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New Locomotive Maintenance Program Pennsylvania Lines West

Scheme of Locomotive Upkeep Completely Revised, Involving Many New Shop Structures and Much New Equipment

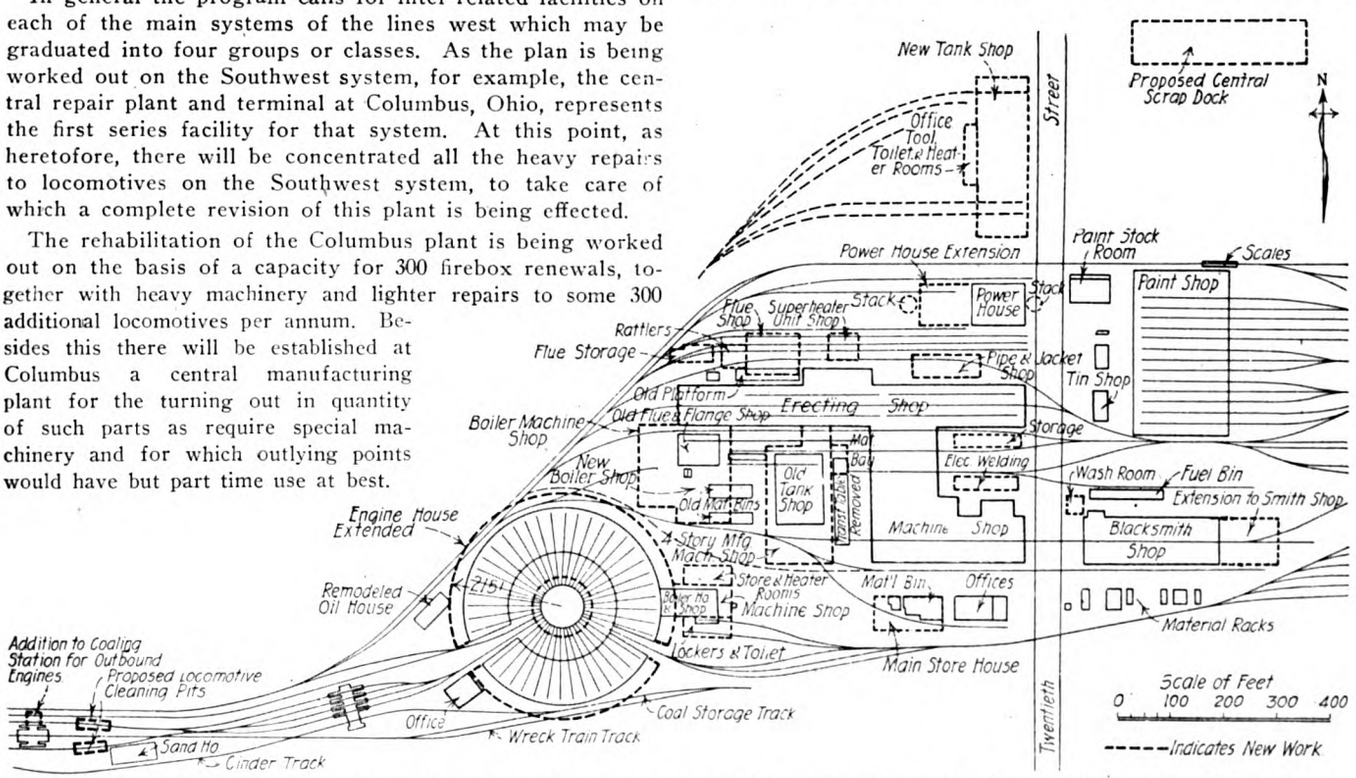
The following is a general statement as to the new program with attending facilities for the upkeep of motive power equipment on the Southwest system of the Pennsylvania Lines West. This work involves a series of terminals and repair plants ranging in four steps from the central plant at Columbus through successive stages to the "turn-around" points equipped for light running repairs only. The central plant has been completely revised and extended, while among the secondary plants are examples of both modernized facilities and complete new yards, terminals and shops.

For several years past the Pennsylvania Lines West have been giving attention to an enlarged and revised scheme of locomotive maintenance and during the past year very considerable progress has been made in the carrying out of this program. The plan involves the complete modernization of existing facilities, where such are to be retained, in addition to which several yards, terminals, and repair plants are being newly built in their entirety.

In general the program calls for inter-related facilities on each of the main systems of the lines west which may be graduated into four groups or classes. As the plan is being worked out on the Southwest system, for example, the central repair plant and terminal at Columbus, Ohio, represents the first series facility for that system. At this point, as heretofore, there will be concentrated all the heavy repairs to locomotives on the Southwest system, to take care of which a complete revision of this plant is being effected.

The rehabilitation of the Columbus plant is being worked out on the basis of a capacity for 300 firebox renewals, together with heavy machinery and lighter repairs to some 300 additional locomotives per annum. Besides this there will be established at Columbus a central manufacturing plant for the turning out in quantity of such parts as require special machinery and for which outlying points would have but part time use at best.

The Columbus engine terminal also is being enlarged and extended to enable the engine house force to conduct both heavy and light running repairs, independently of the system shop. This is a principle that is being adhered to in engine terminals all over the system; i. e., each roundhouse organization with its equipment is to be made such that all running repairs will be taken care of without resort to major shop facilities. To accomplish this, each enginehouse has built in conjunction, an "annex" fitted with a complement of machine tools such as are required for running repair work. Accompanying this article are tools layouts of the Columbus enginehouse annex and that of the Bradford terminal which are typical of these facilities and which will be seen to differ from each other, if at all, chiefly because of the greater amount of this work that must be taken care of at the Columbus terminal. Standard features of Lines West roundhouses, whether newly constructed or modernized, include also boiler washing and filling systems, indirect hot air heating through outlets in the side walls of the pits, ap-



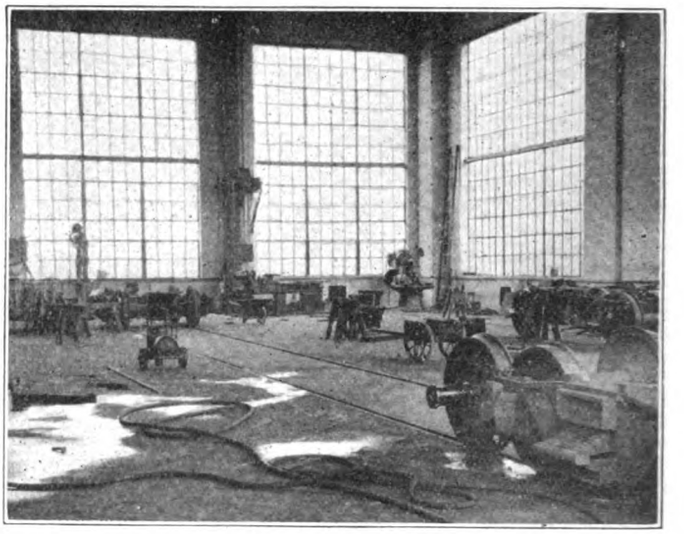
Layout of Locomotive Repair Plant Showing Additions to and Revision of Previously Existing Facilities, Pennsylvania Lines West, Columbus, Ohio.

proved systems of illumination, blower lines, drop pits, turntables capable of taking modern heavy locomotives, and crane equipment, either jib or traveling, for handling locomotive parts.

Repair facilities of the second series, on which the system shops will depend for relief from a very great burden of work, will be equipped to handle Class 3 and lighter repairs, these consisting of light firebox work and flue renewals, turning of tires and heavy repairs to machinery. One of the points now being fitted out for this class of work on the Southwest system is Logansport, Ind. For the Northwest system, the complete new terminal and shops at Stark, a short distance east of Canton, Ohio, presents one of the best examples to be found on either system, since the others are, for the most part, rehabilitations and extensions of previously existing terminals and shops. Outstanding features of the second series plants, as typified by Stark, are two; first, a new Type "A" enginehouse which probably is the most modern of the many new designs brought out in recent years, and second, a unit machine and erecting shop, also modernly constructed and equipped for handling all classes of repairs to locomotives other than firebox renewals which, as stated, are concentrated in the central repair plants.

Conspicuous features of the Type "A" enginehouse are the 75-foot span 15 tons capacity circular crane operating in the main bay, the framework of which is of steel, and the provision for smoke collection by the down-draft system instead of by jacks after the usual manner. The erecting and machine shops are laid out on the transverse pit principle, there being, in addition to the erecting bay, a heavy machine bay and a light machine bay, the latter with a mezzanine floor on which are located the lighter classes of locomotive maintenance work. Both the erecting and the heavy machine bays are equipped with abundant crane facilities. Logansport, which is taken as the typical example of this class of plant for the Southwest system, has been provided with a new erecting and machine shop of the character mentioned, but being already an important repair point prior to the institution of the new locomotive maintenance program, it was possible to arrange for taking care of the work by remodeling the existing enginehouse rather than by the erection of a new Type "A" roundhouse such as with the new plant at Stark. These new structures are referred to more in detail later in this article.

