POWER

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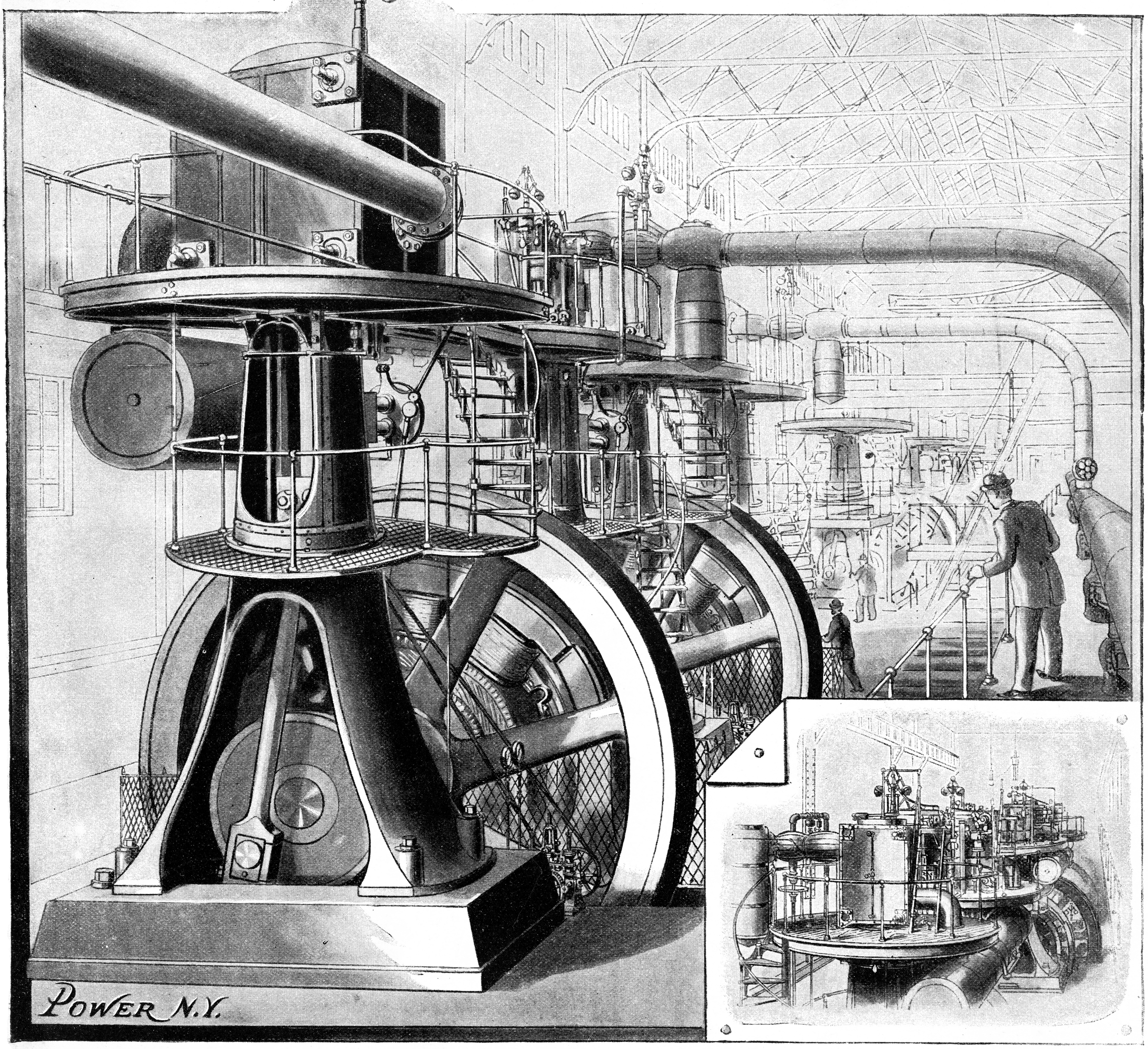
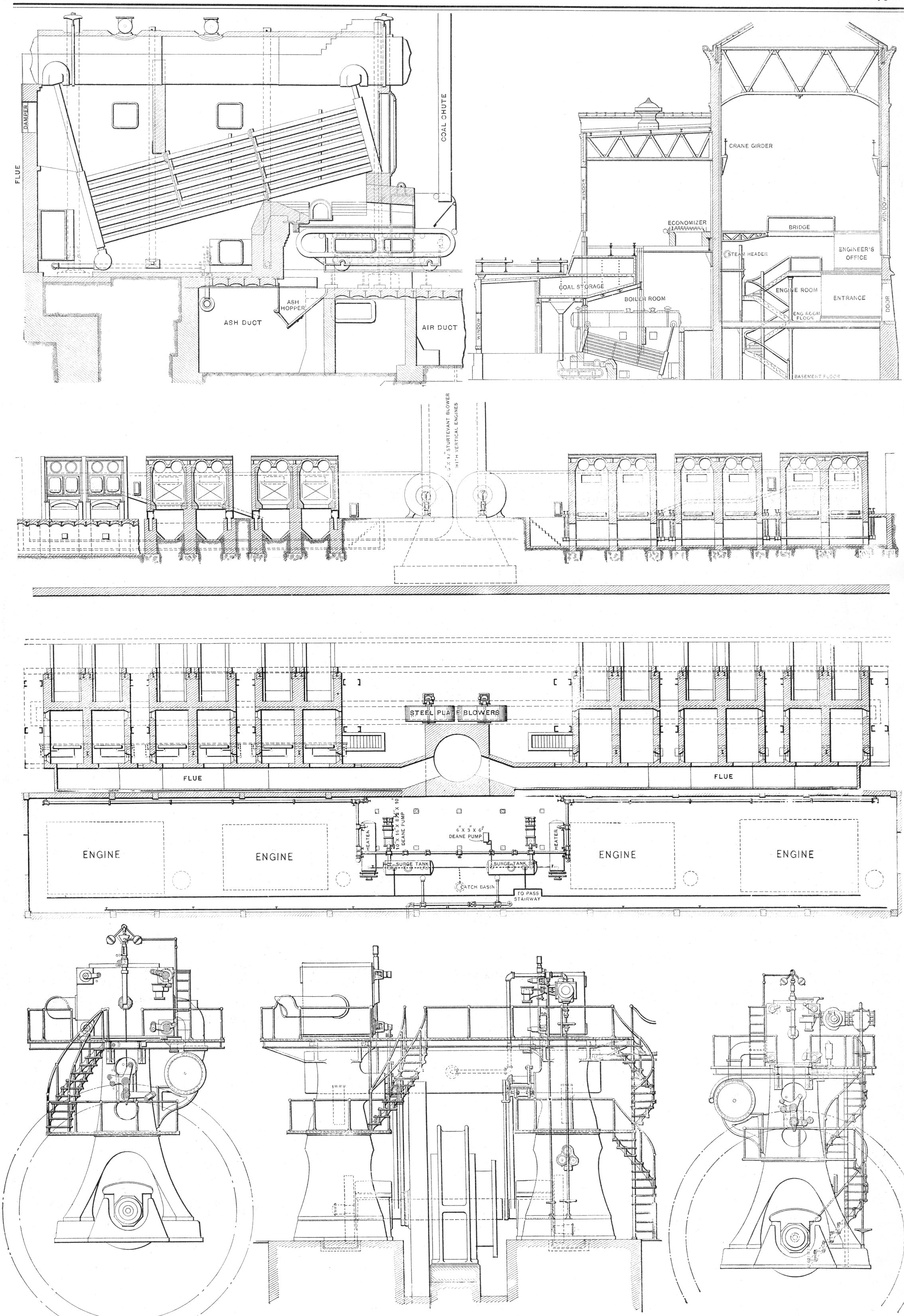
The Chicago Metropolitan West Side Electric Elevated R. R. Station.

