

SOME OF THE APPARATUS IN USE IN THE CENTRAL WEST

The Power Specialty Company, of New York, has equipped the power plant at Terre Haute with the Foster superheater, and the Kent wing-wall furnace is used with success at the Muncie, Ind., power plant.

The Trolley Supply Company, of Canton, Ohio, supplies some fifty companies in Ohio and Indiana with the Knutson trolley retriever. This device is used by practically all the electric roads around Columbus, Dayton, Cincinnati, Cleveland, Lima, Springfield, Toledo, East Liverpool, Norwalk, Anderson, Evansville, Ft. Wayne, Indianapolis, Terre Haute, South Bend and other interurban centers.

The General Electric Company reports the following list of apparatus supplied in the Columbus district:

Scioto Valley Traction Company.—Complete General Electric switchboard apparatus in power house; three G. E. sub-station equipments, each consisting of one 400-kw, 600-volt, 25-cycle, three-phase rotary converters; seventeen quadruple GE-66 motor equipments with type "M" control. Columbus, Urbana & Western Electric Railway Company.—Two GE-800, two-motor equipments with K-9 controllers, and one GE-1000, two-motor equipment with K-10 controller. Columbus, Grove City & Southwestern Railway Company.—Two GE-54 motor equipments with K-12 controllers, and two GE-73 two-motor equipments with C-6 controllers. Central Market Railway Company, Columbus, Ohio.—One 250-kw, 425 r. p. m., 500-volt, belt-driven generator; two 300-kw, 500 r. p. m., 600-volt, 25-cycle rotary converters; six 110-kw, 370-26,400-volt transformers. Columbus, Newark & Zanesville Traction Company.—Two 800-kw, 94 r. p. m., 13,200-volt, 25-cycle alternators; one 1500-kw, 94 r. p. m., 13,200-volt, 25-cycle alternator; one 35-kw, 125-volt, engine driven exciter; one 35-kw, 125-volt motor generator set; six 120-kw transformers; eight 300-kw, 500 r. p. m., 600/370-volt, 25-cycle rotary converters; eight 120-kw transformers; thirteen quadruple GE-73 equipments with type "L" control; five double motor GE-75 equipments with K-6 controllers; four quadruple GE-57 equipments with B-8 and K-14 controllers; two quadruple GE-67 equipments with K-6 controllers; ten double motor GE-67 equipments with K-10 controllers; two double motor GE-1000 equipments with K-10 and B-8 controllers; one double motor GE-800 equipment with type "K" controller.

Columbus, London & Springfield Railway Company.—Fifty quadruple GE-54 equipments, with K-12 controllers; twenty double motor GE-54 equipments, with K-10 controllers; fifteen quadruple GE-73 equipments, with type "M" control; two double motor GE-73 equipments with K-6 controllers; three quadruple GE-57 equipments, with D-8 controllers. Columbus, Delaware & Marion Railway.—One 2000-kw, 750 r. p. m., 25-cycle, 2300-volt Curtis turbines; one 800-kw, 1500 r. p. m., 25-cycle, 2300-volt Curtis turbine; two frequency changers, consisting of two ATB 10-200-750-2300-volt generators; one motor generator exciter, consisting of one 45-kw, 750 r. p. m., 125-volt generator, direct connected to an "L" 4-75-750-2300-volt induction motor; one 25-kw Curtis steam turbine exciter; one 400-kw, 150 r. p. m., 550-volt, generator; one 400-kw, 860 r. p. m., 550-volt generator; three 110-kw transformers; three 600-kw transformers; four 300-kw, 500 r. p. m., 600-370-volt, 25-cycle rotary converters; eight 220-kw transformers; eleven GE-73 quadruple equipments, with type "M" control; three quadruple GE-1000 equipments, with K-6 controllers; three double motor G. E. 800 equipments, with K-2 controllers.

Columbus Railway & Light Company.—Five quadruple GE-67 equipments; 143 double motor GE-67 equipments; twenty double motor GE-52 equipments; forty-nine double motor GE-54 equipments; thirty-five double motor GE-800 equipments. Equipments at Station No. 1.—Two General Electric generators, type M. P., class 14-1000-100, form H, amps. 1739, speed 100, voltage 525-575; one generator (booster), type M. P., class 6-150-500, form L, amps. 500, speed 500, voltage 300; one generator, type M. P., class 12-850-100, form A, amps. 1518, speed 100, voltage 500-560; two generators, type M. P., class 10-500-110,

amps. 910, speed 110, voltage 500-550; two alternating-current generators, type ATB, class 4-500-1800, form T, amps. 72, speed 1800, voltage 4000; one generator (steam-driven exciter), type M. P., class 6-30-305, form A, amps. 240, speed 305, voltage 125; one generator (motor-driven exciter), type M. P., class 4-35-720, form H, amps. 280, speed 720, voltage 125; one generator (new steam-driven exciter), type M. P., class 6-50-280, form L, amps. 400, speed 280, voltage 115-125; one generator (300-kw M. G. set), type M. P., class 8-300-400, form H, amps. 522, speed 450, voltage 525-575; one generator (500-kw M. G. set), type M. P., class 8-500-400, form H, amps. 870, speed 400, voltage 525-575. Equipments at Station No. 2.—One double-current generator, type A. C. T., class 20-480-150, form B, speed 150, continuous current, 1600 amps., 300 volts, alternating current, cycles 25, volts 185; two generators, type D. D., class M. P., 14-200-120, amps. 1303, speed 120, volts 150; one double current generator, type A. C. T., class 20-480-150, form A, speed 150, continuous current, 1600 amps., 300 volts, alternating current, 25 cycles, 786 volts; one generator, 18 poles, 1000 kw, 100 revolutions, 3640 amps., 275 volts; two generators (No. 8 M. G. set), type M. P., class 8-200-514, form L, amps. 1480, speed 514, voltage 118-210; two generators (No. 9 M. G. set), type M. P., class 8-200-400, form L, amps. 1480, speed 400, voltage 135; one generator (motor-driven exciter), type C. E., class 4-15-1200, form A, amps. 120, volts 125, speed 1200; one generator (booster), type M. P., class 4-40-850, form H, amps. 200, speed 850, voltage 200. Central Market Station.—One generator, type M. P., form H, class 6-250-425, amps. 455, speed 425, voltage 500-550; one generator, type M. P., form L, class 6-45-600, amps. 750, speed 600, voltage 60-130.

