

Extensions to the open hearth building were necessary, in order to provide room for bottom casting the slab ingots as required for plate mill consumption. This auxiliary feature of the main installation \$600,000 and, without considering the necessary extension to the electrical power plant facilities, brings the total cost of the plate mill to \$5,000,000.

The work was entirely supervised by the steel company's engineering and construction departments, and the erection of all buildings and machinery, with the exception of the structural steel and the main motor, was carried out by the company's engineering

and construction forces. It is a remarkable fact that, of nearly 4,000 bolts in the machinery and building foundations, not one had to be changed; this testifies to the accuracy with which the drawings were prepared and the work executed. The entire project represents the latest practice in the manufacture of steel plates, and aside from the fact that it is a most creditable extension to the steel plant of the Dominion Iron and Steel Company, Limited, it cannot but be a most valuable addition to the manufacturing wealth of Canada.

## New Tube Mill in Youngstown

Youngstown Sheet and Tube Company Have Completed a New Mill to Be Used in Manufacturing Lap-weld Pipe—Several Unique and Distinctive Improvements Feature the Mill.

THE Youngstown Sheet & Tube Company, at their East Youngstown plant, put in operation July 15, 1920, a tube mill which is designed to finish from 4 to 10-inch lap-weld pipe.

The distinctive features of the mill are the heating system, the absence of steam machinery, the elimina-

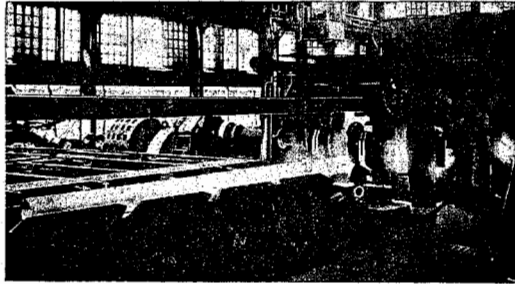


Fig. 1—Welding pipe by lap-weld process.

tion of all exposed wiring and the grouping of controlling apparatus at a minimum number of points.

**Building.** The total floor space occupied by the mill is approximately 59,000 square feet.

The mill which is built as one continuous building, 100 feet wide by 475 feet long, consists of two departments as follows:

The furnace department, which is 100 feet wide by 228 feet long, houses both the bending and welding furnaces, conveying machinery, chargers, chill and size rolls, cross rolls, scarfing and welding rolls, draw bench, buggy, turning trough, bar pullers and cooling racks.

The threading floor is 100 feet wide by 247 feet long, housing skids, scales, threading and socket screwing machines, pipe conveying machinery, tester, intensifier, and pipe straightener.

The mill is equipped with two 10-ton cranes, furnished by The Cleveland Crane & Engineering Company, Wickliffe, Ohio.

The building is of steel and brick construction and was furnished by the McClintic-Marshall Company,

of Pittsburgh, Pa., much study being spent on the lighting, ventilating and heating system.

The roof of the building with the Pond type inverted monitor roof, and equipped with Lupton top-hung sash and operates in the monitor, and with United Steel sash, furnished by the Trussed Concrete Company, for the side walls.

The side wall sash consists of two rows of continuous sliding sash each five feet high, the full length of the furnace building; the threading floor, having brick walls, is provided with ample pivoted ventilating sash.

### Building Annex.

This building which is located on the north side of the mill and adjoining, covers a floor space of 2,538 square feet, is 55 feet wide by 46 feet long, built entirely of brick, and also being amply provided with sliding and pivoted ventilating sash.

In this building well equipped rooms for millwrights, electricians, die, wash and lockers; also office for both furnace and threading floor foremen are located. In the basement the heating, ventilation system, also the cooling station with the equipment for the cooling of drinking water for the mill are located. The wash and locker rooms are furnished with up-to-date shower baths, clothes hangers and sanitary equipment.

As the floor of the mill building is seven feet above the ground level, large concrete platforms, ramps and walks were built around the mill to facilitate the handling of the finished and unfinished products.

On the west side the platform is 36 feet wide by 60 feet long equal to 2,160 square feet extending on into the skelp yard runway which is at right angle and adjacent to the mill.

The old skelp yard runway which has a crane span of 77 feet 2 inches and a length of 292 feet 6 inches was extended 123 feet together with the mill building.

This crane runway is equipped with two 10-ton cranes.

The platform on the east side extends out into the present warehouse which is also at right angle and adjacent to the mill. It is 36 feet 4½ inches wide and 100 feet 0 inches long, equal to 3,637 square feet.

The crane span of this warehouse is 85 feet 0 inches

is a remarkable piece of machinery and by 483 feet 6 inches long. It is equipped with three 10-ton cranes. The concrete walk on the south side is 6 feet 6 inches wide and runs along the length of the building for 380 feet 0 inches. The walk on the north side is 6 feet 0 inches wide with a length of 113 feet 0 inches.