The accompanying illustrations are descriptive of the station erected to drive the electric elevated road in Chicago. This is the first permanent elevated road to be operated by electricity and is operated by the Metropolitan West Side Elevated Railroad Company. The station as at present constituted contains about 6,000 horse-power of Allis vertical engines and Babcock & Wilcox boilers, and is capable of enlargement by extension at either end. Coal is brought to the station by cars on elevated tracks and is delivered to the tank below as shown in the drawings on the next page. From this tank it flows as required through chutes to hoppers on the furnace fronts, from which it is automatically stoked in a furnace built by the Babcock & Wilcox Company which is shown in detail upon page 3. A chain grate, carried upon sprocket shafts at the front and back is kept in motion by the worm gear upon the axle of the front shaft. The shaft carrying the worm receives its motion through a ratchet wheel operated by a pawl on a reciprocating arm. The amount of movement of this arm and consequently the rate of travel of the grate can be adjusted by varying the distance of the point of attachment of the eccentric rod to the reciprocating arm in an obvious manner. The aperture between the hopper and the furnace is regulated by an adjustable plate, shown in position in A. On the other side of the furnace shown at B is the simple mechanism for operating this plate consisting simply of a worm carried on a shaft rotated by a key crank, the worm engaging with a segment upon the shaft which carries the arms from which the plate is suspended. The coal is carried into the furnace from the hopper by the movement of the grate, and the height of the opening determines the



