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AN IMMENSE VACUUM PAN FOR SUGAR MAKING.

The representation herewith shows probably the largest vacuum pan ever built, recently constructed by Robert Deeley & Co., at their works, foot of West 32d St., New York city, for the California Sugar Refinery, San Francisco, Cal., Claus Spreckles, president. The body of the pan is of iron, 1½ inches thick, there being four perpendicular sections, two dome-like sections at the top, and one bottom section, all accurately and carefully fitted and bolted together. The inside diameter is 17 feet, the height being 31 feet 7 inches, and the height to top of overflow 42 feet 6 inches. The capacity of this pan is about 1,000 barrels, or over 100 tons, of sugar at each "strike," the time required to make a "strike," or sufficiently exhaust the water from the juice before treatment by the centrifugal, being under ordinary conditions three hours.

The principle on which a vacuum pan is based is the fact that the boiling point of water, sirup, or any liquid, is in part dependent upon the pressure of the atmosphere, the temperature at which the liquid boils being higher or lower according as the atmospheric pressure is increased or diminished. In practice, with these pans, the liquor is boiled at a temperature of 110° to 120° F., so there is no danger of burning the sugar, the inversion of sugar is reduced to a minimum, and the rapidity of the operation is greatly increased. A pan of this size must necessarily be of great strength, in order to resist the atmospheric pressure, which increases according as the vacuum is more perfect.

The arrangements for heating will be readily understood by reference to the illustration, the copper coils for this purpose presenting a surface of over 3,000 square feet. There are eight of these separate coils, five being of 4 inch diameter and three of 5 inch diameter, affording 69 inlets and outlets, and connected with eight steam trunks, two of 8 inch and six of 12 inch diameter, the steam being supplied by a 30 inch main. Every facility is given for easy working, all the main valve stems being carried to convenient positions on the working platform, from which also the "strike," or discharge valve at the bottom of the pan, is operated. This valve is 20 inch diameter.

The pan is charged with the liquor through two 6 inch valves, controlled on the working platform, the atmospheric pressure readily forcing the liquor in. The cane juice with which the pan is charged usually gauges 25° to 30° Baume, or about 10 pounds to the gallon, and when discharged it is

about the consistency of thick mortar. It is intended, in operation, that this pan will be filled with liquor only to a depth of 18 feet, leaving 8 feet vapor space above within the pan itself, besides the room allowed in the great pipe leading from the top. There is a spray catcher or interceptor in the dome of the pan, and the vapor pipe leading up from its top is 6 feet in diameter. Situated in this vapor pipe, between pan and condenser, as shown on illustration, is a portion enlarged to 10 feet diameter forming a trap to catch any overflow, which can be returned to pan or tanks, as desired, and thence the 6 foot vapor pipes continue to condenser, which is 8 feet diameter and 28 feet high. The condenser has two 8 inch perforated injection pipes and four scattering plates. The pumps which make and maintain the vacuum are connected with the condenser, forming what is termed a "dry" vacuum.

The pan has two of what are styled lock proof-sticks, for removing and testing from time to time a small quantity of the sirup, but these proof-sticks are in reality tubes with nicely fitted valves and a piston for removing the sirup without destroying the vacuum. There are also eight eyeglasses arranged in different positions to enable the operator to keep a constant watch on the work going on inside the pan. A barometer and thermometer are also connected with

the interior of the pan, by which the extent of the vacuum and the temperature of the contents are indicated at a glance. Formerly vacuum pans were built almost exclusively of copper, but of late years cast iron has been the choice, only the heating coils being of copper, the coils being so fixed as to prevent their vibrating during the boiling, and allowing for expansion and contraction without strain.

