

Engineering for Education

New Isolated Plant Supplies Light, Heat and Power to D.S.H.S.; Transmission Lines Carried 590 Ft. Through Underground Tunnel

The following article describing the power and heating plant of the Deerfield-Shields High School was published in the March issue of "Power Plant Engineering."

Due to the ever increasing demand for education, community growth is, as a rule, bound to be accompanied by increased local educational facilities, and as the smaller towns and even villages do by no means suffer from a lack of schools of the primary and secondary grades, so we find but few of our larger cities which do not have their universities and other institutions of advanced learning. This is particularly

ing engine room, with the floor line of the latter about 14 ft. above that of the boiler room. It is a fireproof structure of steel, concrete and brick, having overall dimensions of approximately 50x74 ft., and with both exterior and interior architectural features of plain but pleasing appearance. Outside walls are faced with rough red brick, while the interior walls of the engine room, except a 6-ft. wainscoting which is of a tan color, are painted a light cream. The same color scheme is employed in the boiler room, although here, in order to neutralize the effect of the coal and ash dust bound to find

the fuel directly into the bin below. From here the coal is shoveled into one ton cars which, after being weighed on a 3000-lb. beam scale, is placed in front of the boilers with in easy reach of the fireman. Trucks and wagons before being dumped, are also weighed, a five-ton scale having been provided for the purpose.

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40 to 50 lb. gage. Service is through a 3-in. line with connections such as will allow this water to be fed directly to the boilers, to an open feed water heater rated at 700 hp. or to an overhead hot well, a steel tank having dimensions of 5 by 8 ft. and located directly above the boiler feed pumps as indicated in Fig. 3. The line connecting with the hot well is tied in with a 4 1/2-in. main which carries the discharges from the two vacuum pumps placed to the right of the heater.

With the scheme of connections employed, the water flows by gravity to the heater, from where, after it has attained the desired temperature, it is delivered to the boilers by means of either one of two 7 by 4 1/2 by 8-in. duplex pumps, having 4-in. suction and 3-in. discharge connections. Control of pumps and regulation of feed is done entirely by hand.

Steam leaves the boilers through 6-in. connections tying in with a 10-in. header, which in turn is joined to a 9-in. riser feeding a main distribution header of like size. At a

separate supply line, 2 1/2 in. in diameter, and may exhaust either directly into the heater or the heating main. The engine exhaust, a 6-in. line, connects directly with the 3-in. heating main.

In the Engine Room Shows in Fig. 1 is an interior view

Steam Distribution
Under normal conditions, as stated above, exhaust steam is used for heating purposes. That coming from the engine, after passing through an oil separator, is discharged into the 3-in. main connecting with the heating system and provided with two