A third series facility is laid out with the idea of handling heavy running repairs for the largest types of engines, such as tire turning, light repairs to machinery, partial flue renewals, etc., designated Class 4 repairs. The leading feature of such a plant is the Type "A" enginehouse as mentioned. In addition to having the advantage of the traveling crane, such points will generally be fitted out also with electric screw jack locomotive hoists for un-wheeling and re-wheeling engines as well as the usual drop pits by means of which single pairs of wheels may be removed for tire turning. Richmond, Indiana, a layout of which plant is presented herewith, is typical of the plants and terminals in this series.

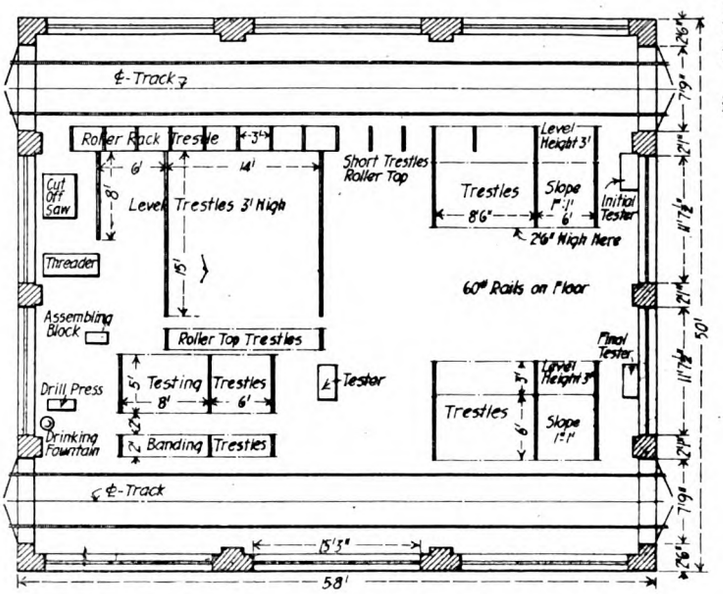


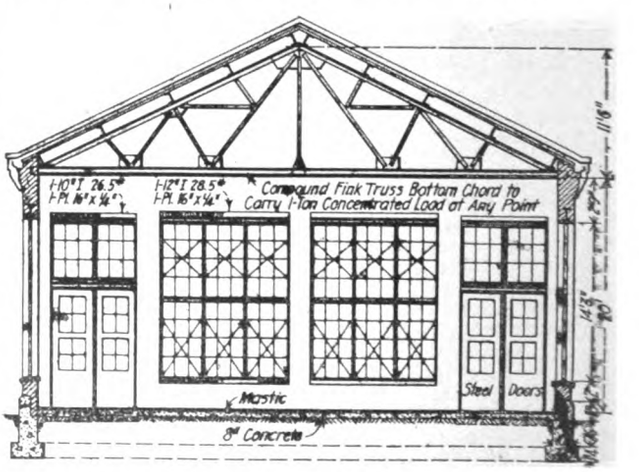
Truck Repair Corner of New Tank Shop, Pennsylvania Lines West, Columbus, Ohio.

The fourth series points are merely "turn-around" engine terminals and are equipped for making light running repairs only. The features of the plants in this class are Type "B" enginehouses which offer generally the same facilities for handling locomotives as do Type "A" roundhouses except for the traveling crane and the down-draft smoke collecting features. This circumstance greatly simplifies the character of the design as can be seen by reference to the transverse section of the Type "B" roundhouse which has been constructed at Bradford, Ohio, a terminal typical of the points in the fourth series group. These enginehouses are provided each with its annex housing tool equipment such as is needed in the making of both heavy and light running repairs.

Having outlined in a general way the scheme of locomotive maintenance that is being put into effect, the following is presented as in the way of more detailed information pertaining to the improvements installed at each of the four points chosen as being typical each of its respective series.

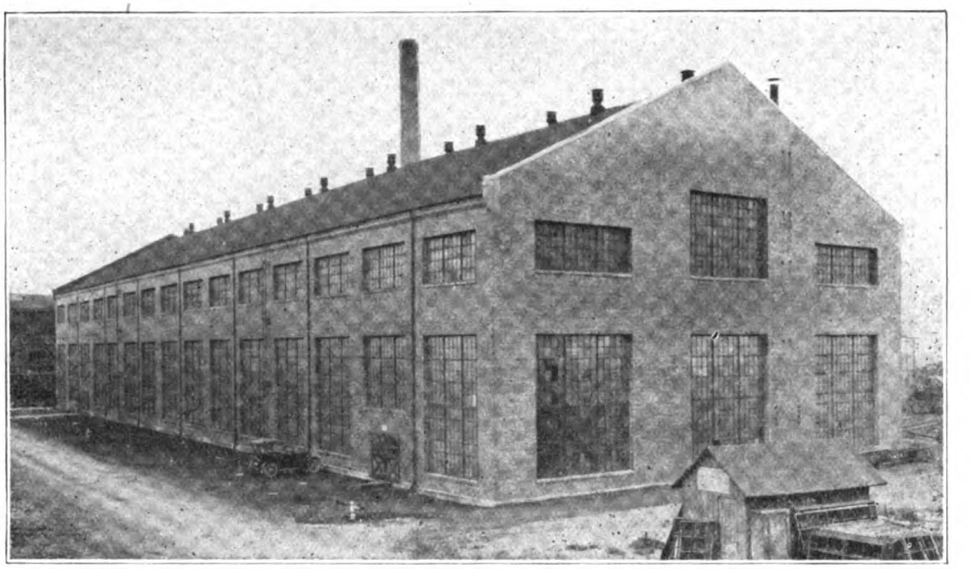
The enlargement of the Columbus terminal and shops has involved, among other things, the interesting project of in-





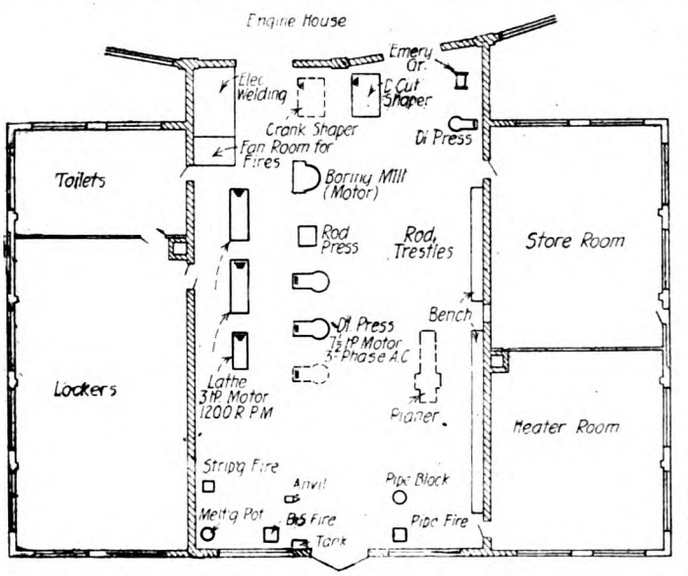
Tool Layout and Section of Superheater Unit Shop, Pennsylvania Lines West, Columbus, Ohio.

creasing the diameter of both the turntable pit and the exterior wall of the house which has been done without suspending the normal functions of the terminal. The transverse section of this roundhouse indicates the extent of the improvements to this structure. A noteworthy feature in addition to those already mentioned, consists in the laying of vitrified tile conduits for use at some future date in connection with a down-draft system of smoke collecting and elimination. In conjunction with the jib cranes mounted on opposite sides of the columns in the row nearest the outer circle of the house, there is provided an overhead trolley system of such capacity and so located as to serve as a means of conveyance for parts between the drop pit section and the annex. The latter, newly constructed, is supplied with machine tool equipment as shown on the accompanying layout for heavy running repairs and is a part of the same structure housing the roundhouse sub-stores department, the heating equipment for the enginehouse, and the locker and toilet facilities for the employes.



New Tank Shop, Typical of New Construction at Columbus Shops, Pennsylvania Lines West.

