

drills, three 16 in. lathes, a 24 in. vertical drill, and three 28 in. vertical drills, all on a 20 h.p. group drive; medium sized horizontal boring mill with $3\frac{1}{4}$ h.p. drive; two 6 ft. radial drills; 48 in. horizontal rod milling machine for side and main rods, keyways, and sometimes shoes and wedges; two 18 in. lathes, 18 in. emery, 30 in. slotter with 13 h.p. motor; 48 in. planer with 15 h.p. motor (has shoe rack to the rear of slotter with classified shelves with numbers and classes of locomotives marked thereon); 24 in. lathe, 18 in. lathe, and 16 in. lathe; coach wheel lathe; and 48 in. lathe.

The tender wheels are handled at the west end of the centre bay, to the west of the coach wheel lathe, where the tires are turned. An oil furnace, built up of fire brick, has been constructed at the wall for the heating of the tires in batches of six. Leading down the shop, from this furnace are a couple of elevated tracks at a level of about 2 ft. above the ground and about 4 ft. apart. The axles rest on these rails, with the ends projecting beyond the rail on each side, the heated tire being slipped over the supported wheel centres from each end. The open space each side of the wheel tracks provides wheel storage. The wheels to be turned enter from the end door and are mounted in the coach wheel lathe, turned and then run further on into the shop, where the crane picks them up

constantly employed keeping the tools in shape. The shelves, being open on both sides, are equally accessible to the operator and tool room attendant. At the side of the tool grinder, there is a board of sample tools for the guidance of the operator.

Further along the west wall, there is a $3\frac{1}{2}$ in. turret lathe, followed by a no. 2 B. & S. tool grinder with a 12 in. swing. It is used for grinding taps, reamers, special tools, and air motor and hammer parts. Back of these two machines are two tool lathes, a 12 in. and a 14 in., employed principally on such work as special taps and reamers. All these machines are on a 15 h.p. group drive through jack shafts attached to the ceiling.

Next to the machine shop wall is a small power hack saw, with a patent drill grinder alongside. On the opposite side of the room is a general service double grinder and buffer. Back of this is located a 14 in. shaper, and alongside a large vertical miller for heavy tool work, and a second miller of smaller size for small tool work.

The bench in the southeast corner is used for air motor and hammer repairs, and on a rack on the south wall is carried a full line of these parts. A similar rack carrying threading machine dies for all the different makes in use but one, adjoins this last rack. A full line of tool milling cutters is carried on a board attached to the east

erecting shop pits, are placed in trucks in the main bay of the machine shop, the whole truck being then picked up by the travelling crane and carried down the shop to the track that runs across the machine shop into the tube shop. The tubes are either stored on end in the racks on the east wall of the tube shop just inside the door of the shop, until required, or if the rattler is ready, they are pushed along on the truck and spotted opposite the rattler, into which they are dropped through a slit in the side of the wall about 6 ft. above the ground. After the necessary rattling, they are dropped out through a lower slit on the tube shop floor, from which position they are picked up and piled on trestles in the middle of the floor to the west of the through track. They are then heated in the oil furnace adjoining, and the heated bad end sawed off in the hot saw along the north wall, the end being flared in the same heat by an air operated press alongside. Each tube, on the completion of these two operations, is piled on trestles to the west of this last machine, the ends lying in the same direction as before.

From a pile of safe ends along the west wall, one is slipped into the flared end of the tube, and the two parts heated in the oil furnace adjoining, followed by welding together in the rotary swedging machine alongside. On the completion of this oper-

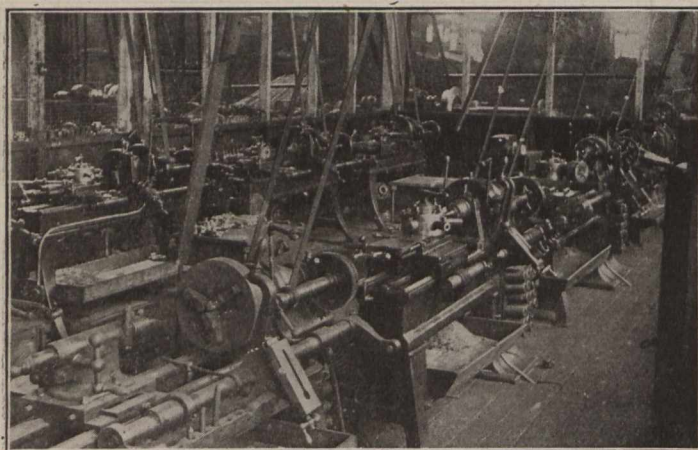


Fig. 11.—Brass Room Lathes.

and carries them to the tender department at the opposite end of the shop.