ENGINE ROOM OF THE METROPOLITAN WEST SIDE ELECTRIC ELEVATED RAILROAD STATION, CHICAGO, ILL.

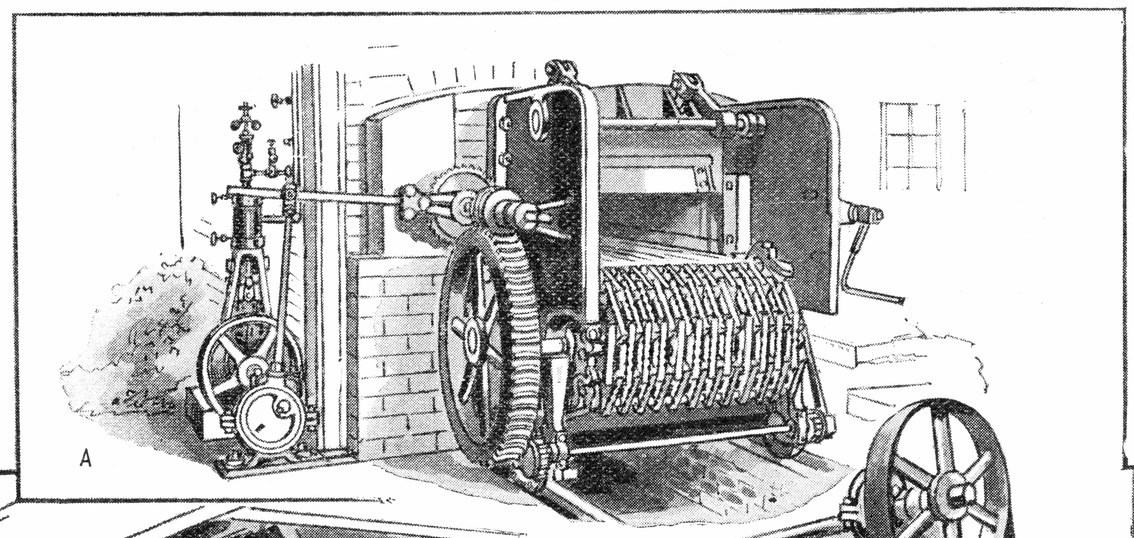

DAMPER
FLUE
COAL CHUTE
ASH HOPPER
ASH DUCT
AIR DUCT
WINDOW
COAL STORAGE
BOILER ROOM
CRANE GIRDER
ECONOMIZER
BRIDGE
STEAM HEADER
ENGINEER'S OFFICE
ENGINE ROOM
ENTRANCE
ENG ROOM FLOOR
DOOR
BASEMENT FLOOR
36" X 12" STURTEVANT BLOWER WITH VERTICAL ENGINES
STEEL PLATE BLOWERS
FLUE
FLUE
ENGINE
ENGINE
ENGINE
ENGINE
HEATER
10" X 16" X 8½" X 10" DEANE PUMP
6" X 3" X 6" DEANE PUMP
HEATER
SURGE TANK
SURGE TANK
CATCH BASIN
TO PASS STAIRWAY