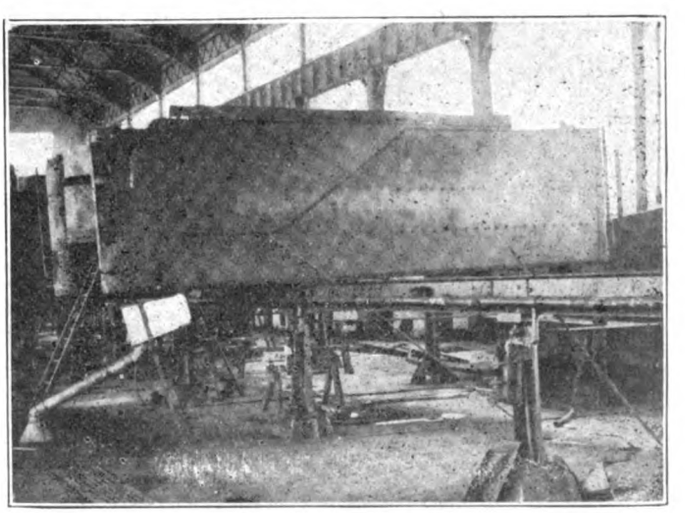
In the repair plant proper several important new structures have been erected, the largest and possibly the chief among which is the four story manufacturing machine shop of brick and steel construction in which, hereafter, are to



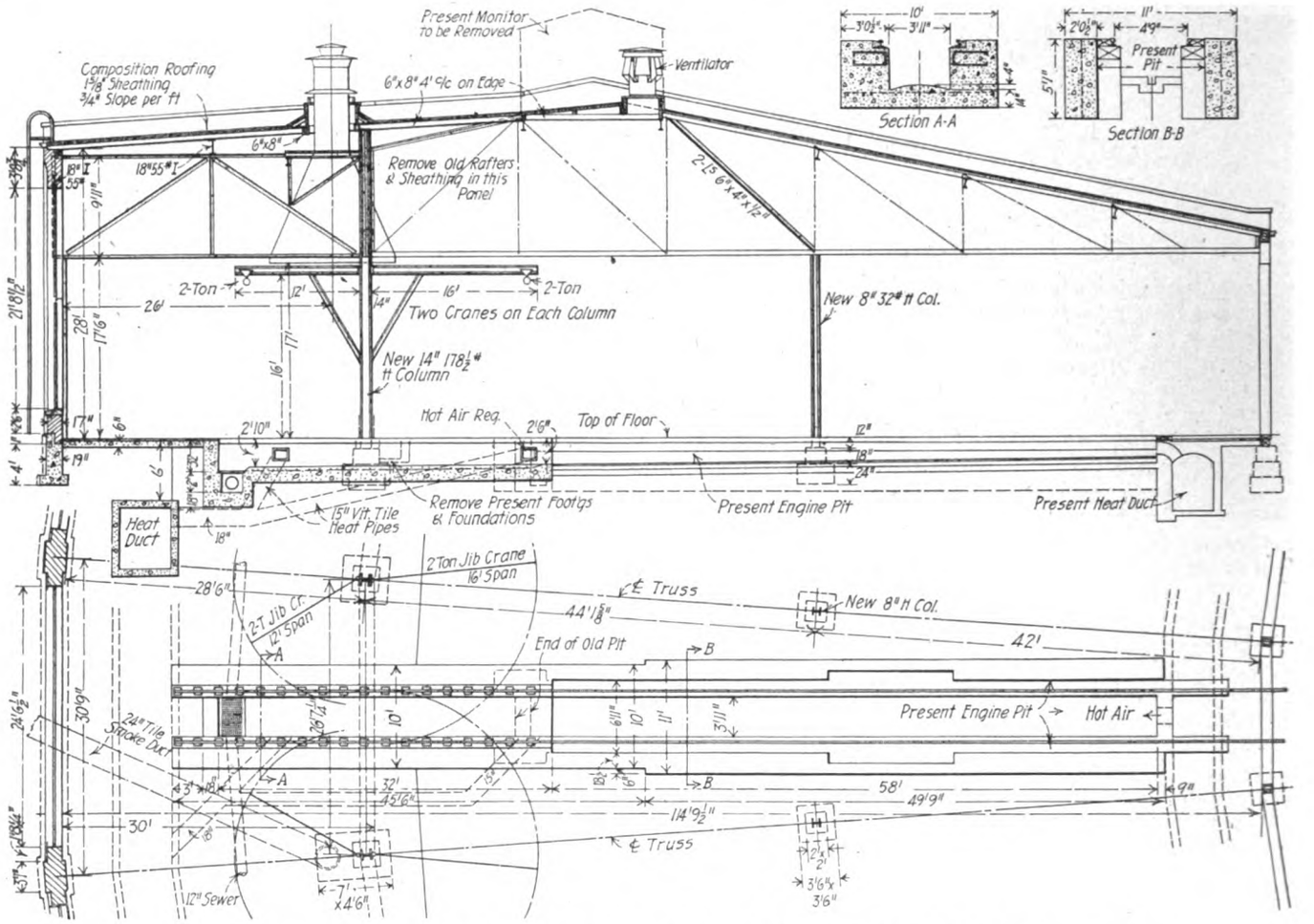
Tool Layout in Roundhouse Annex, Columbus Engine Terminal, Pennsylvania Lines West.

be turned out such parts for stock at subsidiary shops and terminals as best lend themselves to manufacturing processes. This will include all such work as is usually turned out on automatic machinery in addition to such heavier parts as pistons, piston rods, valves, valve motion parts, cylinder heads, packing rings, etc. Although termed a "manufacturing" machine shop, several departments of this structure will be devoted to purely local activities as, for example, the 50-foot wheel shop bay built in the form of a one story annex to the main structure. This portion of the building is fitted with a saw-tooth roof and is served by a ten ton electric crane. The remainder of the first floor area is utilized principally for work on driving rods, driving boxes and similar work. The third floor of the building will constitute an air brake shop in conjunction with which will be handled repairs to lubricators and injectors. On this floor also will be located the shop tool manufacturing and repair department, leaving the second floor for the manufacturing of the heavier parts referred to and the fourth floor for the accommodation of automatic machinery.

The site occupied by the manufacturing machine shop was formerly occupied by a tank shop, to take the place of which there has been erected an entirely new structure 93 by 300 feet in size in a new location as shown in the layout. This building also is a brick and steel structure in which there is provided a 25-tons capacity crane for handling tenders, frames, trucks, etc., as well as the necessary machinery for repairs to this class of equipment. The unique plan of providing permanent steel trestles on which to deposit locomotive tender tanks is carried out in this shop. These trestles are in the form of I-beams mounted on cast iron columns which in turn are set on concrete footings in the floor. Along these I-beams are run water lines for testing tanks, air lines for the operation of pneumatic tools and electric conduits from which to provide current for extension cord lighting and for electric tool operation. Tender frames, likewise, are mounted on trestles, these however of the ordinary wooden variety, placed directly ahead of the tanks to which the frames belong. The plan of operation involves



Permanent Trestle for Tender Tank Repairs, Pennsylvania Lines West, Columbus, Ohio.

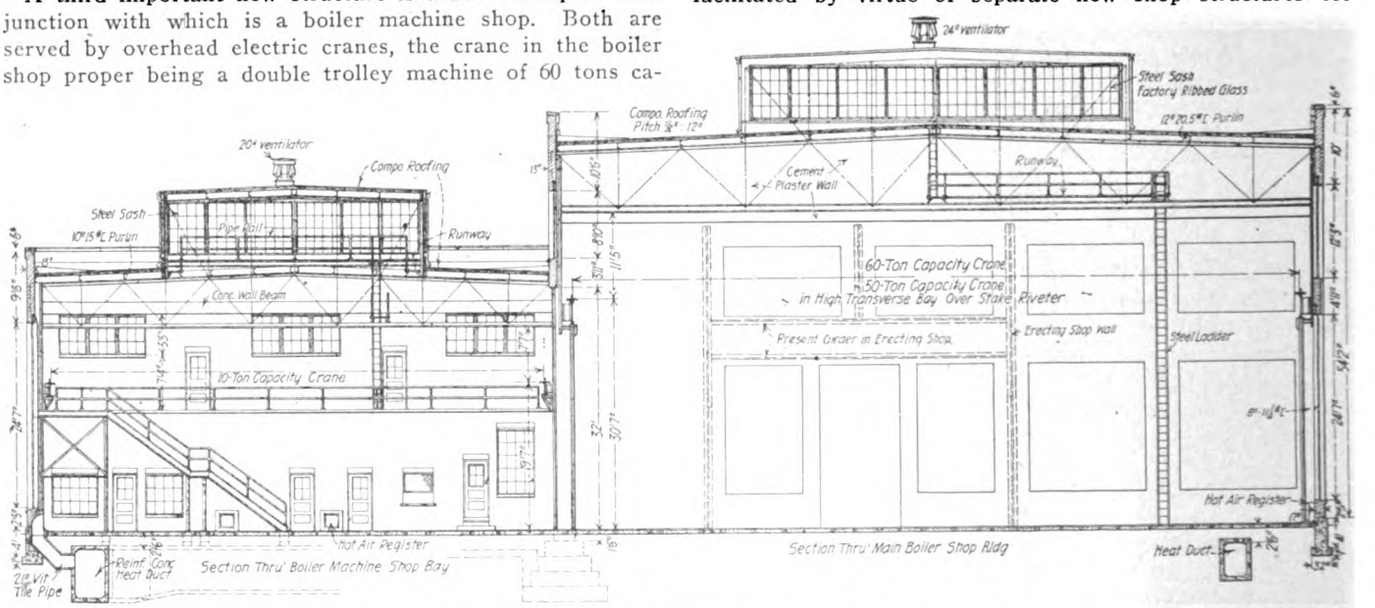


Typical Plan and Section of Stall of Enlarged Roundhouse, Pennsylvania Lines West, Columbus, Ohio.