The Electric Storage Battery Company, of Philadelphia, has been very successful in introducing batteries for interurban and city roads in Ohio and Indiana. In addition to the installations mentioned elsewhere in this issue the following installations of "Chloride Accumulators" may be mentioned:

In Dayton, the City Railway Company operate a 550-volt battery rated at 265 kw. Since this installation was made the company has been able to run the station with the operation of one 500-kw unit less than before. The saving in coal has been large. The ultimate capacity of this battery is 350 kw.

The Peoples' Railway Company, Dayton, also operates a battery for power house regulation rated at 390 kw, with an ultimate capacity of 660 kw.

The installations of the Cleveland Electric Railway are particularly interesting. There are four of these in all. The first is a battery of 1536-kw capacity, installed in the Cedar Avenue power station. This operates to remove fluctuations during the larger portion of the day, and also assists in taking two peaks, one in the morning and one in the afternoon, thereby saving the operation of a large unit during these periods. The other three batteries are for an entirely different purpose, being installed far out on the lines of the company, where there are heavy loads to be dealt with at certain times of the day. One of these batteries is at Windemere, with a present capacity of 660 kw and an ultimate capacity of 880 kw; one at Harvard Street, with a capacity of 1435 kw, which may be increased to 1700 kw later, and one at Detroit Street, with an initial capacity of 840, which may be increased to 1050 kw later. These batteries remove fluctuations from the line during ordinary conditions of load, thereby evening up the demand on the power house, and they each also supply current for a heavy local load of short duration, which would otherwise come back on the power house at the time when it was carrying heaviest load.

The Springfield Railway Company operates a 264-kw battery, with an ultimate capacity of 390 kw for power house regulation.

At Steubenville, a line battery with a capacity of 250 kw is used to maintain a constant voltage on the lines to the company's park. The lighting of the park is very satisfactorily accomplished from the railway feeders, owing to the regulating effect of the battery.

A system somewhat similar to the one in Columbus, described elsewhere, has been installed for the Toledo Railways & Light Company, where there are two batteries. One of these, with a capacity of 880 kw, is used normally to regulate the railway fluctuations. A second battery, with a capacity of 1200 kw, is

normally used to carry the peaks of the lighting load. The whole system is, however, so arranged that either battery or both batteries may be used in emergency to assist either the lighting or the railway system.

The Youngstown & Sharon Street Railway Company operates two batteries, one with a capacity of 96 kw and the other with a capacity of 144 kw to regulate the loads on the sub-stations. These batteries remove fluctuations, leaving a constant load for the rotaries.

The Pennsylvania & Mahoning Valley Railroad also operates sub-station batteries for similar work at Youngstown and Niles. These batteries have an initial capacity of 350 kw and an ultimate capacity of 440 kw.

The Gould Storage Battery Company, of New York, has a number of important battery installations for interurban work in the district. The Dayton & Muncie has Gould batteries at each of the following stations: Greenville, Winchester, Union City and Selma. The maximum battery discharge at these plants ranges from 630 amps. to 650 amps. Each installation consists of 304 type S-609 elements, and each operates in connection with a C. E. M. F. 44-kw differential booster. These batteries are located in sub-stations for the purpose of keeping the load on the rotaries practically constant. The regulation obtainable is variable at the will of the attendant. The booster regulator may be set so that the d. c. output from the rotaries is constant within limits of 6 per cent plus or minus of any average desired, that is, the variations of load on the rotaries may be made as small as 6 per cent while the average load on the rotaries may be set at any desired value. These plants were installed August, 1905.

The Dayton & Northern has a 500-amp. (maximum outfit) Gould battery, consisting of 266 elements of the O-513 type, operating with line type shunt booster. The battery is located at Fairview Hill, on the road from Dayton to Greenville, and supplies current to the cars climbing the heavy grade, at the same time maintaining the voltage on the line at a higher and more constant value and making the load on the rotaries supplying this section of the road far more constant. The booster is located at the power house at Brookville, about 9 miles from the battery, and is used to raise the voltage on the feeder leading to the battery. The current fed from Brookville to the battery may be varied as desired to suit different schedules. This plant was installed July, 1906.

The Dayton & Western has a 500-amp. (maximum outfit) battery of the same type at each of its sub-stations at New Hope and Snyders. These batteries are located at a distance from the power house at West Alexandria, and are used to maintain the voltage on the lines at a high and steady value. The booster is a 3-unit outfit, and raises the voltage on feeders leading from the power house to the batteries. The current fed to the batteries may be varied to suit different schedules. These plants were installed June, 1905.

The Van Dorn & Dutton Company, of Cleveland, is furnishing a large proportion of the roads in this district with its gears and pinions.

The Niles-Bement-Pond Company, of New York, has supplied its machine tools to interurban and city repair shops generally throughout Ohio and Indiana.

The Niles Car & Manufacturing Company, of Cleveland, Ohio, has furnished a large number of interurban cars operating in the district. Reference to several of these is made in the chapter on rolling stock design and equipment in this issue. The J. A. Hanna Company, of Cleveland, has charge of general sales for this company.

The Heine Safety Boiler Company, of St. Louis, has equipped a number of plants in the Central West with its boilers. A partial list of the companies with the horse-power capacity installed follows: Michigan City Electric Company, Michigan City, Ind., two 130 hp; Cincinnati, Lawrenceburg & Aurora Electric Company, Cincinnati, Ohio, four 250 hp, installed in 1899; Canton & Akron Railway, Canton, Ohio, two 300 hp, installed in 1904; Cleveland & Southwestern Traction Company, Elyria, Ohio, three 500 hp, installed in 1902; Columbus, Delaware & Marion Railway Company, Delaware, Ohio, two 267 hp, and four 366-hp units, two of which are just being installed, and the other two will be de-

livered soon; Mahoning Valley Railway, Youngstown, Ohio, two 400 hp, installed in 1900; Toledo Railways & Light Company, Toledo, Ohio, eight 500 hp, installed at intervals between 1895 and 1901; Zanesville Railway & Light Company, Zanesville, Ohio, two 370 hp.