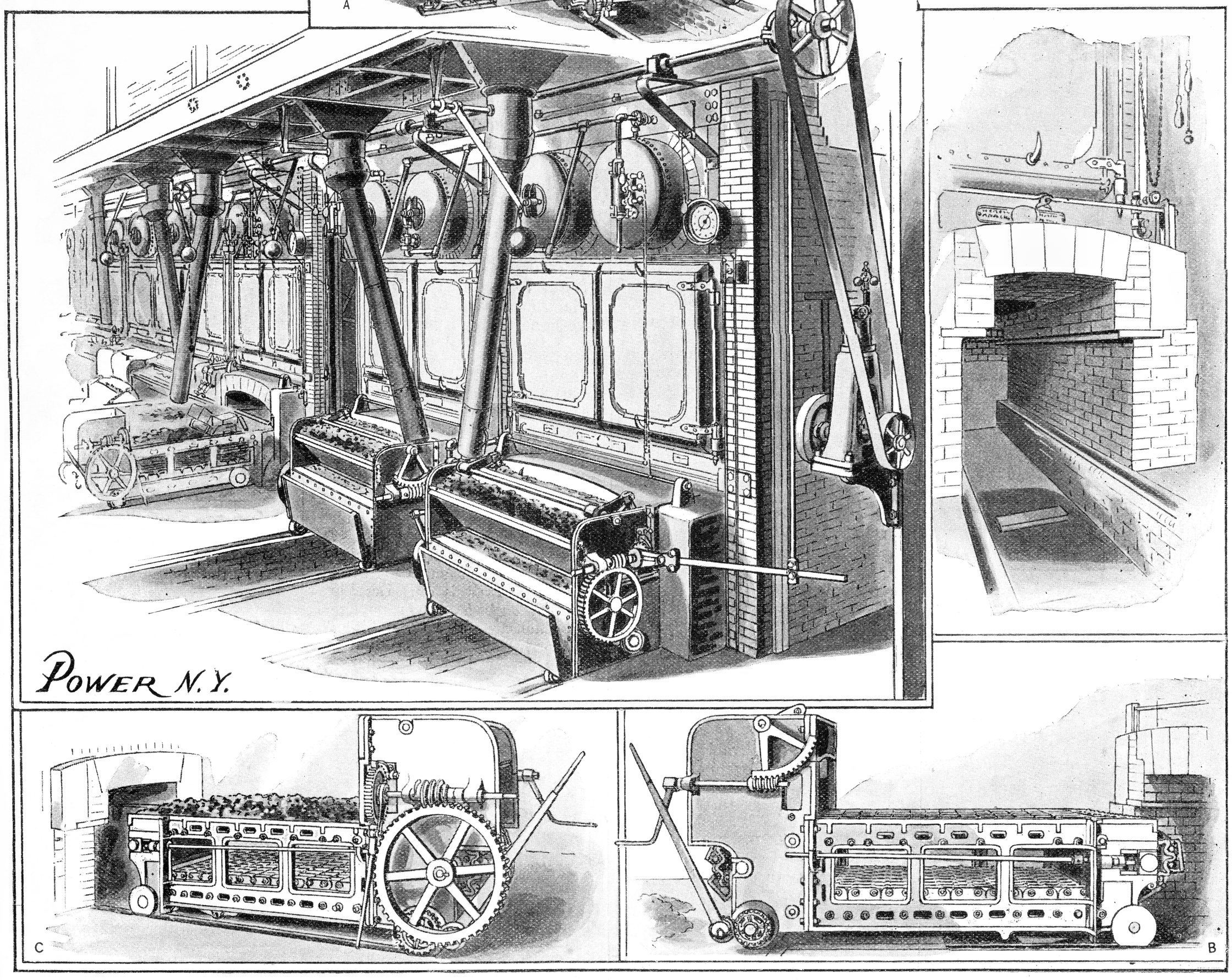
thickness of the fire. The stoker and grate are self-contained, have no connection with the setting and may be run out from the furnace with the fire burning on the grate as shown at C. This is done by means of the wrench and pair of pinions best seen at B, in front, the larger pinion being upon the face of one of the trucks which carries the front end of the stoker. By rotating the side rods shown in both B and C the boxes in which the back shaft is journaled are carried toward or from the center, loosening or tightening the grate. By the time the coal reaches the back end of the furnace it is reduced to ashes and dumps over the back end of the grate into a closed ash-pit as shown in the outline drawing. At intervals slides in these ash-pits are opened, allowing the contents to discharge into a screw conveyer which carries them to the boot of a bucket elevator by which they are taken to cars on the same tracks over which the coal is brought. The conveying and elevating machinery is furnished by the Link Belt Machinery Co., of Chicago. Draft is furnished by two Sturtevant blowers 8 feet in diameter run by Sturtevant engines at an average speed of 185 revolutions per minute. The air is delivered to a passage running beneath the boilers as indicated in the outline, and discharged through ducts in the setting into the space between the upper and lower portions of the grate, whence it is constrained to pass for the most part, through the fire, a small amount finding its way around the back end of the grate, and mingling with the products of combustion at the bridge wall. Notwithstanding the cheap grade of fuel used the combustion is practically smokeless. There are at present installed twelve 250 horse-power Babcock & Wilcox boilers each containing 2,789 square feet of heating surface and set in batteries of two boilers each, three batteries on each side of the stack, which is in the center of the station. On both sides of the central line the station is a duplicate both as regards engines and boilers, as will be seen from the plan. The six boilers on each side of the stack will eventually discharge their gases through a Greene economizer of 600 tubes having an aggregate heating surface for each economizer of 6,000 square feet. The stack is of steel 150 feet in height, and 12 feet diameter inside of the brick lining. Risers from the boilers conduct the steam to an 18 inch main header, extending along the engine room side of the wall between the engine and boiler houses. Access to this pipe is afforded for its entire length by a gallery as shown at the right in the front page view. This main is of heavy cast iron. It is 200 feet in length and expansion is provided for by a U of wrought iron pipe into the construction of which A. F. Nagle, M.E., the consulting engineer of the station, has aptly introduced some corrugations at the foot of the risers to add to the flexibility and lessen the side strain. From the main the supply pipes reach to the high pressure cylinders of the several engines by easy copper curves as shown in the front page view. The station stands between the outgoing and incoming tracks, and thus is of necessity long and narrow, its width being but 90 feet with a present length of 300. Of this 90 feet the engine room occupies but 39. The engines are Reynolds-Corliss vertical compounds, carrying General Electric armatures directly on their main shafts. The valves are double ported and each cylinder is fitted with the Reynolds gear which allows cutting off at any point up to three-quarter stroke. The cut-off on both high and low pressure cylinders may be put under the control of the governor or the cut-off on the low pressure cylinders may be made positive at any desired point in the stroke. An extra or emergency governor is applied to each engine, its function being to close a butterfly valve in the main steam pipe in case of undue acceleration.