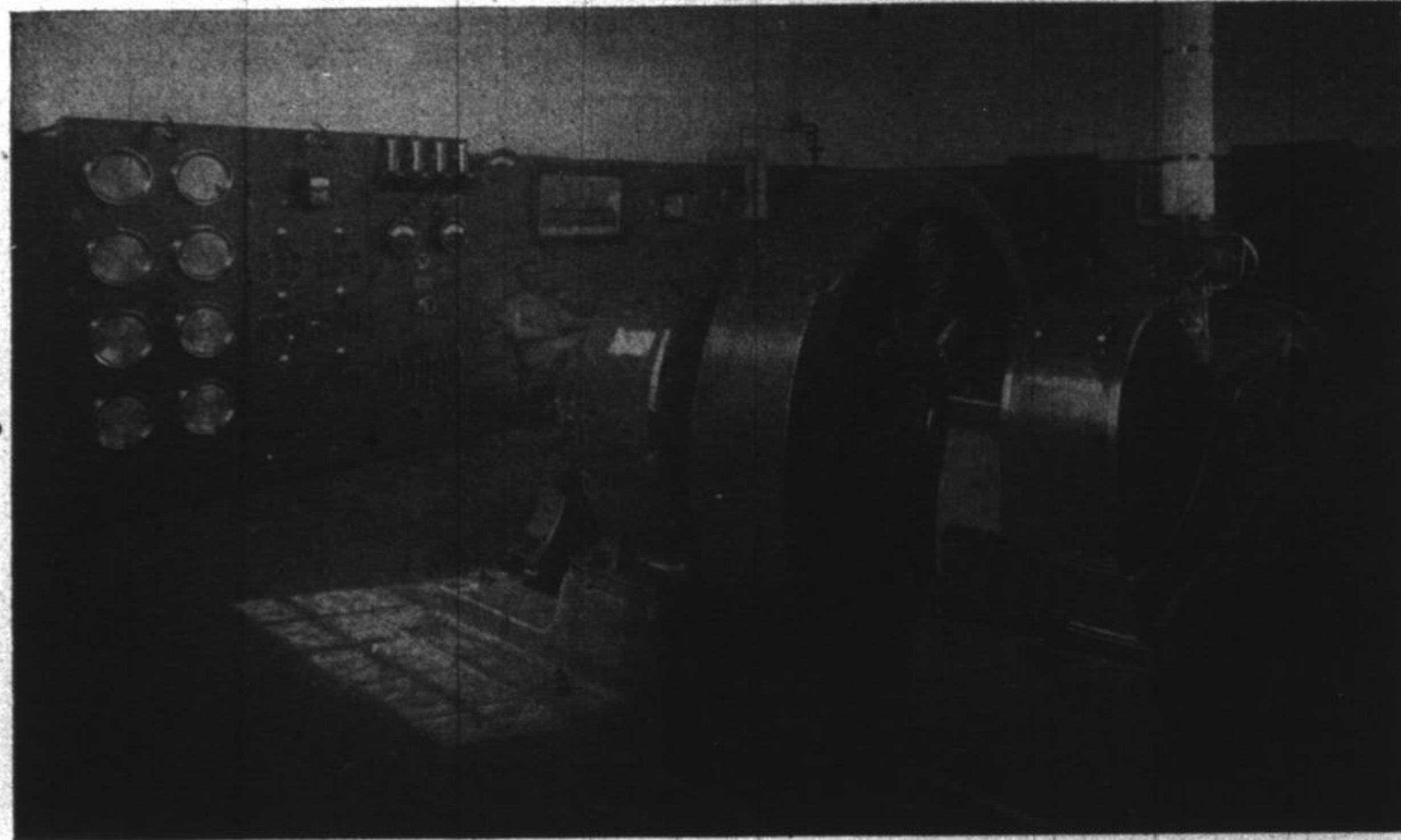


FIG. 1. INTERIOR OF ENGINE ROOM, DEERFIELD-SHIELDS TOWNSHIPS HIGH SCHOOL

true of the more densely settled centers of population, and even here the outlying suburbs are not prone to depend upon the city for the education of their young, but provide schools and academies which in many instances offer courses of study comparable to those offered by the institutions of the neighboring metropolis.

As a typical instance we may cite the case of the Deerfield and Shields Townships, Lake County, Ill., which

lodging on such surfaces, side walls for a height of about 6 ft., boiler setting walls and pipe covering have been made a dark green; the metal work, such as stairs, railings, and exposed pipe fittings, is in black.

A noticeable and valuable feature is the excellent degree of natural illumination available, provided by means of large windows placed in all outside walls of both boiler and engine rooms.

boilers which provide this are two in number, each of water tube type, having a rated capacity of 271 hp. under a normal working pressure of 80 lb. gage. They are set in a single battery and are provided with

point near the wall separating boiler and engine rooms, this header is divided, one branch of 6-in. being carried into the engine room, while the other, 8 in. in diameter, through the medium of a pressure reducing



FIG. 2. GENERAL VIEW OF BOILER ROOM

although within half an hour's ride of Chicago, have at Highland Park one of the most modern and fully equipped schools in the middle west. This school, known as the Deerfield-Shields Townships High School, consists of five distinct buildings, two devoted to class rooms, one to the gymnasium, one to the industrial arts and sciences, while a fifth, set back somewhat from the

Steam-Making Equipment

Due to placing the power house on a decided slope of ground, and the general arrangement of building employed, the coal storage and handling question resolved itself into a comparatively simple problem. By means of an extension of the boiler room foundations, a distance of approximately 26 ft., and providing a suit-

able covering fitted with eight 1-ft. 10-in. coal holes, a storage bin having a capacity of about 300 tons of coal was provided. Wagons and trucks delivering this fuel are, due to the fact that the top of the bin is at the same elevation as the roadway, capable of driving directly over one of the coal holes and discharging