The Creaghead Engineering Company, of Cincinnati, has sold Creaghead flexible brackets to a number of interurban roads in the district, prominent among which may be mentioned the Interurban Railway & Terminal Company, at Cincinnati; the Dayton & Xenia Transit Company, and Dayton, Springfield & Urbana Electric Railway.

The Babcock & Wilcox Company, of New York, gives the following list of plants in Ohio and Indiana where Babcock & Wilcox boilers will be found: Toledo, Fremont & Norwalk Electric Railway Company, Fremont, Ohio, 1500 hp; Columbus, Buckeye Lake & Newark Traction Company, Hebron, Ohio, 1208 hp; Lorain Street Railway Company, Lorain, Ohio, 1014 hp; Sandusky & Interurban Electric Railway Company, Sandusky, Ohio, 1208 hp; Springfield, Troy & Piqua Interurban Railway Company, Springfield, Ohio, 1200 hp; Indianapolis & Northern Traction Company, Anderson, Ind., 5200 hp; Central Market Street Railway Company, Columbus, Ohio, 500 hp; Columbus Railway Company, Columbus, Ohio, 3500 hp; Cincinnati Traction Company, Cincinnati, Ohio, 6291 hp; Dayton, Springfield & Urbana Street Railway, Medway, Ohio, 2470 hp; Indianapolis Traction & Terminal Company, Indianapolis, Ind., 4000 hp; Indianapolis Street Railway Company, Indianapolis, Ind., 3400 hp; Indianapolis & Cincinnati Traction Company, Rushville, Ind., 2800 hp; Winona & Warsaw Railway Company, Winona Lake, Ind., 642 hp; Winona Interurban Railway Company, Winona Lake, Ind., 1200 hp; Indiana Union Traction Company, Anderson, Ind., 1200 hp; Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., 4000 hp; Cleveland Electric Railway Company, Cleveland, Ohio, 1021 hp.

The Green Fuel Economizer Company, of Mattewan, N. Y., has installed economizers in the power stations of the Columbus Railway & Light Company, the Cincinnati Street Railway Company, the Terre Haute Railway & Light Company, and also at Findlay, Ohio, and Grand Rapids, Mich.

The National Brake & Electric Company, of Milwaukee, has installed in the Milo sub-station of the Columbus Railway & Light Company an interesting motor generator set, which is described in the article on the electric railway systems of Columbus elsewhere in this issue. The Columbus Railway & Light Company has also installed a National induction motor generator set in a new sub-station at the corner of High and Town Streets, for use on the underground Edison lighting system.

The Brown Hoisting Machinery Company, of Cleveland, in addition to other apparatus supplied in the district has installed an interesting single-rope Brown patent grab bucket for unloading cars at one of the stations of the Cleveland Electric Railway Company. The company states that with this bucket it has unloaded broken stone, swinging the stone from one car to another, at a cost of \$.008 per ton. Many of the interurban roads use Brown hoists, traveling cranes, jib cranes, etc.

The Kinnear Manufacturing Company, of Columbus, has supplied a number of its well-known rolling doors for car houses in the Central West. Two interurban railways entering Columbus, namely, the Columbus, Delaware & Marion Electric Railway and the Columbus, London & Springfield Traction Company have installed the Kinnear door, and the Columbus Railway & Light Company uses a large number. The Dayton City Railway has twenty-six Kinnear doors on its car house, and the Indianapolis Traction & Terminal Company uses fifteen doors in its car houses and eleven at its freight and express station. These are but a few of the Kinnear Company's many customers in this district.

The Locke Insulator Manufacturing Company, of Victor, N. Y., has supplied the following equipment to interurban roads in this district: High-tension insulators to the Indianapolis, Columbus & Southern Traction, Cleveland & Southwestern Traction, Rapid Railway System of Detroit, Toledo & Western Railway, Stark Electric, Western Ohio, Lake Shore Electric, Detroit, Ypsilanti, Ann Arbor & Jackson, Cincinnati, Milford & Loveland, Cincinnati & Columbus, Ft. Wayne, Van Wert & Lima, Ft. Wayne & Wabash

Valley, Indianapolis & Cincinnati, Scioto Valley, Columbus, London & Springfield, Indianapolis & Northwestern, Canton-Akron, Cincinnati, Georgetown & Portsmouth, Eastern Ohio and others. Strain insulators to the Columbus, Delaware & Marion and Scioto Valley; wall insulators to the Cincinnati, Milford & Loveland, Toledo, Port Clinton & Lakeside, Indiana Union, and Ft. Wayne & Wabash Valley.

The Westinghouse Company makes the interesting statement that it has sold to electric lines in Ohio approximately 5500 motors, with an aggregate of 300,000 hp, and to the electric lines in Indiana approximately 1075 motors, with an aggregate of 59,000 hp. Many of the Westinghouse power house and sub-station installations in the district are referred to elsewhere in this issue.

The Heywood Brothers & Wakefield Company, of Wakefield, Mass., states that it has furnished its Wheeler type of seats and its spring seating for the following roads in Ohio and Indiana: Columbus, Buckeye Lake & Newark Traction Company, Pennsylvania lines west of Pittsburg, Columbus Railway & Light Company, Toledo, Fostoria & Findlay Railway Company, Columbus, Newark & Zanesville Electric Railway, Toledo & Western Railway Company, Toledo Railways & Light Company, Youngstown & Sharon Street Railway, Indianapolis & Northwestern Traction Company, and Terre Haute Traction & Light Company, Terre Haute, Ind.

