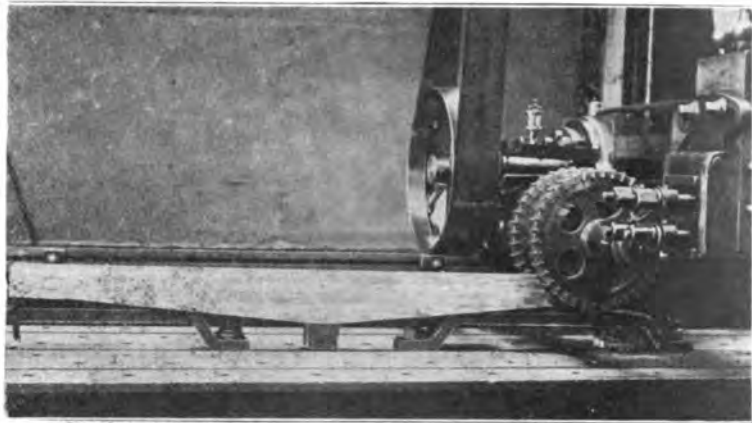


old planer has been converted into a milling machine on which practical results are being obtained, is illustrated by the accompanying reproduction of a photograph taken in the machine department of the Port Huron shops of the Grand Trunk Railway. This conversion was made under the jurisdiction of Mr. M. H. Westbrook by applying a Farwell milling attachment to an out-of-date planer.

Truck pedestal jaws, shoes and wedges, cross head gibs and shoes, and much other work of a similar nature is now performed by milling with this machine in much less time than was possible with the previous arrangement of the machine as a planer. The illustration shows the three sides of a cast iron guide bar finished in one operation.



MILLING ATTACHMENT FOR PLANERS.

## Electric Locomotives

### *Pennsylvania R. R.*

**W**ITH a view of determining the type best adapted to pulling its heavy passenger trains through the New York tunnels, the Pennsylvania Railroad has in progress a series of experiments upon electric locomotives.

Through the experiments which are being conducted on its West Jersey and Seashore Division and the Long Island Railroads, the company intends to determine some of the general characteristics of the electric locomotive and to secure operating data based on actual service.

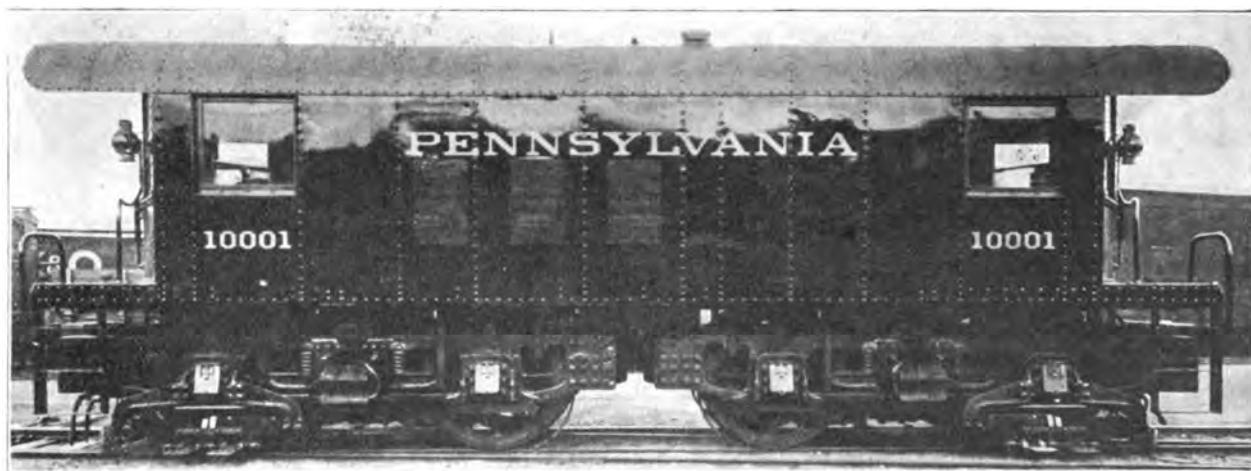
Of the two direct current locomotives now undergoing tests, one is equipped with four 350 horsepower geared motors, and the other with four gearless motors in order

advantages of the two methods of motor suspension under the same conditions of service.

