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IMPROVED PUMPING ENGINE FOR WATER WORKS.

We illustrate herewith one of the smaller sizes of an improved duplex pumping engine for water works, manufactured by Messrs. Dean Brothers, of Indianapolis, Ind. The steam cylinders are 16 inches in diameter. water cylinders 10 inches in diameter, and the stroke 16 is inches. The machine is capable, we are informed, of delivering 1,000,000 gallons in 24 hours; or when connections are made with hose to different hydrants, it will throw four 1¼ inches streams to a hight of 130 feet, which is sufficient for towns with from 5,000 to 8,000 inhabitants. The manufacturers construct much larger engines of the same description, capable of de livering 6 000,000 gallons in 24 hours, or throwing twelve fire streams from the mains, all working equally well in connection with the reservoir, the standpipe, or the direct pressure system of supply. Steam is used expansively, and the larger engines are provided with adjustable cut-offs. The crank shafts are connected together by a coupling, and the cranks are set at right angles to each other, so that they may run very slow without stopping, or may maintain a high speed without injury. All bearings have large areas, and have means of adjustment in case of wear; the water cylinders are lined with copper; the valve seats are made of gun metal with noiseless rubber valves, and the larger sizes of pumps have hand holes for examining or removing the valves. The piston rods are of steel, and the water piston rods are covered with brass. The crank shafts are made of hammered iron, the crank pins of steel, and the cranks of cold blast charcoal iron. Every part is made of the best material, carefully fitted. All the pipes are carried under the floor, as shown. The steam supply pipe is carried into the bottom side of the steam chest, and the exhaust pipe leads down between the pumps. The suction pipe, which is brought up between the water cylinders, has a vacuum chamber attached, which is represented between the wheels.

All the pipes being out of sight gives the engine room a very neat appearance and insures a dry floor. In front of the steam cylinders are three throttle valve stands, the center one is for running the pumps duplex, the others are for running them separately.

An important feature of this duplex pump is that it may be converted into two single pumps by uncoupling the crank shaft, which can be done very quickly. By closing the valves on one pump, the other may be run alone. This is a point of considerable advantage, especially where direct pressure is used, as the supply would be interrupted if the engine were stopped for a few minutes, and a fire might occur at the very time the engine is at rest.

We learn that this machinery has been in constant operation at Union City, Ind., night and day, for over two years, without stopping, and has never cost a dollar for repairs. The supply is there kept up by pumping directly into the mains, and in case of fire the hose is attached to the hydrants.

The following cities are also using the duplex pumping engines, which furnish the entire supply of water for fire and domestic purposes: Peoria, Ill.; Alton, Ill.; Charleston, Ill.; Brazil, Ind.; Attica, Ind. It is claimed that the engines in Peoria are showing a saving of 35 per cent in fuel over the machines previously used. And in all the other cities the machines are working with great economy, no fire engines being employed, the hose being attached directly to the hydrants. The manufacturers (whose address is at junction of Delaware street and Madison avenue, Indianapolis, Ind.), also make an excellent variety of steam pumps for general purposes.