The Baldwin Locomotive Works, of Philadelphia, states the following electric railways in the States of Indiana and Ohio are either wholly or in part equipped with Baldwin trucks: Cleveland & SouthWestern Traction Company; Columbus, Delaware & Marion Railway Company; Muncie & Portland Traction Company; Detroit, Monroe & Toledo Traction Company; Dayton & Northern Traction Company; Ft. Wayne & Wabash Valley Traction Company; Ft. Wayne & Springfield Railway Company; Cleveland Electric Railway; Ft. Wayne, Van Wert & Lima Traction Company; Indiana Union Traction Company; Indianapolis & Western Traction Company; Indianapolis & Eastern Traction Company; Indianapolis & Cincinnati Traction Company; Lake Shore Electric Railway Company; Lima & Toledo Traction Company; Toledo & Chicago Interurban Railway Company; Terre Haute Traction & Light Company; Western Ohio Railway Company; Winona Interurban Railway Company; Youngstown & Southern Railway; Youngstown & Ohio River Railway & Light Company. With the exception of those in city service all these trucks are of the regular Baldwin M. C. B. double-bar equalized type for interurban service, and the surface equipments are modified from this standard only so far as short wheel base and outside hung motors make necessary. All of the interurban trucks are equipped with either Standard Steel Works steel-tired wheels or with solid rolled forged steel wheels made by the same company.

The Curtain Supply Company, of Chicago, states its curtains and fixtures are in use on practically all of the interurban roads in the district.

The Lord Electric Company, of Boston, has furnished Thomas soldered rail bonds to the following companies: Cincinnati, Georgetown & Portsmouth Railway Company; Tuscarawas Traction Company; Keystone Construction Company; Louisville & Southern Indiana Traction Company; Indianapolis & Eastern Railway Company; Indiana Union Traction Company; United Gas & Electric Company; Calora Coal Company. The Lord Company has also supplied Shaw non-arcing lightning arresters to the following: Columbus Railway & Light Company; Mt. Vernon Electric Railroad Company; Lake Shore Electric Railway Company; Stark Electric Company; Jamestown Electric Light Company; Cleveland Electric Railway Company; Steubenville & Wheeling Traction Company; East Liverpool Traction & Light Company; Mahoning Construction Company; Southern Railway Company; Indianapolis & Cincinnati Traction Company; Evansville Gas & Electric Company.

W. N. Matthews & Bro., of St. Louis, Mo., states the Columbus Railway & Light Company uses the Kearney cable clamp. The Scioto Valley Traction Company has used 8-in. (about 300) anchors for anchoring its poles throughout its construction work. This company also has its shops equipped with the "Hold Fast"

lamp guard. The Columbus, London & Springfield Railway Company is also using the "Hold Fast" lamp guard.

The National Lock Washer Company, of Newark, N. J., reports its lock washer is in service on many of the electric roads in Ohio and Indiana for many years, as are also its curtain fixtures and sash lock and sash balance.

C. H. Hoyt, of Cleveland, State agent for the Detroit Graphite Manufacturing Company, writes that this company has supplied to the Columbus, Delaware & Marion Railway a special graphite paint for car roofs. It is claimed this paint remains always elastic, keeps the canvas roof waterproof and prevents cracking of the canvas. The same paint is also used for preventing rust on poles and bridges. C. H. Hoyt is also agent for the Carbolineum Wood Preserving Company, and states that the disinfectant oil supplied by this company for preserving wooden pins, cross-arms, poles, ties, trestles, etc., is used by the Scioto Valley Traction Company on its chestnut poles.

The Macon-Evans Varnish Company, of Pittsburg, supplies insulating varnishes to the Columbus Railway & Light Company, the Cleveland Electric Railway Company and many other roads in the district.

The National Brake & Electric Company, of Milwaukee, has supplied air-brake apparatus to the following roads in Columbus: Columbus Railway & Light Company; Columbus, London & Springfield; Columbus, Buckeye Lake & Newark; Columbus, Grove City & Western; Columbus, Delaware & Marion, and Columbus, New Albany & Johnstown. Among recent orders for electrical apparatus the company has lately installed for the Columbus Railway & Light Company two motor generator sets, one consisting of a synchronous set of 500-kw capacity, and one consisting of an induction motor generator set of 250-kw capacity.

The Blake Signal & Manufacturing Company, of Boston, Mass., during the past year has completely equipped with its signals the interurban lines of the Illinois Traction System, supplying over fifty signals on 150 miles of interurban track, and now has in its shop further orders from this system for equipping additional interurban lines as they go into service. During the past three months the Blake Company has equipped portions of the East St. Louis & Suburban Railway, and the Indiana Union Traction, and has its shops well filled with orders for many lines, both in New England and the Middle West.

The J. G. Brill Company, of Philadelphia, has furnished rolling stock to the following interurban roads: Akron, Bedford & Cleveland Railway, ten 31-ft. cars; Painesville, Cleveland & Eastern, ten 31-ft. cars; Lorain & Cleveland, eight 31-ft. cars; Pennsylvania & Astabula, three 30-ft. 8-in. cars, two 31-ft. 8-in. passenger and baggage cars; Mahoning Valley Railway, ten 31-ft. 8-in. cars; Lake Shore Electric Railway, ten 30-ft. 7-in. cars. All of these are closed interurban cars of the drop-sash type, mounted on Brill trucks. The Brill Company has also furnished practically the entire rolling stock for the city of Columbus, Ohio, the cars measuring 28 ft. over the bodies and mounted on Brill maximum traction trucks.