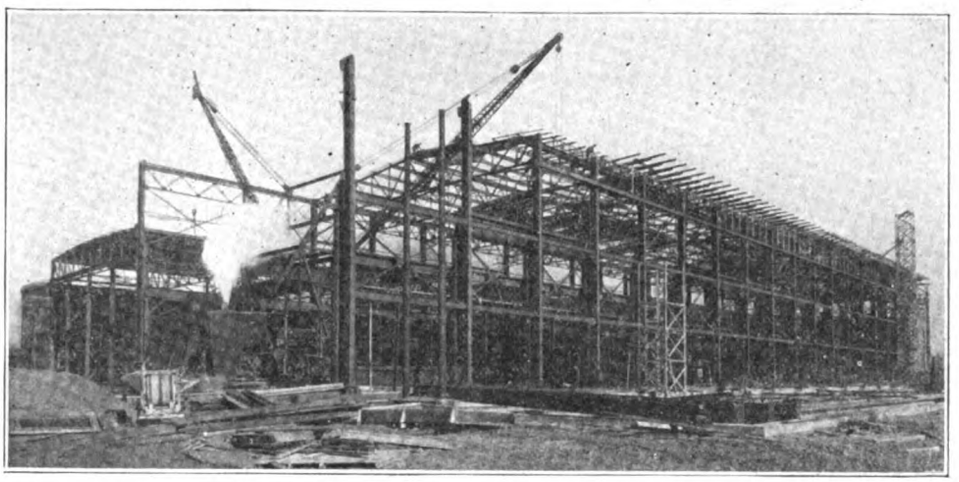
the bringing in of tenders on a track at one end of the building where they are dis-assembled and tanks, frames and trucks are distributed by means of the crane. The work on a given tender completed, the crane serves to re-assemble the parts on an out-going track at the same end of the shop. Tender truck repairs are taken care of on two tracks at one end of the shop while at the other end is located the tool equipment necessary for tender and miscellaneous repair work on stoker conveyors, water scoops, etc.

A third important new structure is a boiler shop in conjunction with which is a boiler machine shop. Both are served by overhead electric cranes, the crane in the boiler shop proper being a double trolley machine of 60 tons capacity and that in the boiler machine shop, of 10 tons capacity. At one end of the main shop is installed a large Hanna stake riveter serving which in the high transverse bay overhead, is a 50 tons capacity crane operated from ground level. At one end of the boiler machine shop is a mezzanine floor serving as a locker room for boiler shop employes, while underneath are rooms for the foreman's office, tool storage, toilets, and heater equipment.

The work at the Columbus central repair plant is further facilitated by virtue of separate new shop structures for



Cross Section of New Boiler Shop, Pennsylvania Lines West, Columbus, Ohio.



Logansport Machine and Erecting Shop in Process of Construction, Pennsylvania Lines West.

flue work, for pipe and jacket repairs, and for the maintenance of superheater units. The flue shop has been laid out in three main transverse bays, one of which is completely equipped for handling, in the one case, the repairs to superheater flues, and in the remaining two, ordinary flue work. Just outside the building at one end is a flue rattler equipment consisting of two rotating drums over which is operated a traveling crane. With this latter equipment, complete sets of flues are lifted from the conveying buggies to the rattlers and returned without handling other than to attach and detach the slings. The clean flues are run into the shop on special flue carriages and moved sidewise across the shop in either of the three bays to which they are assigned, and in the process are cut, safe-ended, swedged and tested to the latest approved methods and equipment in succession. This work done the flues accumulate parallel to a second longitudinal track at the opposite side of the building from which they enter and are removed in the same manner as that in which they are received.

The pipe and jacket, and the superheater shops, to which reference has been made, are located as shown on the general layout. The former is equipped with the necessary pipe bending and threading machinery for locomotive pipe work, and the necessary rolls, brakes, etc., for forming jackets, while in the latter there is installed machinery for cutting off, threading, applying return bends and testing the superheater elements. The nature and arrangement of this latter equipment is indicated in one of the illustrations heerwith.

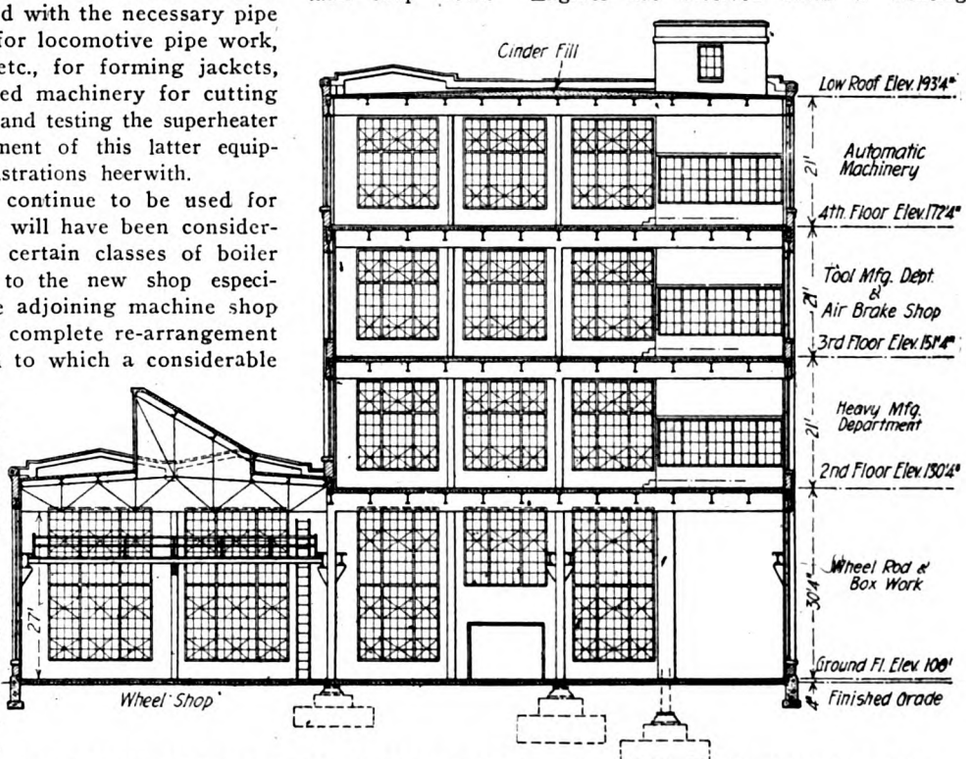
The present erecting shop will continue to be used for that purpose although its capacity will have been considerably enlarged by the removal of certain classes of boiler work formerly taken care of there, to the new shop especially arranged for such work. The adjoining machine shop will continue to be used as such, a complete re-arrangement of tools being effected, in addition to which a considerable amount of new machinery is being secured. The new method of arrangement dispenses with groups of machines as for class or type and constitutes, instead, a method of grouping on the basis of work to be done in any given department.

There is in use at the Columbus shops a seven stall electric welding shop, same being a succession of rooms or stalls under a common roof in which electric welders may carry on their work without interference from the outside and with lessened danger of injury both to themselves and to passers-by because of their being thus isolated.