**Furnaces.** The two furnaces are of a regenerative type and of a special design of The Youngstown Sheet & Tube Company, to operate on coke oven gas.

The bending furnace is 24 feet 5 inches wide by 26 feet 3 inches long; the welding furnace is 19 feet 7 inches wide by 28 feet 3 inches long.

**Machinery.** All machinery used in this mill is of a heavy standard mill type class, with the exception that several special features were incorporated in the design of some of the machines which were furnished by The Youngstown Sheet & Tube Company, to meet their requirements.

These machines were furnished by The Taylor-Wilson Company, and the United Engineering & Foundry Co., of Pittsburgh, Pa.

**Electric Power.** Electric power for operating this company's mills is generated at 6,600 volts, 3 phase, 25 cycle, at various generating stations. Substations located throughout the plant receive the power at this voltage and by means of step down transformers or motor generator sets transform to 220 ac or 240 dc at which voltage the power is delivered to the individual mills. All motors are controlled through automatic control equipment located at centralized points, each group of controllers operating motors within a given range. The wiring from control equipment to motor is in steel and fiber ducts embedded in concrete under the floor.

**Heating System.** The heating system is of a hot air type and is unique in many respects, being designed to obtain the greatest amount of heating capacity at the minimum amount of cost, and is of a patented type. This was patented by Mr. L. Lee, Consulting Engineer of The Youngstown Sheet & Tube Company.

The furnace is 11 feet 3 inches wide, 33 feet 4 1/2 inches long and 7 feet 10 inches high and designed to burn coke oven gas, in its construction the best quality of fire and silica brick are used. The furnace is mounted on two concrete air ducts (running the full length of the furnace) one for cold air and the other for hot air. The air is heated by drawing the cold air from the floor of the threading building by a large turbo conoidal Buffalo air fan forcing it into the cold air duct, through the inside diameter of a series of 4-foot steel pipes (bent in the shape of a large "U") and into the hot air duct; while the hot gases in the furnace are being drawn over the outside diameter of the pipes by an exhauster. These gases continue through the exhauster into the stack which is located on the outside of the building.

The pipes are placed four in a row one above the other, there being 60 rows, making a total of 240 4-inch bent "U" pipes; these pipes are set in with a rust joint, in large cast iron plates which are placed on top of the cold and hot air ducts underneath the furnace. The "U" shape of the pipe as it spans from the cold to the hot air ducts allows for any excessive expansion or contraction which may take place. Both the exhauster and air fans are coupled together with an intermediate shaft using flexible couplings. On this shaft a pulley is mounted, pulley being belted to a motor and the whole driven as a unit.

In the coke oven gas line which is piped to the furnace an automatic valve is so arranged that should by chance the supply of cold air be interrupted in the "U" pipes, gas is automatically shut off, thus preventing the overheating of the pipes. There are several similar types of this furnace now in operation which are giving excellent results.

The hot air duct which leads from under the furnace, as before stated is located in the basement of the building annex, continuous into the threading building under ground and encircles it, making a complete loop.

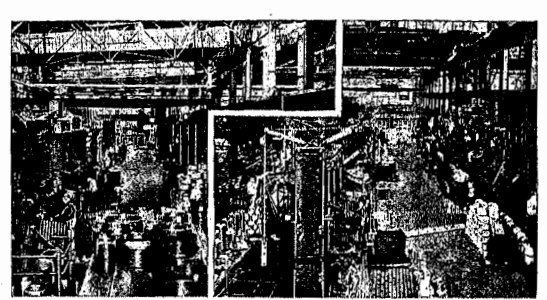


Fig. 2—Where couplings are made for Youngstown pipe.

Two small branches are led from the main duct to the floor in the corner of each building column which are spaced on 19 feet centers. Mounted on these branches are special designed castings giving an ejector effect, that is, as the hot air is forced out it creates a vacuum on the floor which draws in the cold air, causing diffusion of the hot and cold air throughout the building. This system produces a perfect circulation.

All engineering work on this installation was done by The Youngstown Sheet & Tube Co.

**SHEET MILLS OF REPUBLIC IRON & STEEL COMPANY.**

Completion early in 1921 of eight modern sheet mills at the Niles plant of the Republic Iron & Steel Co. will give that interest an annual productive capacity of 140,000 tons of blue annealed, black and galvanized sheets and roofing products. Under normal conditions, it is expected the entire complement of mills will produce 12,000 tons per month. The principal products of the Niles plant will be black and galvanized sheets, the blue annealed tonnage ranging from 16,000 to 18,000 tons per year. New units will be operated in preference to the old, after their completion, in case conditions do not justify operation of the whole.

The Niles plant was originally acquired by the Republic company from the old DeForest Sheet & Tinplate Co., which has since virtually gone out of existence. The property consisted of nine sheet mills and one jobbing mill, with a manufacturing site of 225 acres. The Republic company has effected many improvements to the old plant, including the installation of electrical equipment.