The Ohio Brass Company, of Mansfield, Ohio, states that its overhead material is standard upon the lines of the following leading roads in Indiana and Ohio: Indiana Union Traction Company; Muncie, Hartford & Ft. Wayne Railway Company; Ft. Wayne, Van Wert & Lima Traction Company; Ft. Wayne & Bluffton Traction Company; Marion, Bluffton & Eastern Traction Company; Ft. Wayne & Wabash Valley Traction Company; Indianapolis Traction & Terminal Company. Ohio Brass overhead material is used extensively by every road in and running from the cities of Indianapolis, Ft. Wayne, Terre Haute, Evansville, and in fact by the principal lines in Indiana. In Ohio the company mentions the Cleveland Electric Railway Company, all of the roads in and emanating from the cities of Toledo, Cleveland, Akron, Dayton (except one), Columbus, and a large majority of the other roads in Ohio, as its customers. Referring particularly to the city and interurban systems centering in Columbus, the Central Market Street Railway Company is equipped with Ohio Brass hangers and clamps, as are also all of the inter-company is now expecting an order for sufficient Nichols-Lintern sanders and Aikman annunciators to equip the cars of the Dayton, Springfield & Urbana and the Columbus, London & Springfield

Railway Company's lines. These two, as well as the Scioto Valley Traction Company, are also using the "Genuine Bell Metal Motor Bearings," as are most of the other Columbus roads. The Scioto Valley Traction Company's private car is equipped with the "Aikman Pressure Annunciator," and should be quite an attraction to the visitors to the convention. The Columbus, Newark & Zanesville Traction Company, the Columbus, London & Springfield, the Columbus, Buckeye Lake & Newark Traction Company, and the Indiana, Columbus & Eastern Traction Company are using the "Armstrong Oilers," for which the Ohio Brass Company is the agent. Several of the cars to be shown at the Columbus convention are equipped with this company's Nichols-Lintern air sanders and Aikman pressure annunciators.

The American Blower Company, of Detroit, Mich., sends the following particulars concerning its installations in Ohio and Indiana: Muncie, Hartford & Ft. Wayne Electric Railway—At this plant are installed six Jones underfeed stokers and two 9 x 7 automatic engines for driving a 90-in. full housed, steel plate blower. Eastern Ohio Traction Company, Chardon, Ohio—At this plant was installed nine Jones underfeed stokers to operate which was furnished one 100-in., three-quarter housed steel plate blower, driven by one 8 x 10 horizontal automatic engine. Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio—Here were installed twelve Jones underfeed stokers and two 100-in. three-quarter housed steel plate fans. Lima Electric Railway & Light Company, Lima, Ohio—At this plant were installed fourteen Jones underfeed stokers. South Covington & Cincinnati Street Railway Company, Newport, Ky.—At this plant was installed six Jones underfeed stokers. The company has installed a heating plant at the Avondale car houses, Cincinnati, Ohio. These car houses are heated by the fan system, consisting of a heater made up of six sections, having a total capacity of 4950 ft. It has also sold the Cincinnati Traction Company one heater having 900 ft. in three sections, another of 850 ft. in two sections, and one 90-in. full housed steel plate fan with overhung wheel and fan. It has also furnished engines and generators to the Winona Interurban Railway Company, Winona Lake, Ind. At this plant was furnished a 5 x 5 type "A" vertical, automatic, inclosed, self-oiling engine to drive a 7½-kw, 120-volt NI Bullock generator. The engine is attached direct to the dynamo shaft, and both are mounted on a cast iron sub-base.

The American Blower Company has standardized some forty different makes of generators for its engines. The engine is fully inclosed and is lubricated by a novel pump oiling system, the oil being distributed by gravity from an oil reservoir at the top of the frame, which latter is filled by a pump located at the base of the engine. The oil is filtered at three different points in its circuit, and the method of introducing the oil to the bearings is new and novel. Every engine installed has a record of running at least three months before requiring any additional oil or any adjustment.

The Armstrong Oiler Company, of Philadelphia, has introduced its journal oiler on a number of roads in Ohio and Indiana.

The General Fire Extinguisher Company has its fire protection apparatus in all the car houses of the Cleveland Electric Railway Company. These installations and various tests made on them have been described in the columns of the STREET RAILWAY JOURNAL.

The Lagonda Manufacturing Company, of Springfield, Ohio, has furnished its boiler cleaners to all the stations in Columbus.

The Central States Bridge Company, of Indianapolis, Ind., built practically all of the bridges on the majority of lines entering Dayton and also Indianapolis, together with the structural steel for the power houses. It also designed and built two viaducts for the Dayton & Western Traction Company, aggregating about 1200 ft.

The Green Engineering Company, of Chicago, has sold Green traveling link grates for 3000 hp of boilers in the Spring Street station of the Columbus Railway & Light Company.

The Bellamy Vestlette Manufacturing Company, of Cleveland, Ohio, is supplying its "Vestlette" to the Columbus Railway & Light Company; Dayton City Railway Company; nearly all of the interurban lines running into Columbus; the city lines in

Indianapolis, Toledo, Cleveland and the interurban roads running out of these cities, as well as to many other roads in Ohio and Indiana.

The Chase-Shawmut Company, of Newburyport, Mass., has supplied a large number of rail bonds to the different roads throughout Ohio and Indiana. These bonds have all been of the soldered type, in forms that were suitable for application on the bottom of the rail and on the web of the rail under the plates. Among the roads supplied have been the Cleveland & Southwestern Traction Company; the Cincinnati, Lawrenceburg & Aurora Electric Street Railway Company; Ohio Central Traction Company; Mansfield, Crestline & Galion Railway Company; the Indiana Union Traction Company, and the Terre Haute Railway & Light Company. The Cleveland & Southwestern was one of the first large systems to look into and adopt soldered rail bonds, it having had them in use for five years or more. The Chase-Shawmut Company has also recently closed a contract for the complete bonding of the tracks of the Cleveland, Ashland & Mansfield Traction Company's tracks.

The Southern Exchange Company, of New York, furnished the poles used in the entire construction of the Columbus, London & Springfield Railway; Columbus, Buckeye Lake & Newark Railway; Columbus, Delaware & Marion Railway; Columbus, Urbana & Western Railway. These roads have used many thousand of the Southern white cedar poles of which the Southern Exchange Company makes a specialty. In the State of Ohio the following companies constructed their lines of the same material: Zanesville Railway, Light & Power Company; Springfield & Xenia; Springfield & Piqua; Cleveland & Southern Railway; Cleveland, Painesville & Ashtabula; Pennsylvania & Ohio; Toledo & Western, and Toledo & Indiana.