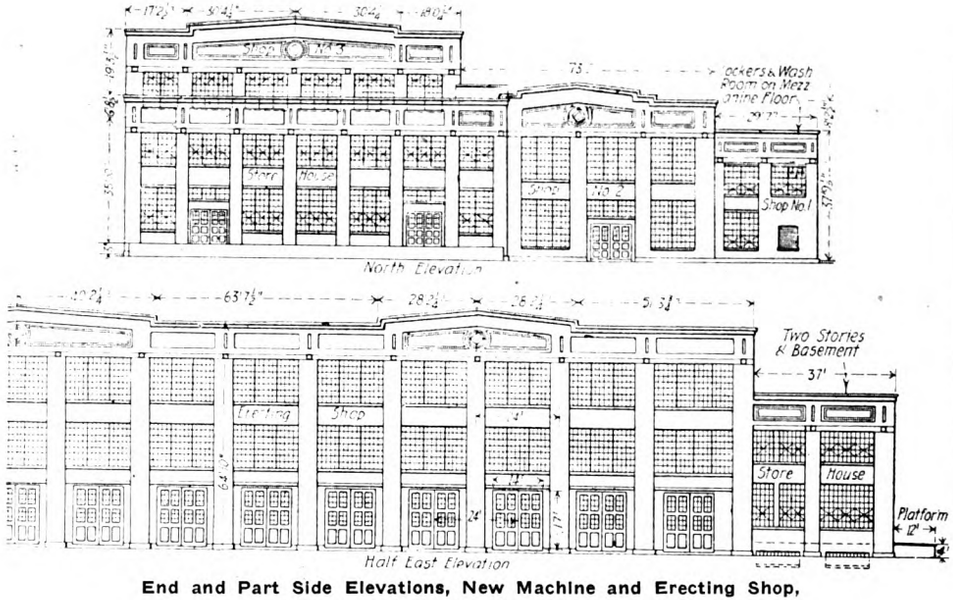
These extensions have required a considerable enlargement of the previously existing power plant capacity. Whereas the boiler plant formerly housed four 300-horse power Sterling boilers, the latter are being removed and in their stead there are being installed five 600-horsepower Ladd boilers. All boilers are stoker fired, coal being received from a traveling coal hopper which in turn is supplied by means of a Jeffrey elevating and conveying system. While current for the most part is secured from outside sources, the power plant contains three 400-horsepower generating units two of which are used to supplement the outside supply, while the third is held in reserve. Compressed air is provided from a 5,000 cubic foot capacity Ingersoll-Rand compressor supplemented by a 1,500 cubic foot capacity Laidlaw Dunn Gordon compressor.

In addition to the structures previously mentioned there has been erected a new main storehouse building, while there are contemplated lesser improvements in the way of oil house equipment, an engine washing plant, extension to the coaling plant, and like facilities.

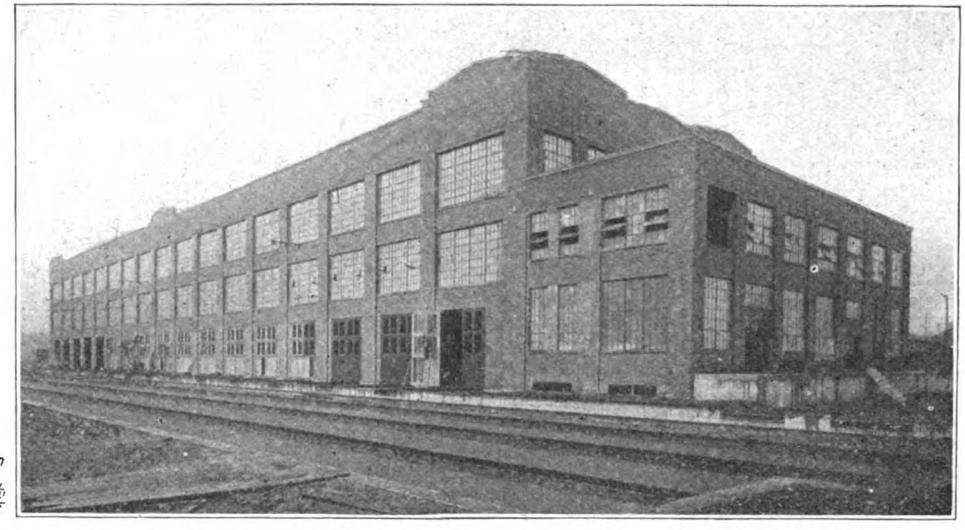
Typical of the second series plants is that represented by the revised layout at Logansport, Indiana. The main feature of this plant is the new erecting and machine shop shown in cross section and by the half-tone reproductions herewith. This structure is 195 feet wide by 422 feet in length and is erected in three main bays, 90 feet, 75 feet and 30 feet in width from center to center of columns, respectively. The widest of these bays constitutes the erecting shop in which there are a total of 17 transverse pits, three of which at one end of the building are reserved for tank shop work. Engines are received from a Whiting



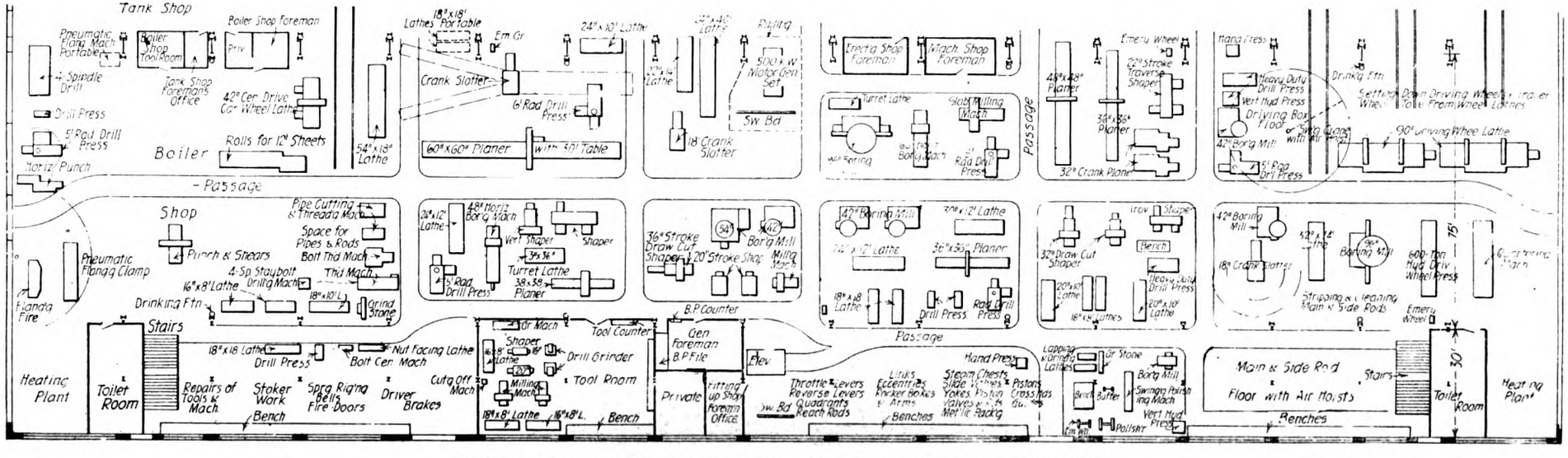
Cross Section of Manufacturing Machine Shop, Pennsylvania Lines West, Columbus, Ohio.



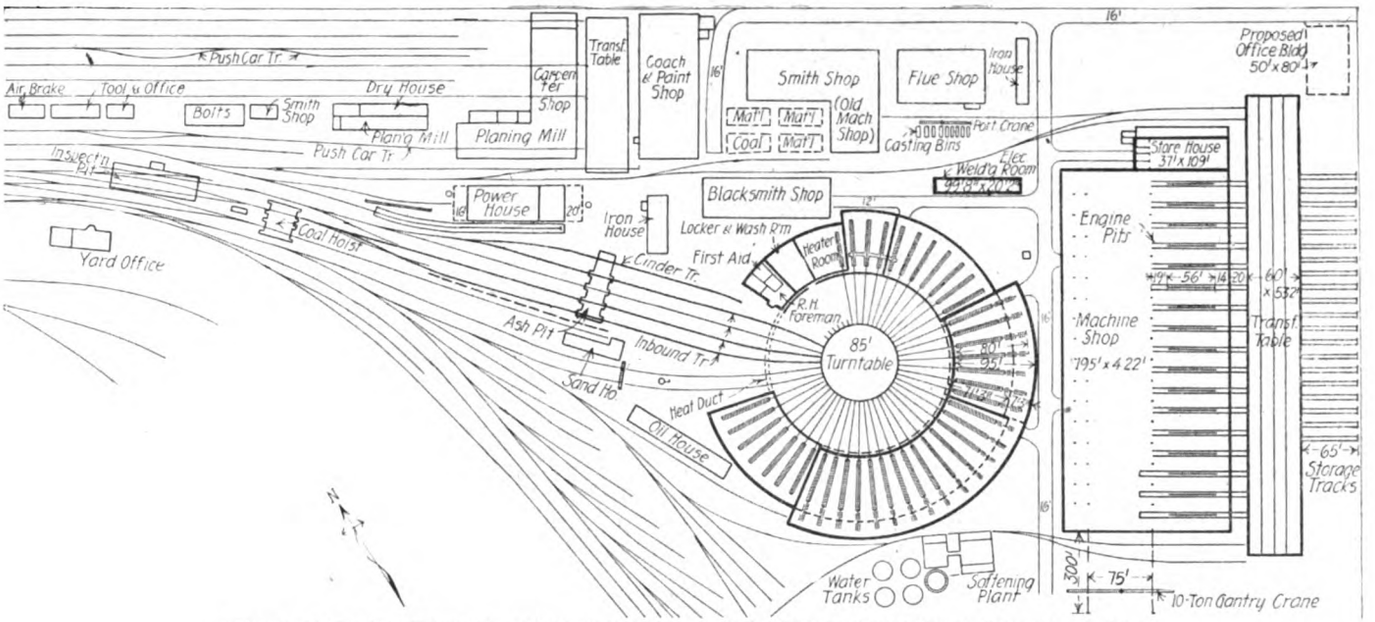
End and Part Side Elevations, New Machine and Erecting Shop, Pennsylvania Lines, West, Logansport, Ind.