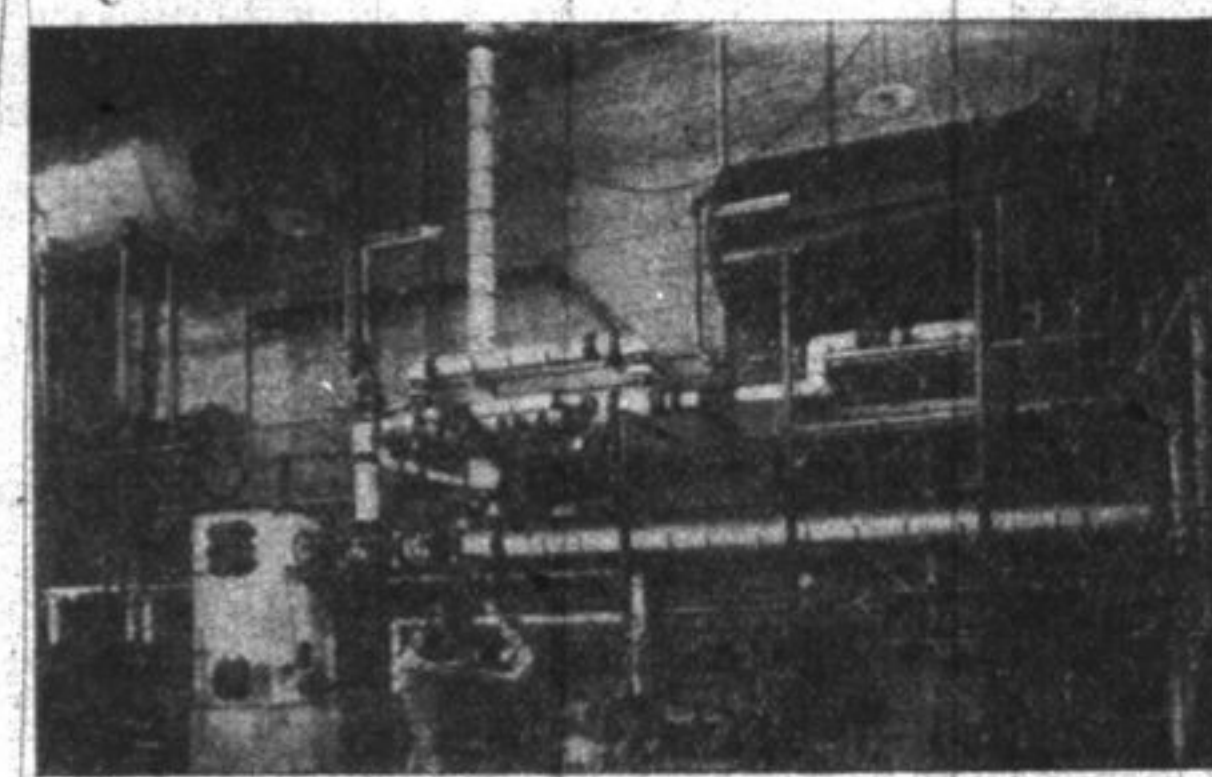


FIG. 3. VIEW IN BOILER ROOM SHOWING HOT WELL, HEATERS, AND BOILER FEED AND VACUUM PUMPS

group formed by the others, is the power house, used to serve the institution with electric energy, steam, hot water and air.

As will be noted by references to Figs. 4 and 6, the building housing the steam and power generating equipment and auxiliary apparatus comprises a boiler room and adjoin-

ing engine room, with the floor line of the latter about 14 ft. above that of the boiler room. It is a fireproof structure of steel, concrete and brick, having overall dimensions of approximately 50x74 ft., and with both exterior and interior architectural features of plain but pleasing appearance. Outside walls are faced with rough red brick, while the interior walls of the engine room, except a 6-ft. wainscoting which is of a tan color, are painted a light cream. The same color scheme is employed in the boiler room, although here, in order to neutralize the effect of the coal and ash dust bound to find

