the boiler room basement. Extension cord receptacles are also located at various places in the building.

All the large steam driven units are lubricated by a gravity pressure system, and all waste oil flows by gravity to a filter located in the pump pit from which it is again pumped to the overhead supply reservoir.

The pit arrangement is probably the most interesting of the power house details, and is shown completely in the accompanying illustrations. The several boilers all have 8 in. U bend steam connections from the top, connecting through openings in the fire wall with a 14 in. steam main along the fire wall over the pit. From this main, the several connections to the different power units lead off, all protected with magnesia coverings, which in addition to introducing an economy, add an attractive appearance to the piping. At the engine end of each of the connections, there is a separator. Near the centre of the room are two 6 in. steam legs with separators at the lower end, connecting with a 6 in. steam main just below the floor level, this main running the full length of the pit, supplying all the auxiliary equipment there located. At the east end of the upper main, there is a 10 in. steam leg with separator, connecting with a 10 in. main that runs through the tunnel down the midway, supplying steam for shop use, but principally for the steam hammers in the blacksmith shop.

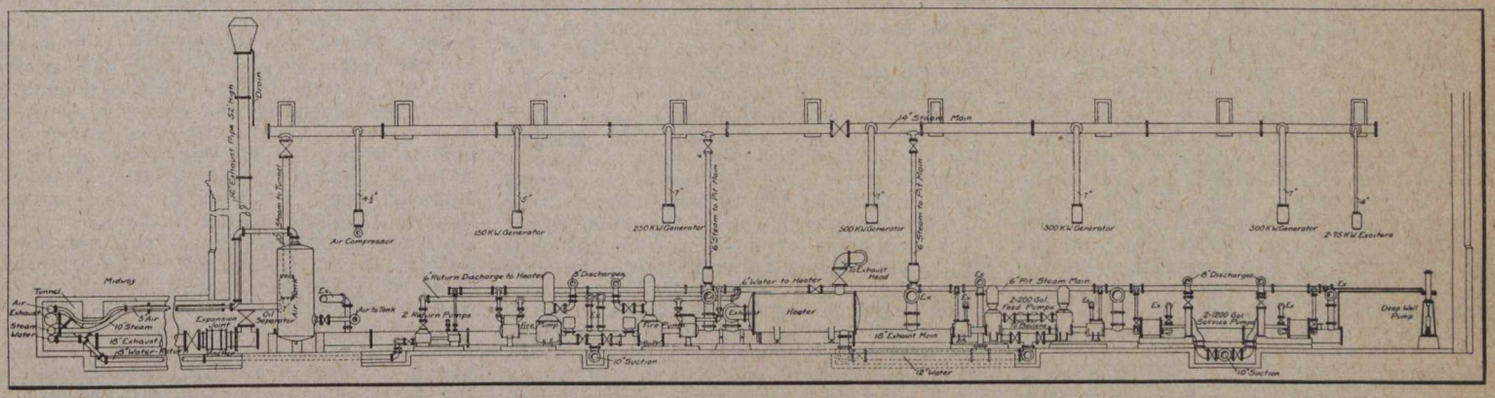
In addition to the electric generating apparatus in the engine room, there is a horizontal cross compound, Corliss, two stage air compressor having a capacity of 1,500 cu. ft. of free air per minute, at 80 to 100 lbs. per sq. in. pressure. The steam cylinders of the compressor are 16 and 25 ins. diameter, and the air cylinders, 24 and 14 ins., the stroke being 36 ins. Both air cylinders are fitted with Corliss inlet and poppet outlet valves. The speed is regulated by a combination speed and pressure governor, the normal speed being 90 r.p.m. Both air cylinders, heads and intercooler, are water cooled.

The exhausts from the different engines, all lead out from under the engines in shallow trenches under their respective engines, connecting with an 18 in. exhaust main at the bottom of the pit along the fire wall. All the buildings of the plant are heated by exhaust steam on the indirect fan system, as explained and described in the previously mentioned article. This main leads out through the front of the building into the distribution tunnel to all the buildings. At the front of the building, there is an oil separator to keep the heating system clean, and an anchor and expansion ring to take up all the linear expansion due to heat. Midway between the anchor and expansion joint, a vertical 16 in. pipe, 52 ft. high, leads up to an exhaust head on the roof of the building for atmospheric exhaust. There is a back pressure valve in the vertical pipe, which controls the pressure in the heating systems, also the back pressure in the engines; when the heating system is not required, it can be shut off, valves being located in the main just beyond the exhaust head connection.

