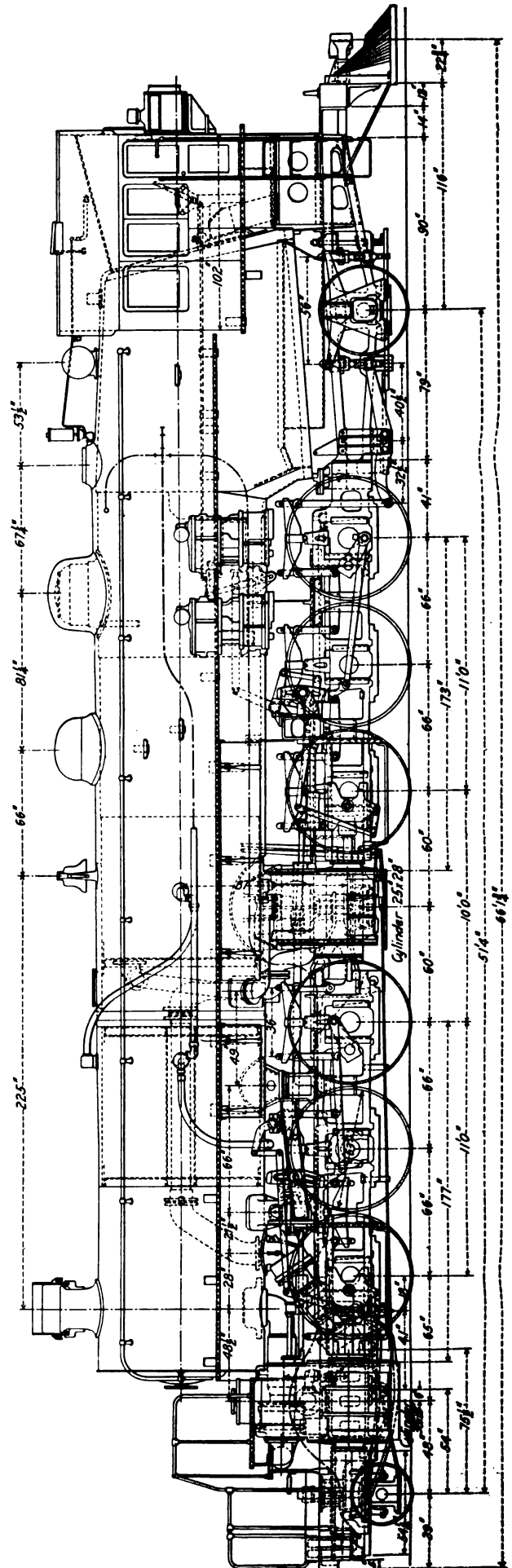
Mallet Passenger Locomotive with Cab at Leading End; Southern Pacific.

bolted and keyed together to form a strong and rigid structure. The low pressure cylinders are bolted directly to a steel box-casting which is secured to the frames.

These engines are designed to run firebox end first to give the enginemen an unobstructed view of the track. The truck under the firebox therefore becomes the leading truck. It is of the Hodges type, and has spring links jointed so as to allow a fore-and-aft motion, as well as a lateral motion. A new design of centering device is applied to this truck. It consists of a double coil centering spring that is held in a vertical position between two cast steel washers, and is guided by a vertical thrust bar. This thrust bar is placed on the center line of the locomotive and is suspended from a cross-tie. The upper spring washer bears on the cross-tie, through two 2-in. pins and a bearing plate. On these pins is suspended a U-shaped strap, which is wide enough to embrace the spring washers. A link connects the lower end of the strap with a lug which is bolted to the truck frame. When the frame is displaced from its middle position, the strap is pulled to one side, and one of the upper pins is drawn down, thus pushing on the bearing plate and throwing the spring into compression. The bottom spring washer is held in place by a link which is pinned to the engine frame.

These locomotives are equipped for burning oil, and the tenders are coupled at the smoke-box end. The two tanks are semi-cylindrical in shape, and are placed end to end. The tender frame is composed of 12-in. channels weighing 40 lbs. per foot, and braced transversely. The end bumpers are of cast steel. The tender trucks and the trailing truck, are equipped with Standard forged and rolled steel wheels. A table of the important dimensions and ratios follows:

General Data.	
Type	2-6-6-2
Service	Passenger
Fuel	Oil
Tractive effort	66,800 lbs.
Weight in working order	384,800 lbs.
Weight on drivers	320,100 lbs.
Weight of engine and tender in working order	568,000 lbs.
Wheel base, driving	32 ft.
Wheel base, rigid	11 ft.
Wheel base, total	51 ft. 4 in.
Wheel base, engine and tender	85 ft. 1 in.
Ratios.	
Total weight ÷ tractive effort	5.76
Weight on drivers ÷ tractive effort	4.80
Tractive effort × diam. drivers ÷ heating surface591
Total heating surface ÷ grate area	101.7
Firebox heating surface ÷ total heating surface, per cent.	3.3
Weight on drivers ÷ total heating surface	45.
Total weight ÷ total heating surface	54.
Volume of equivalent simple cylinders, cu. ft.	22.5
Total heating surface ÷ vol. cylinders	316.
Grate area ÷ vol. cylinders	3.11
Cylinders.	
Kind	Compound
Diameter	25 in. and 38 in.
Stroke	28 in.
Valves.	
Kind	Bal. piston
Diameter	15 in.
Lead, forward gear	5/16 in.
Wheels.	
Driving, diameter over tire	63 in.
Driving, thickness of tire	3½ in.
Driving journals, main, diam.	11 in. x 12 in.
Driving journals, others, diam.	10 in. x 12 in.
Engine truck, diameter	30½ in.
Engine truck journals	6 in. x 10 in.
Trailing truck, diameter	45 in.
Trailing truck journals	8 in. x 14 in.
Boiler.	
Style	Straight
Working pressure	200 lbs.
Outside diameter of first ring	82 in.
Firebox, width and length	84 in. x 120 in.
Firebox plates, thickness	¾ in.
Firebox water space	5 in.
Tubes, number and diameter	495—2 in.
Tubes, number and diameter (feed-water heater)	424—2½ in.
Tubes, length	20 ft. 6 in.
Tubes, length (feed-water heater)	6 ft. 3 in.
Heating surface, tubes	5,292 sq. ft.
Heating surface, firebox	235 sq. ft.
Heating surface, feed-water tubes	1,590 sq. ft.
Heating surface, total	7,117 sq. ft.
Grate area	70 sq. ft.
Tender.	
Wheels, diameter	33 in.
Journals	6 in. x 11 in.
Water capacity	10,000 gals.
Oil capacity	3,200 gals.



Oil Burning Mallet Passenger Locomotive; Southern Pacific.