The Harrison Safety Boiler Works, Philadelphia, submit a partial list of interurban electric railways in Ohio and Indiana using Cochran heaters: Akron Street Railway & Illuminating Company; Canton & Akron; Cincinnati & Eastern; Cincinnati, Milford & Loveland; Cincinnati Traction; Cleveland, Painesville & Ashtabula; Dayton & Northern; Dayton, Xenia & Bellbrook; Findlay Street Railway; Indiana Northern; Indianapolis, Lebanon & Frankfort; Indianapolis & Martinsville; Indianapolis, Shelbyville & Southeastern; Indianapolis & Union; Kokomo Railway & Light; Lima Electric; Loraine Street Railway; Muncie, Hartford & Fort Wayne; National Transit; Northern Ohio; Ohio Traction; Rapid Transit; Toledo & Chicago; Toledo & Indiana; Toledo & Western; Wabash River; Youngstown Consolidated; Winona & Interurban.

The Buckeye Engine Company, of Salem, Ohio, has equipped a number of the power stations installed in and near Dayton, Ohio, as follows: Dayton & Xenia Traction Company, two cross-compound engines, 600 hp each; Dayton & Northern Railway Company, two cross-compounds, 400 hp each; Dayton & Troy Electric Railway, two cross-compounds, 625 hp each; Dayton, Covington & Piqua Traction Company, two cross-compounds, 600 hp each; Indiana, Columbus & Southern Traction Company, one cross-compound and one simple, 1175 hp; Dayton & Western Traction Company, two cross-compounds, 350 hp each; Interurban Railway & Terminal Company, two cross-compounds, 700 hp each, and two exciter engines; Union City, Winchester & Muncie Traction Company, two cross-compounds, 800 hp each, and two exciter engines. The company also furnished Buckeye engines for the Dayton Electric Light Company aggregating 3300 hp; also four tandem compound engines to the City Railway Company, of Dayton, 545 hp each; also for the Indianapolis Street Railway, three cross-compounds of 2000 hp, for the Indianapolis Street Railway Company, for both city and interurban work. It has also equipped many smaller stations, such as the Indiana Railway Company, at South Bend, with 2000 hp, etc.

The O. M. Edwards Company, of Syracuse, N. Y., calls special attention to the limited cars of the Fort Wayne & Wabash which are equipped with a special design of Edwards extension platform trap-door fixtures for the trap doors of the observation platforms. These platforms are covered with rubber block tiling, and are large and roomy, and finely equipped and appointed. These coaches were built by the Cincinnati Car Company, and are exceptionally handsome and attractive in appearance.

The Jewett Car Company, of Newark, Ohio, has built cars for the following roads: Columbus, Buckeye Lake & Newark; Central Market Street; Columbus, London & Springfield; Columbus, Delaware & Marion; Cincinnati & Columbus Traction; Cleveland & Southwestern; Cleveland, Painesville & Ashtabula; Cambridge & Byesville; Canton & Akron; Canton & New Philadelphia; Columbus, Newark & Zanesville; Columbus, New Albany & Jamestown; Cleveland Electric; Cincinnati, Lawrenceburg & Aurora; Canton & Massillon; Canton Street Railway; Camden Interstate; Interurban Railway & Terminal Company; Lake Erie, Bowling Green & Napoleon; Little Miami Traction; Norwalk & Southern; Newark & Granville; Ohio Valley Traction; Sandusky & Interurban; Steubenville, Mingo & Ohio Valley; Toledo & Monroe; Toledo & Maumee Valley; Toledo & Western; Toledo, Findlay & Fostoria; Toledo, Bowling Green & Southern; Toledo & Indiana; Zanesville Railway, Light & Power; Zanesville & Southeastern; Chicago & South Shore; Indianapolis & Northwestern; Indianapolis & Martinsville; Indianapolis & Greenfield; Indianapolis, Columbus & Southern; Indianapolis, Greenwood & Franklin; Kokomo, Marion & Western; Lake Cities Railway; Winona Interurban; Wabash Valley Traction; Wabash River Traction.

The American Brake-Shoe & Foundry Company furnishes the following list of roads and type of brake-shoes furnished in Ohio and Indiana: Cincinnati, Lawrenceburg & Aurora, "U" Diamond "S"; Cincinnati, Georgetown & Portsmouth, Streeter wire back; Citizens' Railway & Light, Diamond "S"; Cleveland Electric, Streeter; Columbus, Delaware & Marion, Diamond "S"; Columbus, London & Springfield, Diamond "S" and Streeter; Columbus, Newark & Zanesville, Diamond "S"; Columbus Railway & Light, Diamond "S"; Dayton, Springfield & Urbana, Streeter and Diamond "S"; East Liverpool & Rock Spring, Diamond "S"; Eastern Ohio Traction, Streeter; Evansville, Suburban & Newburg, Streeter steel back; East Liverpool Traction, Corning and Diamond "S"; Fort Wayne & Wabash Valley, Streeter; Indianapolis Traction & Terminal, Corning; Indiana, Columbus & Eastern, Diamond "S"; Mansfield Railway, Light & Power, Diamond "S"; Mount Vernon Electric Railway, Streeter; Muncie, Hartford & Fort Wayne, plain; Oakwood Street Railway, Diamond "S"; Richmond Street & Interurban, Streeter; Scioto Valley Traction, Diamond "S"; Steubenville Traction & Light, Diamond "S"; Toledo, Bowling Green & Southern, Corning; United Power, Streeter; Youngstown Park & Falls, Diamond "S"; Youngstown & Sharon, Corning.

The Fyricide Manufacturing Company, of New York, has its fire extinguishers on many of the roads in the district.