Of these engines four in two sizes have been installed, the principle dimensions being as follows:

	Large.	Small.
Diam. high pressure cylinder	36	23
Diam. low pressure cylinder	72	46
Stroke	48	48
Cylinder ratio	4	4
Revolutions per minute	75	100
Piston speed	600	800
Main shaft diameter	24	21
Main shaft in journals	23	18
Crank pin diameter	10	6½
Crank pin length	10	6½
Fly wheels diameter	24	18
Rim section	21X20	17X17
Weight of fly-wheel	70 tons	35 tons
Rim speed	94.25	94 25

The receivers are supported on the engine frame as shown by the drawings. A Stratton separator is attached to the steam pipe leading to each engine, and each engine is to be provided with the Seagrist system of oil distribution for both the cylinders and bearing surfaces. The pump which operates the system is shown just within the base of the engine in the main view, and the system is further described on page 10. The station is located about a mile and a quarter away from the Chicago river, but with characteristic Chicago enterprise the engineers have set to work to bring water to the station for condensing purposes. It has been the policy of the road to purchase its own right of way, and through this right of way they will construct a tunnel of ample size to bring to the station all the water it can require for condensing purposes.





BOILER ROOM AND MECHANICAL STOKERS METROPOLITAN ELEVATED ELECTRIC RAILROAD STATION.