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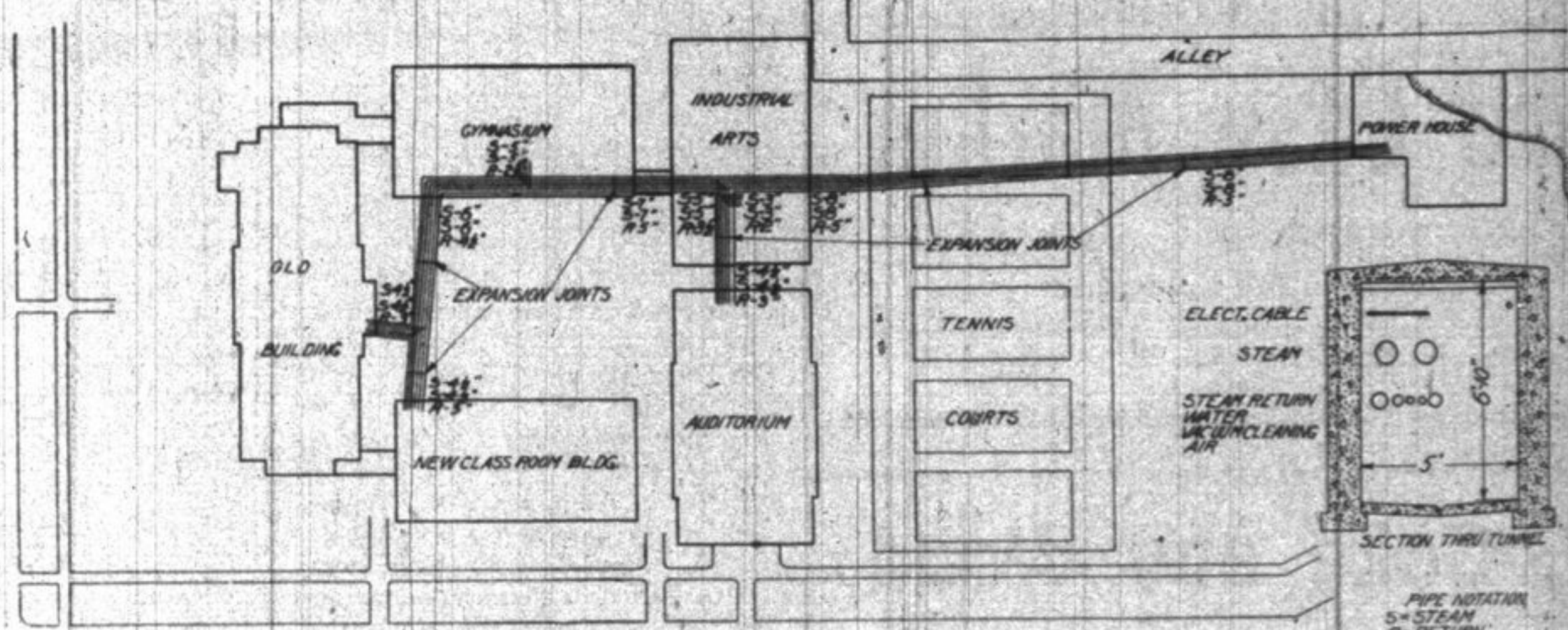


FIG. 5. GENERAL LAYOUT OF BUILDINGS AND TUNNEL SYSTEM

uptakes which connect with a common sheet metal breeching at the rear and tapering in section from about 3 by 4 1/2 ft. to approximately 6 by 4 1/2 ft. at the stack, thus allowing nearly 33 sq. in. of breeching

valve and the bypass arrangement shown in Fig. 6, joins the main exhaust line leading to the various buildings. By this means it is possible to supply live steam to the heating system in the event the en-

4 x 8-in. simplex steam driven air pump and receiver used to supply air at a pressure of 15 lb. gage for the operation of the ventilator dampers in the various school buildings. The steam supplied to this pump is under

the lower ends of which are fitted with cross pieces made of pipe, while not provided a rolling bearing reduce to a minimum the resistance offered by any longitudinal movement of the piping caused by expansion