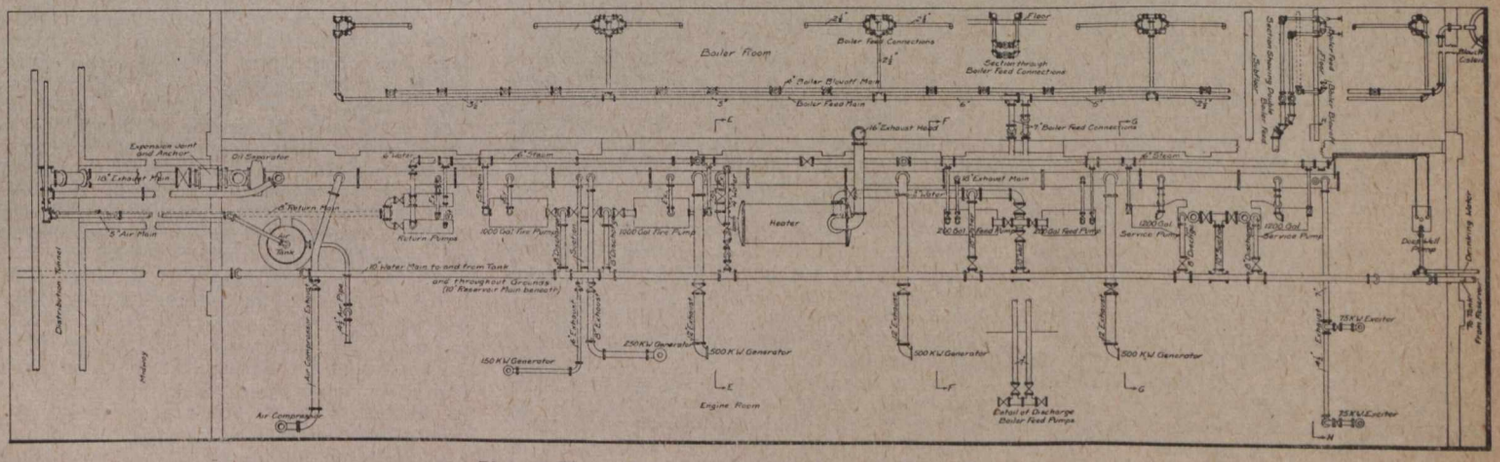
A feed water heater is located at a central point in the pit, one end connecting with the exhaust main, and the other leading on through an exhaust head similar o the one just mentioned. A valve is situated in the short connection from exhaust main to heater for cutting this out when necessary to clean the heater.

The water system is very complete. In order to obtain a soft water supply at the shop site, a pumping station was erected at the Red River. This station has suction pipes running out into deep water, connected to vertical triplex high speed pumps having a 24 hour capacity of 1,000,000 imp. gallons, direct connected through friction clutches with gas engines. There is a duplicate producer plant to ensure a continuity in the service. The water is conveyed the 6 miles to the shops through 6 in. wooden stave piping. At the shop site, some distance to the rear of the power house, the water is emptied into one end of a storage settling basin of a storage capacity of 2,000,000 imp. gallons. This reservoir is constructed of concrete, and is 60 by 270 ft., and 25 ft. deep, the top being slightly above the level of the ground. The reservoir is divided lengthwise by a reinforced concrete wall, the balance being of mass concrete. The dividing wall makes possible the use of one half of the reservoir for storage, while the other half is being cleaned, and vice versa, as the water from the river is full of sediment, requiring constant cleaning. The reservoir is roofed over with double planking supported on steel beams. Close up under the roof are hung a number of heating pipes, to prevent the water from freezing too thickly on top and interfering with the outlet pipes. The water is drawn off from the end opposite that for the entry, giving the sediment a good opportunity to settle.

From this reservoir, the water is drawn off through a 10 in. pipe, coming into the power house in a trench in the bottom of the pit along the engine room side of the auxiliary machinery pit. This main leads along the side of the pit through nearly its full length. Near the rear of the pit are two 1,200 gallon centrifugal service pumps, driven directly by two 70 h.p. Kerr turbines, drawing their water from a 10 in. suction pipe from the reservoir water main, and each delivering through an 8 in. discharge pipe into a 10 in. water main near the top of the pit on a level with the engine room floor, on the same wall of the pit as the reservoir water main. This upper water main connects at the rear, or west end, of the building with a 100,000 imp. gallon steel



Cross Section through Pit, looking towards Fire Wall.



Plan of Piping Arrangement in Engine and Boiler Rooms.