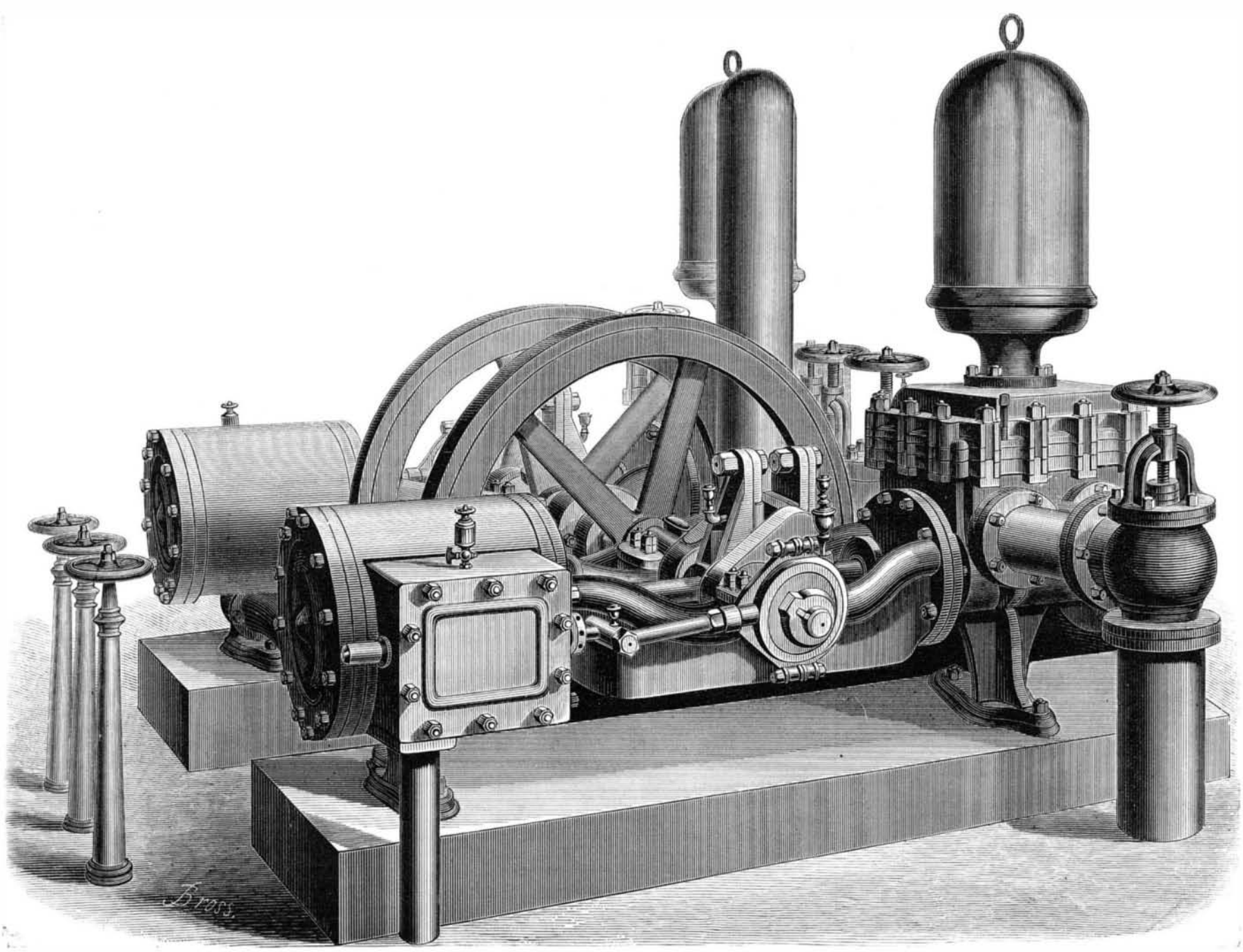
Are Nitrites in Water Caused by Bacteria?

It has generally been supposed that, wherever nitrites were found in spring or well water, they were formed by the oxidation of the ammonia. Mensel has recently proved that, in many cases at least, the nitrates were converted into nitrites through the action of bacteria. The following facts sustain this theory: Well water containing no ammonia, and, when fresh, no nitrites, but some bacteria, after standing a fortnight gave the reaction for nitrites. In this case, the nitrates were the only nitrogenous compounds in the water when it was fresh. Salicylic, carbolic, and benzoic acids, alum and table salt, in short all antiseptics and antizymotics, hinder or retard the formation of nitrites. Water containing nitrates, did not, in the presence of bacteria, produce nitrites; they appeared in from 2 to 14 days after adding some carbohydrate, as sugar, gum, or starch. A few other carbonaceous compounds convert nitrates into nitrites, but slowly and weakly. Antiseptics stop this decomposition.

Freshly distilled water, boiled with sugar and saltpeter, and sealed up while boiling, contained no nitrites after standing for weeks, because no putrefaction can take place without bacteria. Putrefying albuminous substances, brought into contact with nitrates, yield nitrites.

We do not get a correct view of the decomposition going on in wells rich in saltpeter until we look upon the nitrous acid as the direct product of decomposition. The decomposition of cellulose by means of bacteria, in the presence of nitrates, proves that saltpeter is not only direct food for the plant, but, owing to the oxygen in it, performs an important function in the soil. The decomposition process above described is a very extensive one, and elucidates the decay of plants, as well as many other operations in factories. The alkaline nitrates by themselves are not so easily reduced; and if, nevertheless, the microzoa employ their combined oxygen for oxidation, there is an important difficulty in regard to the power of bacteria, because on the one hand they produce oxidation, on the other they deoxidize.

This fact may lead to a new method of combating diseases which are related to bacterian organisms.



DEAN BROTHERS' PUMPING ENGINE FOR WATER WORKS.