The New York Car & Truck Company, of Kingston, N. Y., reports that Peckham trucks are in use in the district as follows: Indiana Union Traction, eight No. 11; Indianapolis, Columbus & Southwestern, twelve pairs No. 36-B; Fort Wayne & Springfield, four pairs No. 40-A; Fort Wayne & Wabash Valley, sixteen pairs No. 14-A-X-S; Fort Wayne & Southwestern, two pairs No. 14-A-X; Muncie, Hartford & Fort Wayne, four pairs No. 26; Indianapolis & Cincinnati, two pairs No. 26; Indianapolis & Martinsville Rapid Transit, one pair No. 32, twenty pairs No. 14-A-X-X; Indianapolis & Northwestern, twenty-three pairs No. 36-B; Kokomo, Marion & Western, eight pairs No. 25, five pairs No. 7-D; Kokomo Railway & Light, two pairs No. 7-D; Chicago & South Shore, one pair No. 14-B-3, one pair No. 26; Dayton & Muncie Traction Company, thirteen pairs No. 36; Canton & Akron, two pairs No. 36-A, six pairs No. 14-B-3-X; Northern Ohio Traction & Light, eleven pairs No. 40-A, ten pairs No. 36-B; Stark Electric, four pairs No. 40, one pair No. 14-A-X-X; Cleveland, Painesville & Ashtabula, eight pairs No. 40; Lake Erie, Bowling Green & Napoleon, one pair No. 36; Chillicothe Electric Railway, Light & Power, four pairs No. 7-B; Cincinnati-Columbus Traction, eight pairs No. 40-A; Cincinnati, Georgetown & Portsmouth Traction, two pairs No. 14-B-3-X; Cleveland & Southwestern Traction, one pair No. 46; Cleveland Electric, two pairs No. 25, thirty-eight pairs No. 14-B-3, twenty-four pairs No. 10; Lake Shore Electric, two pairs No. 40-A, three pairs No. 14-A-X, two pairs No. 26; Columbus, Newark & Zanesville, five pairs No. 36-A; Toledo, Bowling Green & Southern, eleven pairs No. 26, twelve pairs No. 14-B-3; Western Ohio Railway

Company, forty-five pairs No. 14-A-X-X; Columbus, London & Springfield, four pairs No. 46, ten pairs No. 14-B-3; Springfield-Xenia, one pair No. 14-A-X-X, fifteen pairs No. 26; Steubenville Light & Traction, one pair No. 25, seven pairs No. 14-B-3; Cincinnati Traction, forty-six pairs No. 14-B-3-X; Columbus, Delaware & Marion, eight pairs No. 14-A-X.

The Macdonald Ticket & Ticket Box Company, of Cleveland, Ohio, reports the Macdonald holders are in use upon the following roads centering in Columbus: Columbus, London & Springfield Railway Company; Dayton, Springfield & Urbana Electric Railway Company; Columbus, Grove City & Southwestern Railway Company; Urbana, Bellefontaine & Northern Electric Railway Company; Columbus, Buckeye Lake & Newark Traction Company; Columbus, Newark & Zanesville Electric Railway Company; Columbus, Delaware & Marion Railway Company.

The International Fence & Fireproofing Company, of Columbus, Ohio, states its special interurban right-of-way fence is in use on many of the lines throughout Ohio and Indiana. Among those better known in Columbus might be mentioned the Columbus, Delaware & Marion. Both sides of the right of way on this road is fenced from Columbus to Marion with the particular fence referred to. The Columbus, London & Springfield, Dayton, Springfield & Urbana, and many other prominent roads throughout Ohio are also using this special fencing. The company's system of reinforced concrete has also been used extensively in power houses for the different electric lines in Ohio.

The Belknap Hardware & Manufacturing Company, of Louisville, Ky., has furnished in the district a large number of scrapers, picks, shovels, brackets, cross arms, braces, guide rods, axes, handles and other construction tools and appliances, as well as bolts, nails, screws and other hardware.

The Standard Steel Works, of Philadelphia, has its steel-tired and rolled steel wheels on interurban roads generally throughout Ohio and Indiana.

The T. H. Symington Company, of Baltimore, maker of the Symington journal box and Baltimore ball-bearing center and side bearings, reports its devices are in use on the following roads in the Central West: Indianapolis & Northwestern Railway; Indianapolis, Columbus & Southern Railway; Indiana & Cincinnati Traction Company; Cincinnati Traction Company; Cleveland Electric Company; Cleveland, Painesville & Eastern; Canton & Akron Railway; Lake Shore Electric Company; Detroit United Railways; Illinois Traction Company; Columbus, London & Springfield; Columbus, Delaware & Marion; Columbus, Buckeye Lake & Newark.

The Ohmer Fare Register Company, of Dayton, reports that the Indiana Union Traction Company, operating approximately 340 miles of track, is one of the largest users of the Ohmer register. All the interurban cars of this company are equipped with the larger style machines and the city lines are equipped with the smaller register. A few of the other important roads in Ohio and Indiana using Ohmer equipments are as follows: Scioto Valley Traction; Northern Ohio Traction & Light; Canton-Akron Railway; Cleveland & Southwestern Traction; Cleveland, Painesville & Ashtabula Railroad; Hocking Valley Railroad; Fort Wayne & Wabash Valley Traction; Fort Wayne, Van Wert & Lima Traction; Indiana, Columbus & Eastern, and the Muncie, Hartford & Fort Wayne Railway.

The Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y., has supplied telephone apparatus for despatching and other purposes to many roads in the Central West, including the Muncie, Hartford & Fort Wayne; Louisville & Southern Indiana Traction; Cleveland, Painesville & Ashtabula; Lake Shore Electric; Interurban Railway & Terminal Company; Columbus, Delaware & Marion; Columbus, Urbana & Western; Scioto Valley Traction; Toledo & Western.

The Globe Ticket Company, of Philadelphia, has sold both its hand power and power ticket destroyers quite generally throughout the district. It has also during the present year put on the market several new forms of patent transfers and cash-fare receipts for which several millions are used by the interurban roads in the Central West.

The W. T. Van Dorn Company, of Chicago, has furnished practically all of the roads that run into Columbus with various

styles of couplings. The majority of these roads use couplers of heavy types. The Columbus Railway & Light Company uses a number of Van Dorn couplers on its two-car trains operated with multiple-unit control for city service, reference to which is made elsewhere in this issue. Most of the interurban roads running into Indianapolis are equipped with No. 11 or No. 11½ draw-bars, and one or two use the No. 15 coupler. The Lake Shore Electric is equipped with one of the heaviest types made by the Van Dorn Company, namely, the No. 18, which has the Van Dorn Solid connection to the car body.