In exterior appearance the two locomotives are almost identical. They resemble somewhat a short truck passenger car with few windows and large wheels.

The trucks are of the four wheel type, having frames placed outside the wheels, with pedestal boxes and adjustable wedges similar to those used in locomotive practice.

On account of their short wheel base the trucks have a tendency to tilt in operation, and thereby shift a portion of the effective load from one pair of wheels to the other. By an ingenious automatic switching mechanism



EXPERIMENTAL ELECTRIC LOCOMOTIVE.—PENNSYLVANIA RAILROAD.

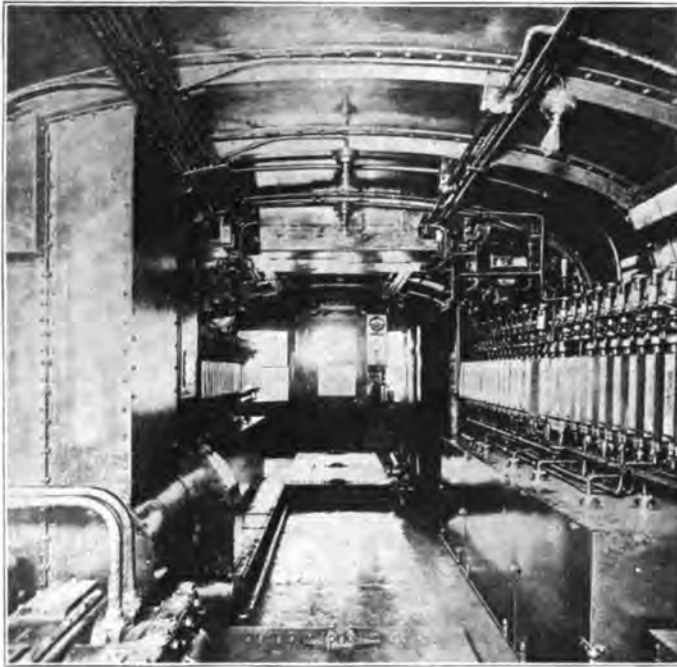
that the relative merits of the two types may be determined.

The locomotive with gearless motors has one of its trucks equipped with two 320 horsepower motors supported by springs from the main journals and wholly independent of the truck frame, while the other truck has two 300 horsepower motors rigidly fastened to the truck frame. This arrangement will demonstrate the

on the lightly loaded axle diminished, in proportion to the difference in axle loads. By this expedient the pulling power of the locomotive is increased 25 per cent.

The outer-end casting of each truck carries the coupler, draft spring and buffer arrangement, so that strains caused by pushing, pulling and buffing are taken directly by the truck frames and do not come upon the under-frame of the cab, except as they are transmitted between

bolsters through the center sill. In order to allow sufficient lateral play when the locomotive is coupled to a long passenger car with considerable overhang, the coupler head has a free movement of 15 inches on either side of the center line of the truck. To facilitate coupling



INTERIOR OF EXPERIMENTAL ELECTRIC LOCOMOTIVE.—  
PENNSYLVANIA RAILROAD.

and uncoupling on curves, the coupler can be swung sideways and its uncoupling pin raised by means of levers at the end of the cab, which can be operated from the platform.

Driving wheels are 56 inches in diameter, with removable tires secured by retaining rings. They are carried by axles 8 ins. in diameter at the center, provided with 6 in. x 11 in. journals.

The spring rigging is of the locomotive type, with semi-elliptical springs over the journal boxes, and equalizers between the springs. To prevent teetering, the equalizer beam is not provided with a fixed fulcrum, but instead supports two nests of helical springs, which in turn help to support the truck frame.

The collector shoes are attached to the four end journal boxes, and are made of two castings forming a spring hinge, with one wing lying in a horizontal plane, and sliding on top of the third rail. The current passes from the third-rail through the collector shoes and the heavy cables connected thereto, to the fuse-boxes located near the shoes.