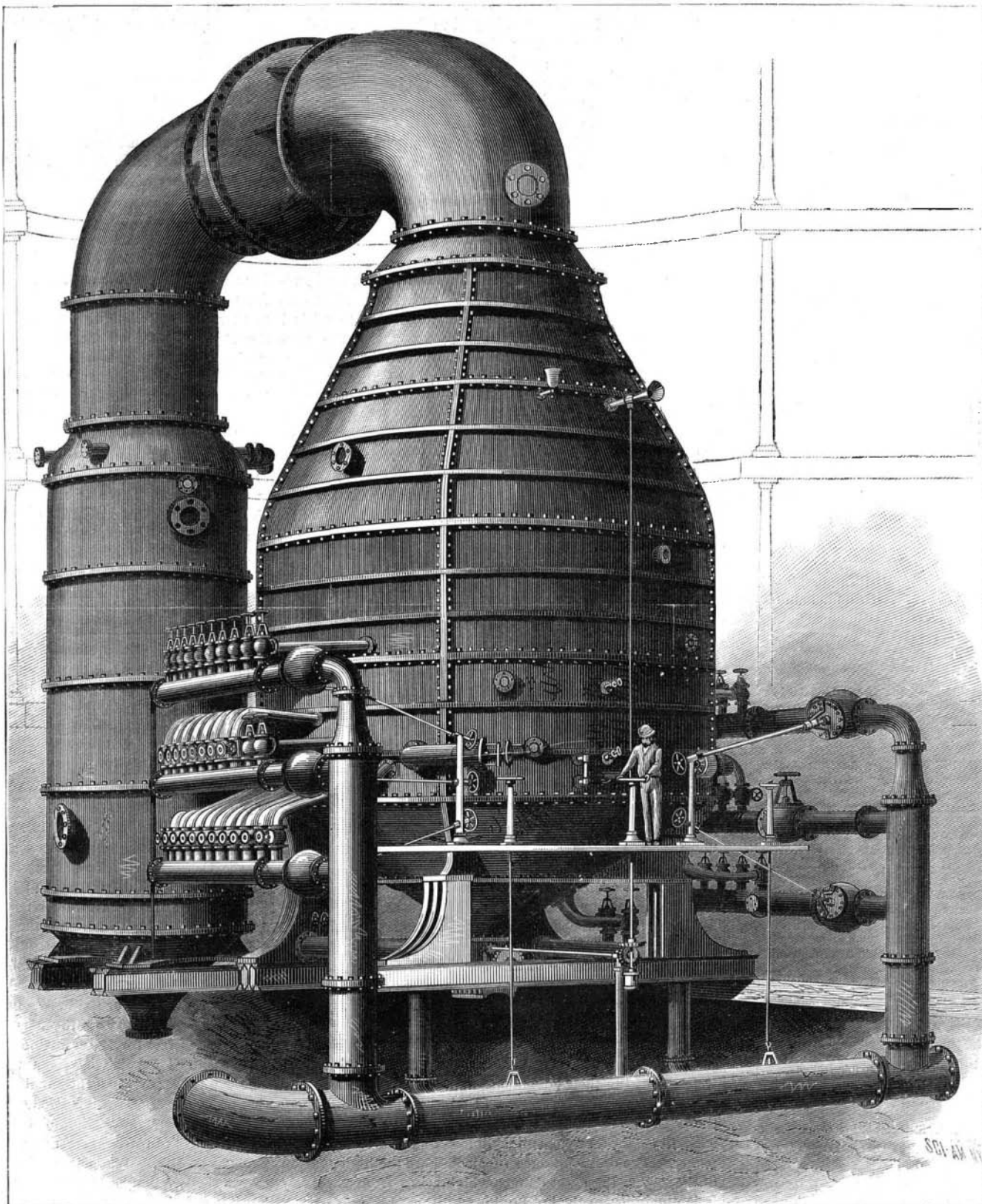
Besides the amount of fuel saved and the economy of conducting the sugar manufacture with a pan of such device as this, where the work can all be so easily overlooked and the process minutely regulated, probably the greatest advantage of all lies in the largely increased proportion of sugar thus gained, and the comparatively small quantity of molasses which each "strike" affords. By such improved pans the yield of sugar amounts to six or eight hogsheads to one of molasses, while by less improved means only two or three hogsheads of sugar are obtained to one of molasses.

The whole work was completed in four months at the Deeley Iron Works, the order having been received July 10, while the pan was being taken down for shipment the second week in November.

The Journey of a Million.

Statistics as carefully studied by Dr. Farr tell us that of a

million children ushered into life nearly a hundred and fifty thousand pass away by the end of the first year. Twelve months later fifty-three thousand more will have followed. At the end of the third year the number living will be diminished by twenty-eight thousand more. Each year of the decade following will make its inroads upon the ranks, but less serious in amount, till the thirteenth year will call for less than four thousand. Those remaining will fall out by twos and threes till the end of the forty-fifth year, when it will be found that in the intervening period about five hundred thousand have succumbed to the hardships of the way. At the end of sixty years three hundred and seventy thousand gray haired veterans would still be keeping step with the duties of the passing days. Eighty years would see thirty-seven thousand remaining, with strength impaired and steps growing feeble. At the end of ninety-five years but two hundred and twenty-three would linger in the darkening path, and these would be rapidly thinned till in the one hundred and eighth year the last survivor of the million would disappear, and join the ranks of his predecessors in the great host of the majority.



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