The Climax Stock Guard Company has sold Climax cattle guards to a large number of interurban roads in the Central West.

The United States Metallic Packing Company, of Philadelphia, reports that among other stations its packings are used in the power houses of the following roads: Columbus Railway & Light Company; Toledo Railways & Light Company, and Terre Haute Traction & Light Company.

The Bayonet Trolley Harp Company sends the following list of electric railway systems in Ohio and Indiana using Bayonet detachable harps: Indiana, Columbus & Eastern Traction Company; Columbus, New Albany & Johnstown Traction Company; Cincinnati, Georgetown & Portsmouth Railroad; Cincinnati, Milford & Loveland Traction Company; Cambridge Power, Light & Traction Company; Dayton & Western Traction Company; Hocking Valley Railway Company (Jackson-Welston Belt Line); Mahoning & Shenango Railway & Light Company; Springfield Railway Company; People's Railway Company; Stark Electric Railway; Steubenville Traction & Light Company; Springfield, Troy & Piqua Railway Company; East Liverpool Traction & Light Company; Mt. Vernon Electric Railway Company; Lake Erie, Bowling Green & Napoleon Railway; Youngstown Park & Falls Street Railway Company; Southeastern Ohio Railway, Light & Power Company; Indianapolis & Eastern Railway Company; Richmond Street & Interurban Railway Company; Indianapolis & Martinsville Rapid Transit Company.

The R. D. Nuttall Company, of Pittsburg, submits the following list of prominent Ohio and Indiana Electric Railways using Nuttall gears and trolleys: Columbus, Urbana & Western Electric Railway; Columbus, Buckeye Lake & Newark Traction Company; Northern Ohio Traction Company; Richmond Street & Springfield Railway Company; Columbus, Delaware & Marion Railway Company; Eastern Ohio Traction Company; Cincinnati, Dayton & Toledo Traction Company; Cincinnati Traction Company; Northern Ohio Traction Company; Richmond Street & Interurban Railway; Louisville & Southern Indiana Traction Company; Indianapolis & Eastern Railway Company; Indiana Union Traction Company.

The Star Brass Works, of Kalamazoo, Mich., is supplying many roads throughout Ohio and Indiana, among which are the following: Northern Ohio Traction & Light Company; Stark Electric; Pennsylvania & Ohio; Canton-Akron Railway; Cincinnati & Columbus Traction; Cincinnati, Lawrenceburg & Aurora Electric Railway; Cincinnati, Milford & Loveland Traction; Cincinnati Traction and all roads connected therewith; Eastern Ohio Traction; Columbus, London & Springfield Railway; Columbus Railway & Light Company; Columbus, Delaware & Marion; all roads entering Dayton except the Oakwood Rail-

way and People's Railway; the Toledo, Bowling Green & Southern Railway; Western Ohio Railway; Lorain Street Railway; Mansfield Railway, Light & Power Company; Columbus, Newark & Zanesville; all roads entering Springfield; Toledo & Indiana; Toledo & Western; Youngstown & Sharon and other smaller roads. In Indiana it sells the Indiana Union Traction Company; Ft. Wayne & Wabash Valley Traction; Indiana & Cincinnati Traction; Indianapolis & Eastern; Indianapolis & Martinsville Rapid Transit; Indianapolis & Northwestern Traction; Madison Light & Railway Company; Muncie, Hartford & Ft. Wayne, Muncie & Portland; Evansville & Princeton; Richmond Street & Interurban Railway; Northern Indiana Railway Company, and the Terre Haute Traction & Light Company.

Merritt & Company, of Philadelphia, gives the following list of the various electric companies in Ohio and Indiana which have recently purchased its lockers: Cincinnati Gas & Electric Company; Cleveland Electric Illuminating Company; Columbus Railway & Light Company; Mansfield Railway, Lighting & Power Company; Marion Heat & Lighting Company; Warner Electric Company; South Bend Electric Company.

The Murphy Iron Works, Detroit, Mich., furnished an installation of eight furnaces for one of the Columbus power houses. It also recently sold a number of furnaces to the Cincinnati Street Railway Company for installation in the Hunt Street station. The Cincinnati company has been using these furnaces for a number of years and has a total of twenty-eight installed. Among other roads in the territory that are using Murphy furnaces may be mentioned the Lorain & Cleveland with four; the Lake Shore Electric with seven, and the Cleveland Electric with twenty-one.

The Traction Equipment Company, of Brooklyn, N. Y., has supplied ventilated spiral resistances to the following roads: Indianapolis Traction & Terminal; Indianapolis & Martinsville Rapid Transit; Ft. Wayne & Wabash Valley Traction; Indiana Union Traction; Cleveland Electric; Lake Shore Electric, and Toledo, Bowling Green & Southern Traction.

The H. W. Johns-Manville Company advises that the following electric roads are using "J-M" overhead line material: Vincennes Citizens; Indiana Railway; Indianapolis Light & Power; Indianapolis Northern Traction; Ft. Wayne & Wabash Valley; Indianapolis Traction & Terminal; Indianapolis & Martinsville; Washington Street Railway, of Washington, Ind.; Indiana Union Traction; Evansville & Mt. Vernon; Columbus Railway & Light; Northern Indiana, and many other roads in Ohio. "Noark" fuse devices and roofing materials, as well as "J-M" overhead line material, are used by these and other companies in the territory.

The Consolidated Car Heating Company, of New York, N. Y., reports that its electric heating equipments are in use on a large number of street railway systems in Ohio and Indiana. The cars of the Scioto Valley Traction Company are entirely equipped with the Consolidated double coil cross-seat heaters, thirty heaters per car, and arranged for four gradations of heat. The Cincinnati Traction Company's recent cars are equipped with 12-heater equipments of the truss plank type and 12-heater equipments of a new panel type. The company's portable vestibule heater, recently designed, has already been sold for a large number of cars for use in Ohio, Indiana and Illinois, particularly in Ohio, where a recent law has been passed requiring the heating of motormen's vestibules.