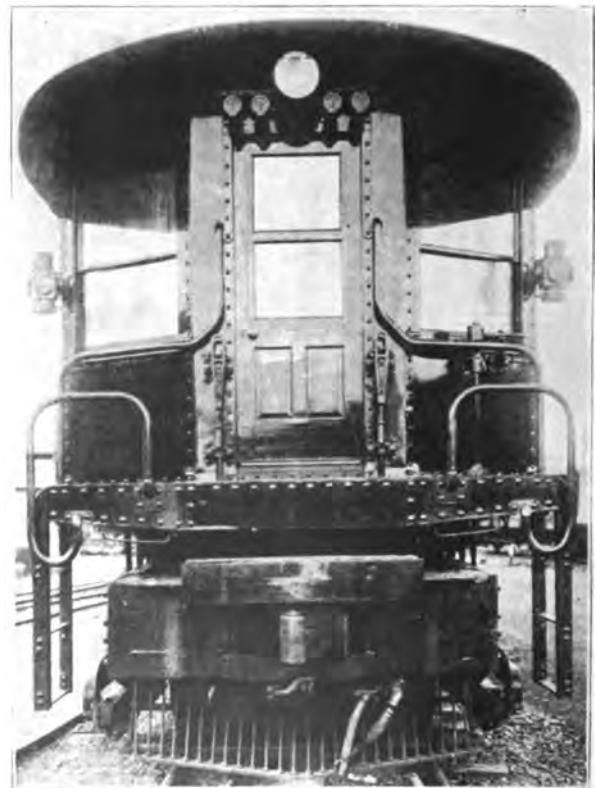
The cab is entirely of metal, its underframe composed of a center sill, built of two 10-inch channels, side sills of 7 in. x 3½ in. angles, plate bolsters and end sills. Within the cab the apparatus is distributed along the sides, leaving a passageway through the middle. The equipment on one side of the cab consists of three main reservoirs, a sand-box, with electro-pneumatic valves underneath, a switch group, two line switches, a case of diverters, and two sets of storage batteries. That on the

other side consists of an air compressor, a compressed air cooler, a fan and motor, a reservoir for control apparatus, a sand-box, two line switches, a whistle reservoir, a motor cut out, a switch group, and a case of diverters.

The locomotive control mechanism is in duplicate, and placed in diagonally opposite corners of the cab, so that the motorman can operate a locomotive, or group of locomotives, from either end of the cab, in either direction. By means of a special grouping of switches it is possible to obtain a constant flow of current without a break, when changing from series to series parallel, and from series parallel to full-multiple. The preliminary tests made with the locomotive proved that by means of this system of grouping switches, the acceleration of the locomotive could be made practically uniform. Both ends of the cab are provided with sockets, so that when two or more locomotives are coupled together connections can be made by means of these sockets, and the group of locomotives can be simultaneously operated and controlled by one motorman from one locomotive.

Hung from the ceiling in the center of the cab are two plug switches, and an ammeter shunt. The conductors from the third rail shoes are connected to one switch, and the trolley cable is connected to the other.

The switches in the switch group are operated by air pressure. The air valve is actuated by a control magnet on a fourteen-volt circuit. When current flows through the magnet the armature opens the air valve, admitting air behind the piston, which closes the switch through which the main current flows. By breaking the control circuit the armature of the magnet is released, which



END VIEW OF EXPERIMENTAL ELECTRIC LOCOMOTIVE.—  
PENNSYLVANIA R. R.

closes the air passage from the reservoir and prevents the egress of air from the cylinder. A spring under the piston pushes it up, and thus opens the main circuit. The line switches are actuated in a similar manner, and also open when an excess of current flows through them.

The cab can be lighted by three lamps, which are in series with the lamps with the headlights; but normally these lamps are to be concealed. Five more lamps, which are in series, are distributed over the ceiling, to assist in lighting the cab when repairs are under way, but are not used when the locomotive is in service.

The storage batteries are in two sets, so that they can be charged alternately by being placed in series with the motor of the air compressor, one set being charged while the other set is in service, the alternation being made each day.

Locomotives are equipped with hand, straight air, automatic, and high speed brakes.