The brass room, fig. 11, is the screened off section at the west end of the north bay. Along the wall, there is a work bench, with two rows of machines paralleling the wall. The south machine of the west row is a 20 in. turret; the next two, 20 in. brass lathes, and the remaining six all 16 in. brass lathes. There is also a 16 in. emery beside the brass room door. These machines are all on a 10 h.p. motor group drive.

The tool room, fig. 12, J. A. Wright, Foreman, is located in a lean-to building, 44 by $31\frac{1}{2}$ ft. wide, on the north side of the building near the centre. It is well equipped with a line of light machine tools, putting the shop in a position to handle a wide range of tools, both in the making and repairing. Between the tool distributing room and the tool room itself, there is an archway, about two-thirds of which has been built up with shelving, open from both sides for the storage of all sizes and shapes of lathe and planer tools. A large stock of all sizes and shapes of tools is here stored and classified according to size and shapes on the different shelves. Inside the entrance way and back of this series of shelves (left background in fig. 12) is located a no. 1 Sellers tool grinder, where an operator is

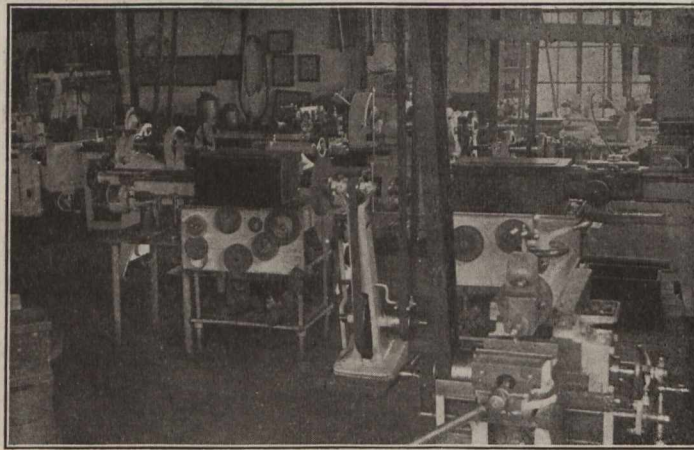


Fig. 12.—Tool Room Arrangement.

wall, close to the two millers.

The range of tool work undertaken is extensive, including not only the threading dies mentioned, but also special taps, standard taps for hurry-up jobs, special hobs, punches and dies, boiler tools, boiler snaps, drill, sockets, ratcatchers, jigs of all kinds, some motor and air hammer parts, and a wide range of special tools.

The tool-distributing room (background in fig. 5) is entered from the east side, with the delivery counter along the south side. Planer and lathe tools are kept in the rack to the rear, large and special reamers in shelves along the west wall, fine reamers and taps in drawers under the delivery counter. Air hose in rolls is stored on shelves in the door corner, and in the centre are kept the machine oil tanks with the waste boxes behind. Here are also stored the portable gas tanks and torches, the whole room being well arranged for the quick distribution of the tools, delivered on the usual check system.

The tube shop is housed in a building 75 by 45 ft., adjoining the machine shop to the north. In a lean to structure on the east of this building, the tube rattler is housed, the driving motor being situated in the divided off south end of the room, entered from the outside, freeing the motor from the injurious dust of the rattler. The tubes, as removed from the boilers on the

ation, the tubes are piled on trestles to the south of this point, at an angle to the southwest corner.

Here the safe ends are again heated in an oil furnace, and that end drawn down in an air operated machine, the tubes then passing on to the trestle pile to the east, the flared ends pointing in that direction. The opposite end is then heated in the fourth oil furnace, and the tube sawed off to length in the hot saw adjoining. The tubes thus completed are stacked on end in the vertical racks in the corner, ready for removal to the erecting shop. It will be noticed that the tubes follow a continuous forward path without a single retrograde movement.

Along the side of the rattler room, there is a track on which two flat cars are kept spotted. Between the wall and the cars, there is a platform at the car level, approached by a ramp from the tube shop door. One car is for the reception of ashes, etc., and the other for the sawed off bad ends, simplifying the removal of these waste products, as produced, to the ash pile and scrap bins, the shop being almost automatically kept free of all unnecessary encumbrances. On both sides of the through tube shop track, in the yard beyond, there are storage piles of new tubes.

A concrete pit in the southeast corner of the tube shop, from which it is railed