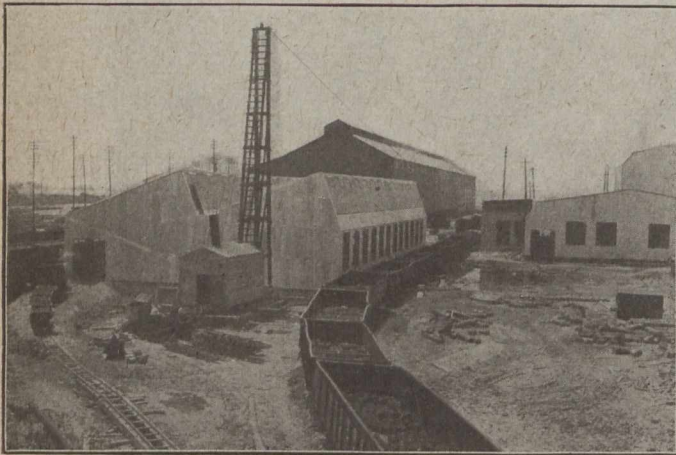


fuel-oil burner. The crane carries the ladle to the pit, where it is held in suspension over the ingot moulds. The operator manipulates the stopper in the bottom of the ladle and fills each mould in turn until the contents are discharged. Another method of pouring, which avoids splashing of molten metal, is to place 84 moulds on a steel car which moves to the required positions under the nozzle of the ladle. The shape of the moulds, the hot tops and the careful pouring of the metal insures the absence of piping, except in the top, or crop, end of the ingot. When the ingots cool to the required temperature, they are taken out of the moulds with one of the E.O.T. cranes or by a jib crane, and placed in a power link belt conveyor at the north side of the pit, which carries the ingots to a piling platform at the west end of the cutting and breaking shop, where they are arranged and piled in heats to await the result of the government analyses.

#### Cutting and Breaking Shop

The cutting and breaking shop is of timber, mill construction, two clear spans, each 30 ft. in width and 12 bays, each 16 ft. in length, with an extension on the east end 38 ft. by 108 ft. The roof is of the saw tooth type, to provide



CUTTING AND BREAKING SHOP NEARING COMPLETION—POWER HOUSE TO THE RIGHT, STEEL PLANT IN THE BACKGROUND

ample light, and, with the walls, is covered with galvanized corrugated iron. The whole building is supported on 10-in. x 10-in. sills resting on piles. The entire floor is covered with 3-in. birch planking.

The equipment consists of one breaking hammer, which is operated by compressed air at 100 lbs. per sq. inch pressure, and 18 cutting-off machines. There is also a large Ingersoll-Rand compressor supplying air for the pneumatic hoists suspended over each machine, and for the breaker.

After analyses have been taken, the billets are rolled on to a conveyor which carries them to tables placed against every machine. Each operator uses an air hoist to lift the ingot into the cutter, which makes a cut about 1 in. deep, ensuring a straight fracture at breaking. When the break is made the crop end falls down a chute and returns to the melting house. The billets, after leaving the breaker, roll onto another conveyor, which takes them through the building to the different inspection departments. Here they are again sorted into heats and inspected for piping, segregation and bad surfaces, etc. The accepted billets are rolled on to power conveyor running underground, which elevates and discharges on to the charging platform at the back or the north side of the heating furnaces in the forge shop, ready for heating and forging.

#### Forge Shop

The forge shop is a steel frame building with a centre span of 60 ft. and two side spans of 30 ft. each, making a total width of 120 ft. It is 300 ft. in length, in bays of 20 ft. The exterior walls are built of concrete and brick to 4 ft. above the ground, and filled in with steel sash and wired glass to the eaves. The roof is boarded and covered with

ready roofing. The building has a concrete foundation resting on piles. A mezzanine floor runs along the south side, 30 ft. in width and 15 ft. above the main floor. This is used as a machine shop for cutting and machining the test pieces, for a pattern storage room, offices and locker rooms. The east end of the forge shop is extended for a distance of 318 ft., being 80 ft. in width, of frame construction, built on mud sills, and is used for inspection and storage of the forgings.

The forge shop is equipped with six 500-ton presses, each press having a concrete foundation 9 ft. square x 10 ft. deep, resting on nine piles, each driven to refusal.

On the north side, are 13 continuous, oil-feed furnaces, capacity of 160 6-in. billets each. Each furnace is supported by concrete foundation 4 ft. thick, resting on 30 piles, also driven to refusal.

Three air blowers, which are connected to the furnace oil-burners, are located in the north-west corner of the building. The delivery from these blowers, at 12 ounces pressure, amounts to 14,000 cu. ft. per min. These blowers rest on concrete pedestals, which are supported by a concrete mat 12 ft. by 24 ft. by 18 in. in thickness, without piles.

Along the north side of the furnaces and slightly higher than the furnace bottom, is a charging platform of timber, frame construction, being 16 ft. in width, resting on mud sills. It is 300 ft. in length, with a link belt conveyor running along the north side close to the railway siding.

#### Forge Shop Operation

The billets, which for 6-in. shells weigh about 150 lbs., are received, in heats, on the charging platform, either from the conveyor or from the railway car alongside the platform. They are rolled into the furnaces by gravity, where they are heated to a forging heat. Passing out at the front of the furnace to an automatic raising and lowering gravity roller conveyor, they are fed to the dies on the presses, where they are punched, stamped and ejected. They are then gauged and placed on a conveyor, which takes them to the heat treatment beds, where they are treated according to the analysis of the steel. When cold, the forgings are taken to the east end of the building, in which is located the piling and inspection department.

Test pieces are cut out of a certain percentage of every heat. These pieces, after being machined to standard sizes required, are tested for elastic limit, ultimate tensile strength and elongation, by the government testing department. After the result of this test is known, they are passed over various gauges for length, concentricity, wall thickness, etc., and are fully inspected. The forgings that pass these tests are ready for shipment, while those that do not pass the test are delivered by conveyors to the heat treatment building.

#### Heat Treatment Building

The purpose of this department is to re-heat and cool in different particular manners, according to the nature of the physical failure of the forging in the above mentioned tests. This invariably results in the saving of shells that would otherwise have been scrapped.

The building is 77 ft. clear span in width and 180 ft. in length. It is of steel frame construction enclosed with corrugated iron, and rests on concrete and pile foundations. It is equipped with one large, car-bottom, heat-treatment, fuel-oil furnace, with two cars. (This allows one car to be filled while the other car is being treated). Each car holds 200 forgings standing on end. At each end of the furnace is suspended an iron plate cover, with louvre shutters, which can be lowered to cover the entire car, when it is necessary to cool the forgings very slowly. To the north of the furnace are two 5-unit, air-cooling machines, each equipped with two blowers, capable of delivering 500 cu. ft. of air per minute at a pressure of 12 ozs. per sq. in. The forgings are treated in this machine when it is necessary to cool them very rapidly.

After the forgings have gone through this process, they are again tested by the Government testing department, and,