Number of pairs of driving wheels.....	4 ins.
Diameter of driving wheels.....	56 ins.
Axles, 8 ins. diameter, 6 ins.x11 ins. journals.....	
Length, inside couplers.....	37 ft. 10½ ins.
Length over platforms.....	35 ft. 8 ins.
Wheel base of trucks.....	8 ft. 6 ins.
Total wheel base of locomotives.....	26 ft. 1 ins.
Width, cab .....	10 ft. 1¾ ins.
Width, body .....	9 ft. 11¾ ins.
Height, rail to top platform.....	5 ft. 5 ins.
Height, rail to top roof.....	13 ft. 4 ins.
Height, rail to top bell (extreme).....	14 ft. 5¾ ins.
Weight—	

Locomotive No. 1001 (with geared motors).....175,100

Locomotive No. 1002 (with gearless motors).....195,200

### Personal Mention

Mr. F. W. Dickinson has been appointed master car builder of the Bessemer & Lake Erie, with office at Greenville, Pa., to succeed Mr. W. J. Buchanan, resigned.

Mr. W. F. Thornton has resigned as foreman of the car department of the Orange & Northwestern to engage in other business at Orange, Tex.

Mr. A. J. Poole, previously master mechanic of the Seaboard Air Line at Atlanta, Ga., is now general master mechanic, a new position, with office at Portsmouth, Va.

Mr. P. G. Leonard, heretofore road foreman of engines of the Springfield division of the Wabash, has been appointed air brake inspector, succeeding Mr. H. C. Ettinger, promoted. Mr. James B. Long succeeds Mr. Leonard as road foreman of engines at Springfield, Ill.

Mr. Alfred Lovell has tendered his resignation as superintendent of motive power of the Atchison, Topeka & Santa Fe to engage in private business. He has been in the service of the Santa Fe since September, 1902, when he became assistant superintendent of motive power, and in February, 1905, he was

promoted to the office of superintendent of motive power.

Mr. Edward F. Fay, general foreman of shops of the Union Pacific at Omaha, Neb., has been appointed master mechanic at Denver, Colo. Mr. George Brown succeeds Mr. Fay as general foreman. Mr. J. H. Rush has been appointed district foreman at Cheyenne, Wyo.

Mr. T. Rumney, heretofore mechanical superintendent of the Erie, has been appointed general mechanical superintendent of that road and its allied and controlled lines, with office at 11 Broadway, New York, N. Y. Mr. William Schlafge, assistant mechanical superintendent, has been appointed mechanical superintendent of the Erie grand division and the New York, Susquehanna & Western Railroad, with headquarters at Jersey City, N. J. Mr. A. G. Trumbull, heretofore assistant mechanical superintendent, has been appointed mechanical superintendent of the Ohio division and the Chicago & Erie Railroad, with office at Cleveland, O. Effective on October 1.

Mr. B. H. Gray, master mechanic of the New Orleans Terminal Company, has been appointed superintendent of motive power of the Mobile, Jackson & Kansas City, with office at Mobile, Ala.

Mr. Joseph W. Walker, heretofore motive power inspector of the Pennsylvania Railroad at Altoona, Pa., has been appointed chief air and motive power inspector of the Western Pennsylvania division, with office at Pittsburgh, Pa.

Mr. J. H. Nash, division master mechanic of the Illinois Central at East St. Louis, Ill., has been transferred to Paducah, Ky., as division master mechanic, succeeding Mr. R. E. Fulmer, resigned.

Mr. R. D. Smith, mechanical expert of the Lake Shore & Michigan Southern, has been appointed assistant superintendent of motive power of the Boston & Albany, with headquarters at Albany, N. Y.

Mr. R. C. Evans has been appointed superintendent of motive power and car departments of the Western Maryland, with headquarters at Union Bridge, Md., in place of Mr. William Miller, resigned, account of ill health.

Mr. R. Tawse, master mechanic of the Ann Arbor, has been appointed superintendent of motive power of that road and the Detroit, Toledo & Iron Mountain, with office at Jackson, O., succeeding Mr. W. G. Wallace, resigned.

Mr. J. A. Lewis has been appointed master mechanic of the Mexican Central at Monterey, Mex., to succeed Mr. R. D. Gibbons, who has been transferred to Aguascalientes, Mex., as master mechanic, succeeding Mr. J. M. Fulton, resigned.

Mr. W. A. Mitchell has resigned as assistant general foreman of machine shops at Topeka, Kan., and has