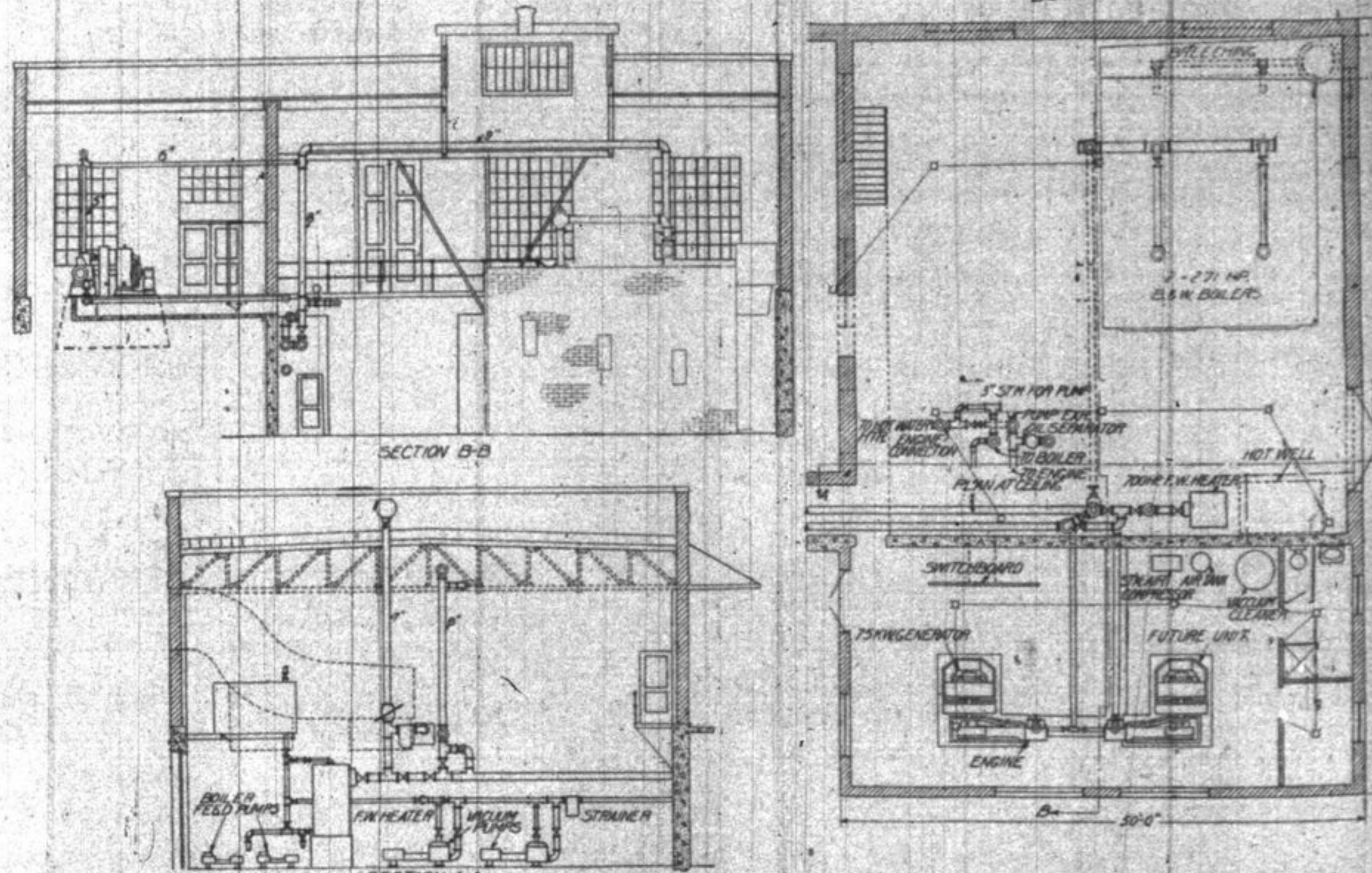


FIG. 6. PLAN AND ELEVATION OF POWER HOUSE

section per rated boiler horsepower. The stack, a structure of radial brick, has an internal diameter of 6 ft. and a height of 150 ft.

Boiler makeup is taken from the local city mains at a pressure of from

one or more of the pumps are in operation, or should the supply of exhaust be insufficient to meet the demand such as may arise during severe winter weather.

The pumps receive steam through

automatic control, the air in the tank acting on a diaphragm valve which as soon as the pressure drops to 14 lb., opens and allows the pump to take steam; with a pressure rise to 15 lb., the steam is cut off.

and contraction. Each of the lines is, in addition, fitted with a type expansion joint, one of which is inserted about every 125 ft.

The tunnel, as may be seen in

(Continued on Page Seven)

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