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THE DRIVEN WELL SYSTEM OF THE BROOKLYN WATER WORKS.

The method of obtaining an additional supply of water for the city of Brooklyn, N. Y., by means of driven wells, has attracted widespread attention because of the originality and boldness of the plans and the perfect success attained; and not only is the same system applicable in the case of other large cities similarly in need of more water, but it is particularly adapted for small towns near which there is no stream of sufficient size to furnish all the water required.

A town unprovided with water works can obtain its supply from driven wells, and an immense aggregate quantity of water can thus be obtained in thickly peopled districts from a comparatively small ground area. But the position of these wells in relation to each other would of course vary with the needs of the owners, and a systematic distribution would be impossible. But if we think of these wells as being arranged in regular order, at certain distances apart along a line extending at right angles to the flow of the underground streams, each one being connected with a large collecting pipe leading to a powerful pump, we shall have an accurate conception of the Andrews system as now in operation in Brooklyn. In an early issue of the SCIENTIFIC AMERICAN we shall describe this system more in detail.

At the Clear Stream pumping station there are 152 driven wells, 2 inches in diameter, arranged in pairs 18 feet apart. This makes two lines of wells, parallel with and between which is the collecting main, 16 inches in diameter. The top of each well tube is connected with the main by a 3 inch pipe; and in each connecting pipe is a valve by which any of the wells can be shut off. Located at the center of the collecting main, which is 1,368 feet long, is the engine house, the interior of which is shown below.

It is apparent that, in the establishment of any such system of water supply, it is of the highest importance that all the material which goes to make up the working plant shall be of the most efficient and thoroughly reliable character, and, with this end in view, the officers of the Brooklyn government contracted for the working of the Andrews system with the Knowles pumping engines. A good view of the plant in one of the stations is given on this page. There are two compound, crank and fly-wheel, duplex condensing pumping engines. The engines were put in under a guarantee to deliver 10,000,000 gallons each 24 hours, but their actual pumping capacity is much in excess of this, since they have delivered 14,000,000 gallons and over during many successive days. The economical duty of these engines is between 80,000,000 and 90,000,000 foot pounds per 100 pounds coal under ordinary working conditions.

The pumping engines are provided with automatic cut-off valve gear of the most approved type, using steam pressure of 90 pounds per square inch. The steam cylinders are arranged on the cross compound plan—that is to say, in each engine, the high pressure cylinder works one water pump and the low pressure cylinder works the other. The pump cylinders are directly connected with the back ends of the steam cylinders. The steam, after having been used in the high pressure cylinder, is carried over to the low pressure cylinder, where it is used a second time before going to the condenser. An intermediate receiver is placed on the pipe between the high and the low pressure cylinder.

The water cylinders have inside packed pistons. The valve area is exceptionally large, so as to admit of a very great quantity of water being pumped with minimum amount of friction. The suction valves are placed below the pump barrel and the discharge valves above, thereby giving the most direct course to the water as it passes through the pumps from the wells to the aqueduct. The suction and discharge pipes for each pumping engine are 20 inches diameter, the suction pipe, of course, leading to the collecting main of the wells, and the discharge pipe extending to the conduit running to the city.

Owing to the admirable design of these engines, they are able to lift water from the greatest possible depth, a vacuum of 26 to 27 inches being readily obtained.