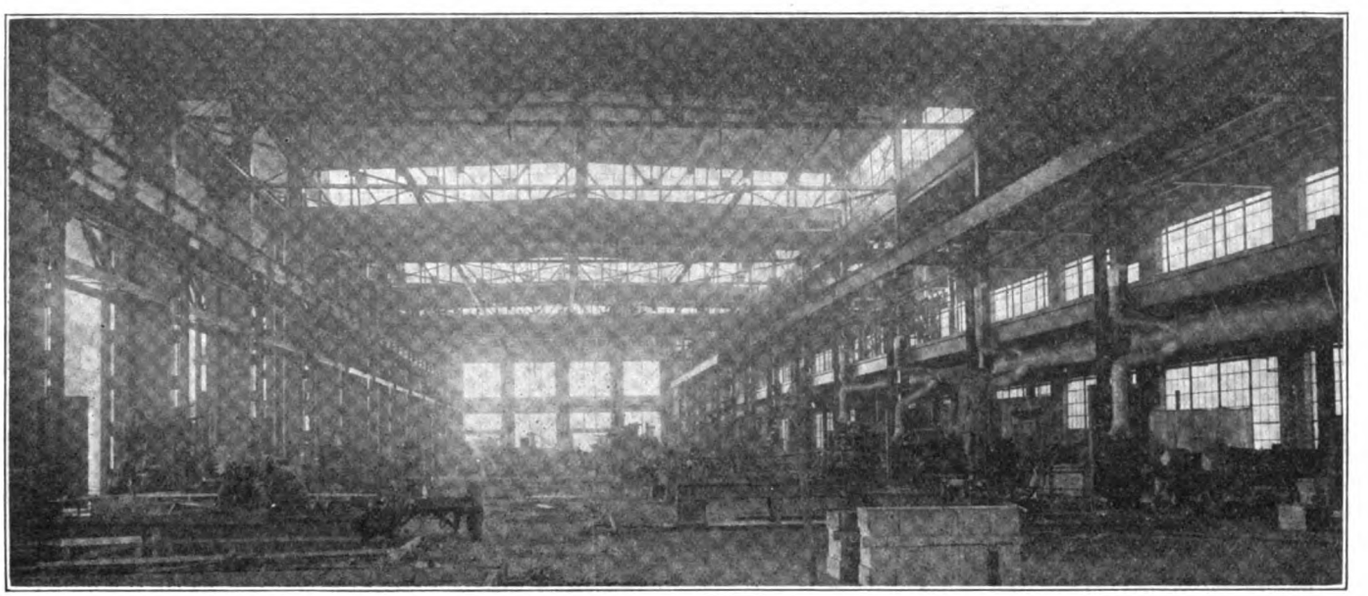
New Machine and Erecting Shop, Pennsylvania Lines West, Logansport, Ind.



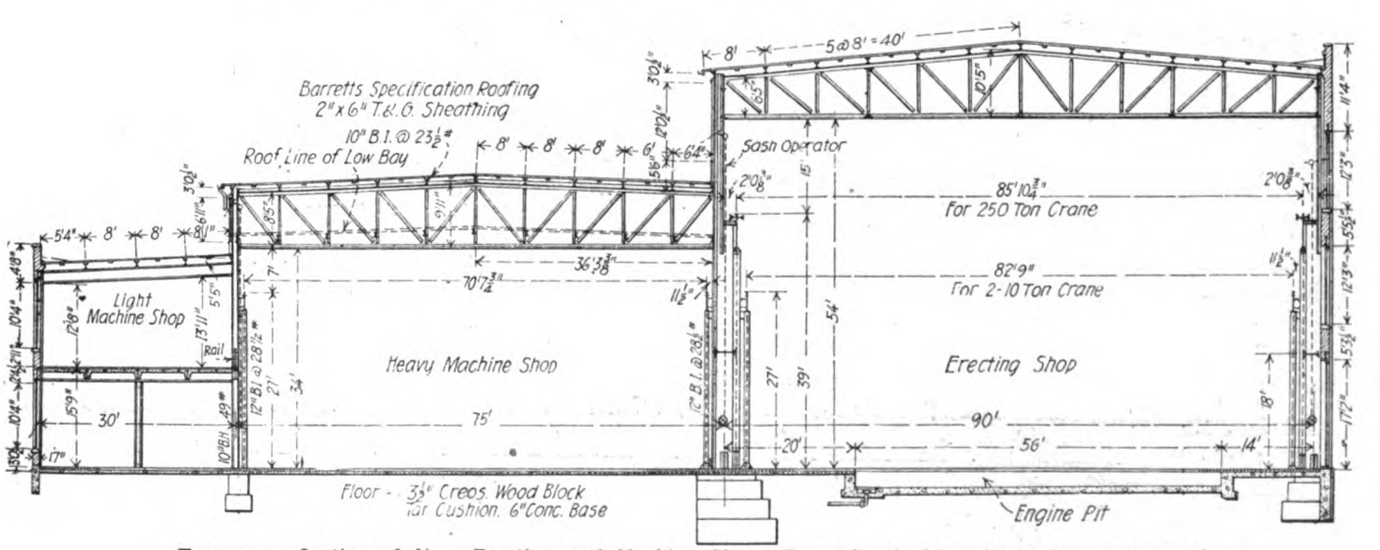
Tool Layout, Heavy Machine Bay, Logansport Shops, Pennsylvania Lines West.



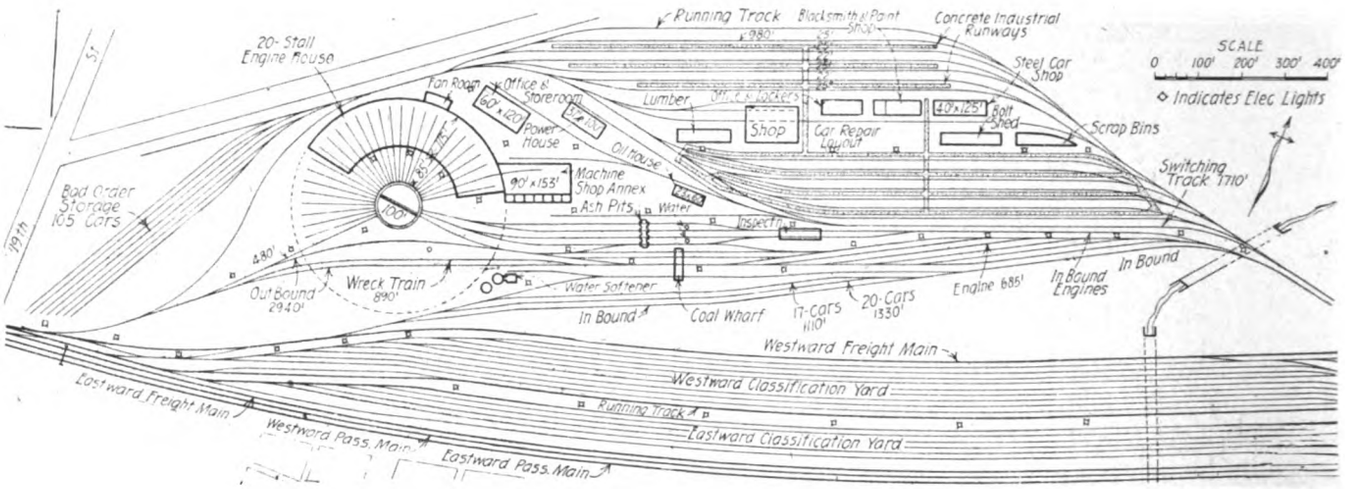
Layout of Engine Terminal and Shop Facilities, Pennsylvania Lines West, Logansport, Ind.