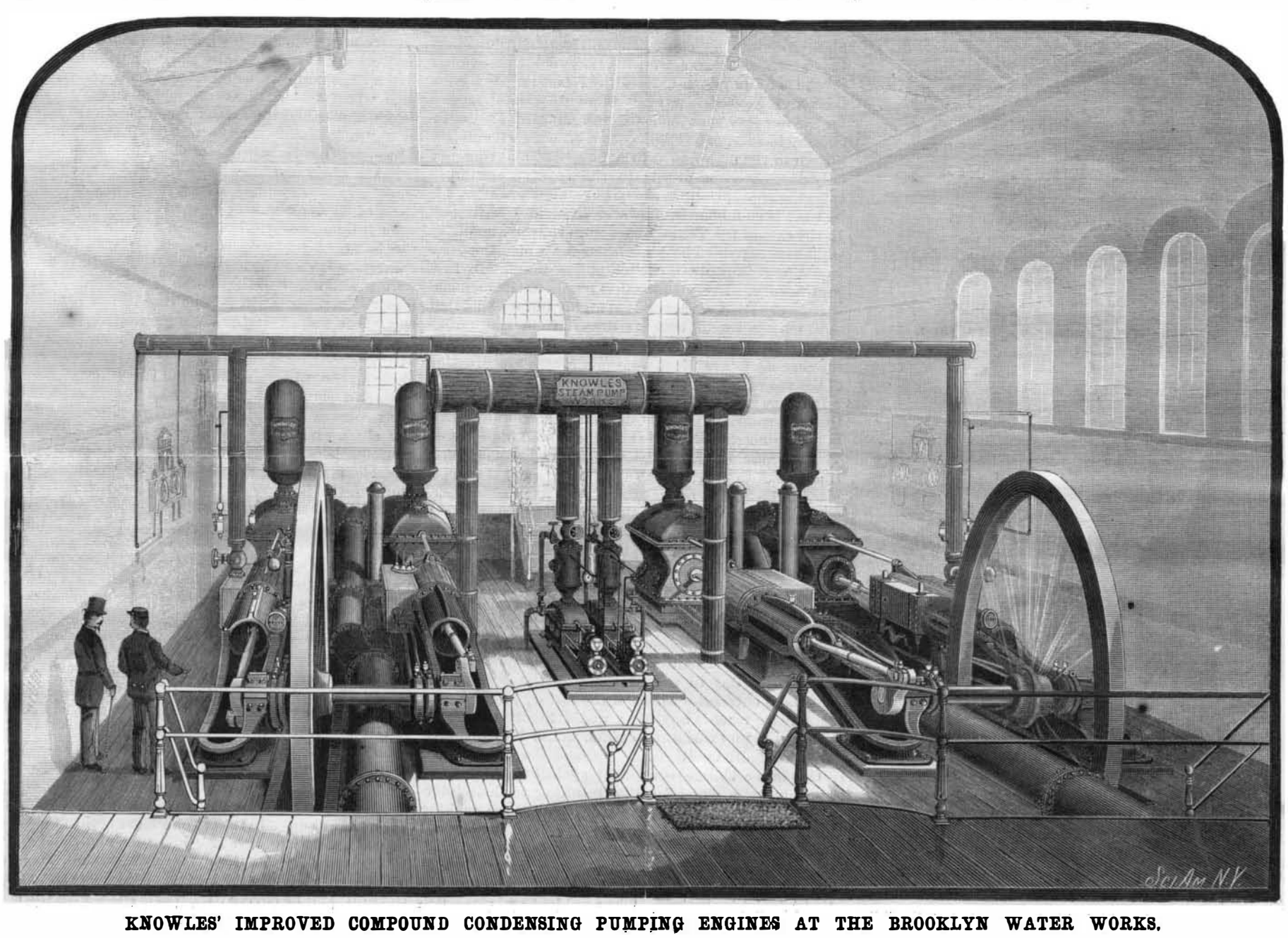
The air pumps for the condensers are of novel construction. They are arranged on the independent system, and are provided with double pump cylinders.

The leg pipe of the condenser goes into one pump, and the air pipe from the condenser goes into the other pump, thereby discharging all the water into one pump and the air into the other; sufficient water is taken in the air cylinder to supply the hot well, by that means securing a higher temperature of water to feed the boilers than would be obtained by the usual design of air pump.

As shown by the engraving, the exhaust steam from each engine passes through an overhead heater, and enters the condensers and air pump shown in the center of the room. The advantage of the independent air pump is that a vacuum can be readily secured for the engines before they are started.

The heater, steam pipes, and steam cylinders are handsomely lagged with black walnut, bound with polished brass bands. The valve seats, piston rods, and water piston are made of gun metal composition, thereby insuring great durability. The cylinders are also lined with composition.

This is the fourth compound pumping outfit supplied for the city of Brooklyn by the Knowles Steam Pump Works, making in all eight compound pumping engines, with their boilers and connections complete. The water works authorities are so well pleased with the performance of these engines that they have specified the same class of engine for a proposed further extension of the water supply.



KNOWLES' IMPROVED COMPOUND CONDENSING PUMPING ENGINES AT THE BROOKLYN WATER WORKS.