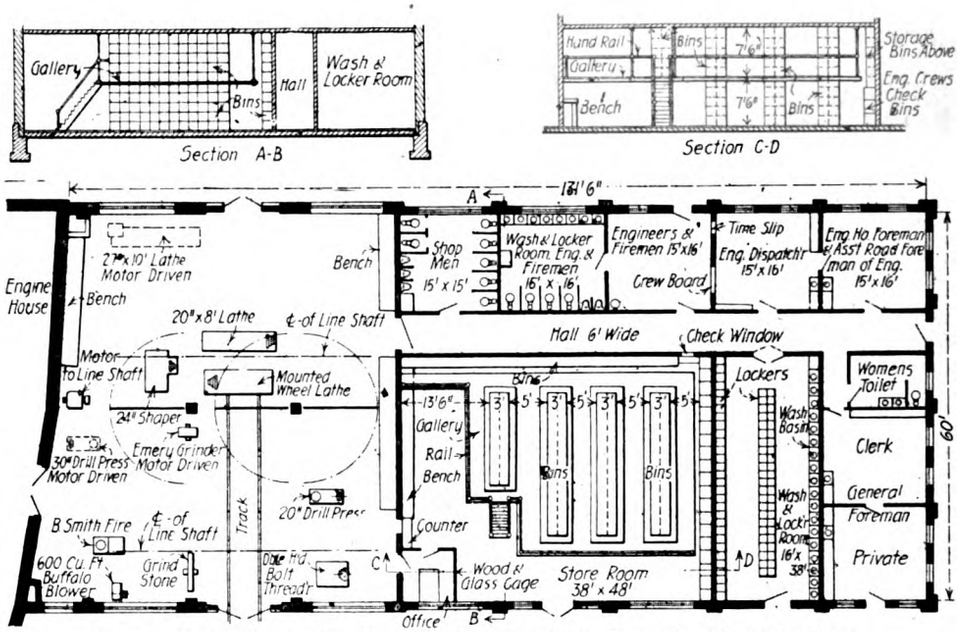
Heavy Machine Shop Bay, Machine and Erecting Shop, Pennsylvania Lines West, Logansport, Ind.



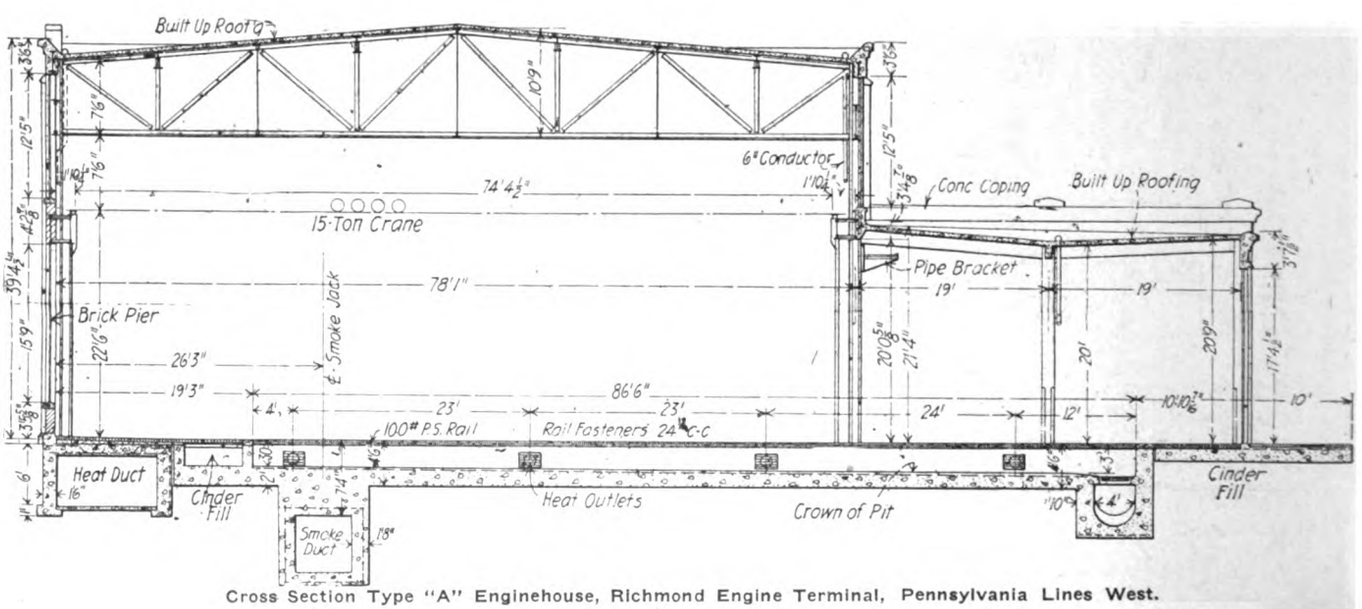
Transverse Section of New Erecting and Machine Shop, Pennsylvania Lines West, Logansport, Ind.



Layout of Engine Terminal and Repair Facilities, Pennsylvania Lines West, Richmond, Ind.



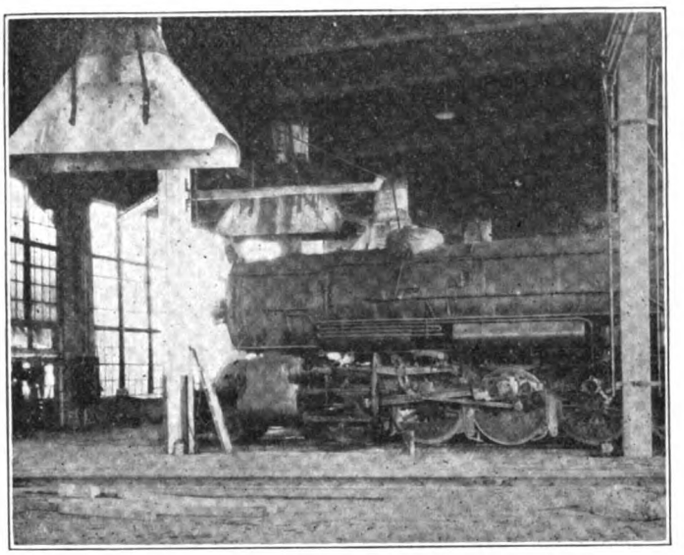
Engine House Annex, Bradford Engine Terminal, Pennsylvania Lines West.



Cross Section Type "A" Enginehouse, Richmond Engine Terminal, Pennsylvania Lines West.

transfer table paralleling the building. The motive power for handling locomotives to and from the transfer table is by means of an electrically driven winch from the table itself. Inside the erecting shop are crane facilities consisting of a 250 tons capacity double trolley Morgan overhead traveling crane having a span of 85 feet 10¾ inches which is said to be the largest crane ever installed for this class of work. Supplementing the main crane is a Whiting 10-ton capacity crane running at a 27-foot level on tracks with a span of 82 feet 9 inches center to center of rails.

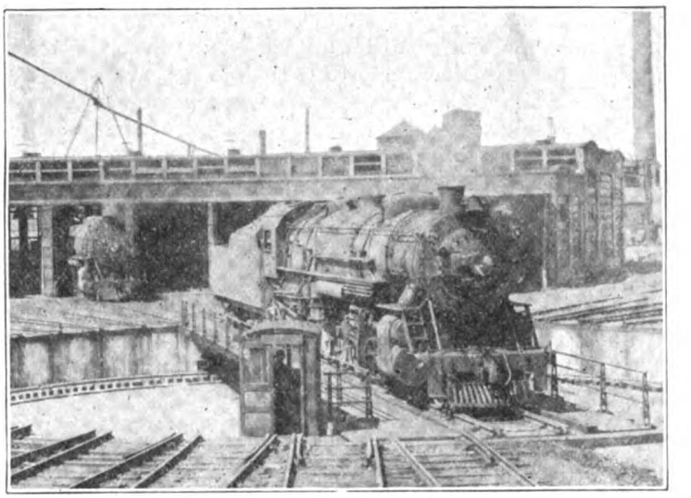
In the heavy machine shop is a second Whiting 10-ton crane running at a 27-foot level on tracks with a span of 70 feet 7¾ inches. This shop has been equipped with a full complement of new machine tools. In this bay all heavy



Interior Type "B" Enginehouse, Pennsylvania Lines West, Bradford, Ohio.

frame, wheel, box and rod work is to be taken care of. The light machine bay provides space for the tool room, valve and brake repairs, rod fitting and similar work. On the mezzanine floor over this bay it is planned to take care of the air brake injector and lubricator repairs and brass shop work generally. At either end of the structure in the light machine bay space is set aside for the accommodation of the two indirect hot air plants by means of which the shop is heated, as well as space for toilet and locker rooms.

This shop is floored throughout with a 3½-inch layer of creosoted wooden blocks resting on a concrete base with a tar cushion intervening. This base is six inches in thickness except in the heavy machine bay where it was made 12 inches in thickness to permit of the installation of machinery without the



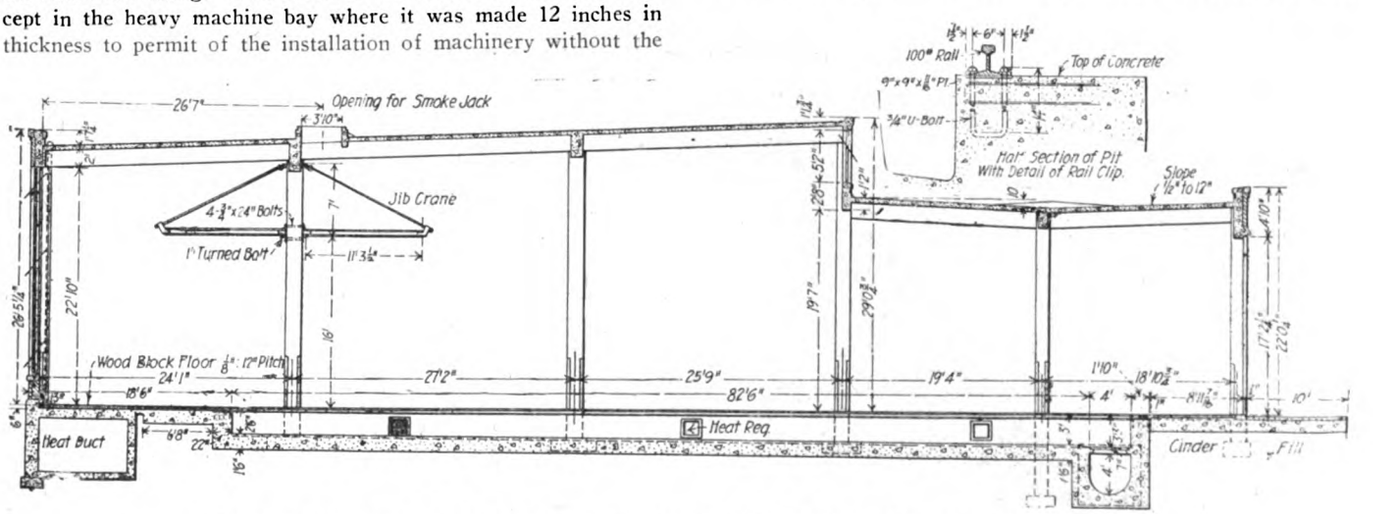
Type "B" Enginehouse, Pennsylvania Lines West, Bradford, Ohio.

necessity of providing special foundations therefor. Engine pits are of concrete, framing is of steel, side walls of brick, while the roofs are covered with Barrett specification roofing laid over tongue-and-groove sheathing.

Further improvements at Logansport have had to do with the remodeling of the enginehouse. This structure originally contained 43 stalls built around an 85-foot turntable, and while the latter has been retained the radii of both the interior and the exterior walls of a 21-stall section have been increased giving these stalls a depth of 95 feet. A 17-stall section remains as before, while that occupied by the remaining seven stalls at one end of the structure has been vacated for the accommodation of the foreman's office, a heater room, first aid room, toilet and locker space. In the engine house, formerly a stone structure, the portion which has been enlarged has been provided with brick exterior walls and steel sash in the outer circle and in the inner circle with wooden vertical rolling doors. A complete new National boiler washing and refilling system has been installed. In a three-stall section of the engine house where the drop pits are located it is planned to handle such running repairs as normally have been delegated to engine house forces under the new program.

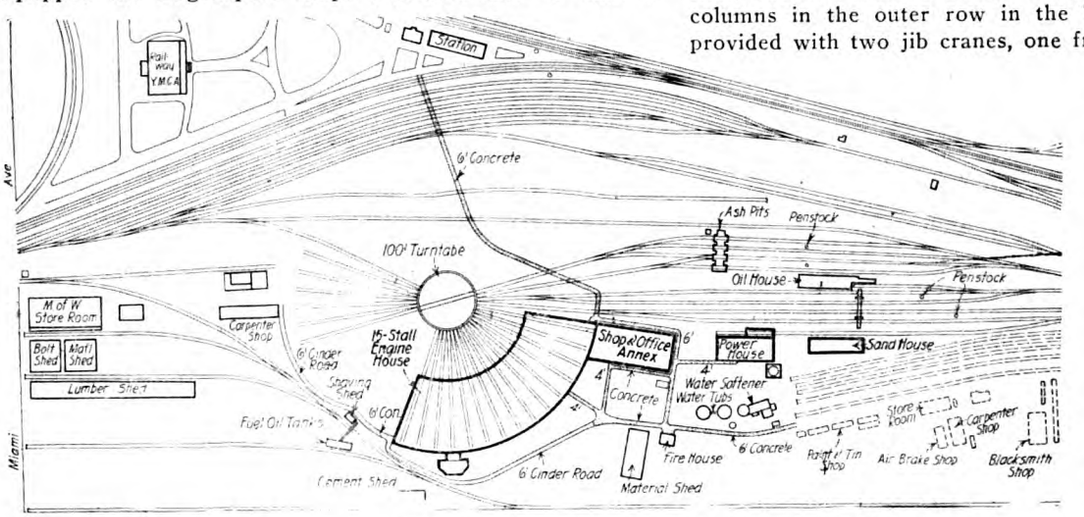
Heating is by means of the indirect hot air system, the coils and fans being located as stated above and the warm air being conducted to the various stalls through an overhead system of piping with outlets directing the air toward the floor at suitable intervals.

The track approach to the engine house is being revised



Cross Section Type "B" Enginehouse, Bradford Engine Terminal, Pennsylvania Lines West.

and it is proposed to incorporate therein a new mechanically operated cinder pit. The removal of the bulk of the work to the new machine shop leaves the present machine shop available for use as a blacksmith shop and the present boiler shop for use as a flue shop. The new improvements include a series of electric welding rooms in a separate structure after the manner of a similar feature at Columbus. Thus equipped the Logansport shops will take care of Class 3



Layout of Engine Terminal and Repair Facilities, Pennsylvania Lines West, Richmond, Ind.

and lighter repairs of the Logansport, Michigan, Richmond and Chicago terminal divisions of the road.

The fourth series facilities at turn-around points at the ends of operating divisions have as their chief features, engine houses of the standard Type "B" design. The accompanying illustrations pertaining to the new roundhouse at Bradford, Ohio, represent a structure typical of this series. As for turntables, pit work, drainage, heating, lighting, boiler-wash equipment, etc., the Type "B" enginehouses are the equivalent of those in the Type "A" class. They differ radically, however, in lacking the traveling crane feature and the accompanying down-draft smoke collecting system, and because of this circumstance the design is very greatly simplified. As the cross section shows, the Type "B" roundhouse is an altogether brick and concrete structure, the two inner bays of which are generally similar to those of the Type "A" roundhouse. As will be seen, however, the remainder of the building is in three bays instead of one single bay, the flat concrete roof of this portion sloping toward the outer circle. Instead of the elaborate crane facilities made available in the Type "A" enginehouse, columns in the outer row in the Type "B" structure are provided with two jib cranes, one front and one rear, these being sufficient to handle rods, air pumps, valve cylinders, covers, etc. Smoke jacks of any acceptable type may be used, those illustrated being constructed of "transite."

An altogether commendable feature of both the Type "A" and the Type "B" enginehouses is the paved areaway, 10 feet in width, outside of the inner circle wall. This gives a satisfactory walkway from one portion of the house to the other and will serve materially to reduce the dangerous crossing of tracks and turntable where walkway is not available.

The enlarged plan of locomotive maintenance as outlined has been evolved and perfected by the mechanical department officers of the road headed by P. F. Smith, Jr., general superintendent of motive power, assisted by Superintendents of Motive Power W. C. A. Henry and T. W. Demarest with their respective staffs. Building designs generally, together with yard layouts, are the work of the system engineering officers at Pittsburgh, Pa. Among these, J. H. Minton, assistant engineer, supervised the design of buildings under the direction of Robert Trimble, chief engineer of construction.

First Annual Convention A. R. A. Section III—Mechanical

Convention Opens With Large Attendance. Successful Meeting Assured

The first annual convention of the newly constituted Section III—Mechanical, of the American Railroad Association, continuing the activities of the former Master Car Builders, and American Railway Master Mechanics' Associations, was called to order on Wednesday morning, June 18, by C. E. Chambers, chairman of the general committee of the A. R. A., now having in charge the above mentioned lines of work. The program for the first three days was arranged to cover those subjects formerly falling into that group dealt with by the Master Car Builders' Association, the initial proceedings being the same as those which, in former years, characterized the opening session of that body's deliberations. An invocation was rendered, an address of welcome was made by the mayor of Atlantic City, following which Mr. Chambers read the formal address delivered annually by the presiding officer of the convention.

In the course of this address, Mr. Chambers gave a most interesting resume of the history and work of the former Master Car Builders' Association. This body was formally organized in the year 1867 at Springfield, Mass., and held its first regular meeting in the fall of that year at Altoona, Pa. Prior to formal organization, covering a period of some two or three years, meetings had been held irregularly at various car shops of the then leading roads, the impelling factor being then, as now, the desirability of facilitating the transportation of commodities through the interchange of equipment, the need for which at that time was becoming more and more apparent as the period of reconstruction after the Civil War was entered into. Interest in this great question was purely an individual matter, remaining so until the year 1882, when formal recognition of the association work was accorded by the railroads and the constitution