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ASCHENBRENNER'S IMPROVED SUGAR-MAKING PROCESS.

There is no process of chemical industry in which the waste reaches greater proportions than in that of sugar manufacture. Dr. Scoffern estimates the loss as nearer two thirds than one half, while another authority emphatically characterizes the proportion as enormous. The weight of the contents of a hogshead of sugar—according to an article on this subject recently published in *Iron*—is about 2,128 lbs. To obtain this quantity of sugar, 3,500 gallons of cane juice are often used, of a strength say of 9° Baumé. Each gallon at this average density contains 1·81 lbs. of sugar; hence 2,500 gallons contain 4,525 lbs. But the planter, as above noted, gets but 2,128 lbs.; hence the amount lost, or 2,397 lbs., is actually more than the maker has to sell. Of this loss 426 lbs. is molasses drained off, while the balance is waste of saccharine matter lost by caramelization; while ordinary processes have the still further defect of evolving, by the boiling of the cane juice, gases which impair the quality of the sugar.

With a view of overcoming these obstacles, the invention we herewith illustrate has been devised. According to the claims of its originator, the largest possible quantity of dry, pure, and naturally white sugar in marketable shape is produced. The importance of such an apparatus, if thoroughly efficient, cannot be overestimated, not only as influencing a vast industry, but as directly affecting every consumer of the staple; and hence no further introduction will be needed to bespeak for the following description the careful consideration which its subject deserves.

The course of the juice, as it emerges from the grinding mill, is through the trough, A, in which, at B, are arranged two inclined filters of different degrees of fineness, the liquid of course passing through the coarse one first. These filters are placed in two sets of grooves so that one pair can be removed for cleaning, leaving a second couple continuing to act, so that the operation need not be interrupted. The object of these appliances is to stop the passage of mechanical impurities floating in the juice. The conduit, B, discharges into a flannel, bucket-shaped receptacle, C, which it also so arranged over a tank, D, as to be readily removed for cleaning and another quickly substituted, which serves to finish the initial filtering process.

The liquid is next conducted to three open kettles in succession. Each kettle has a double bottom so as to be heated by steam. In these receptacles, the juice is precipitated by means of lime and magnesia, a process facilitated by the high temperature imparted by the steam, after which the sediment is drawn off by suitable tubes at the bottom. Thus purified, the liquid passes away through the siphons, E, to another filter, F, which removes the last vestige of foreign substance which may still remain held in suspension. This apparatus consists of a metal case, in which is placed a second case, having two perforated ends and two perforated partitions, forming three compartments. The first is filled with sponge, and the second with bone black, and the third with charcoal. At each end is an empty space for the entering and emerging juice. The inner case is provided with handles to admit of its being lifted out of place for cleaning.

The pump, G, then lifts the juice into the sulphur box, H. This latter portion of the apparatus is of wood, encloses a paddle wheel which is actuated by the steam engine of the mill, and is fed with sulphurous fumes from the adjoining sulphur furnace, I. The revolving paddles throw the fluid into rapid agitation, so that it is thus more thoroughly exposed to the action of the gas and caused, it is claimed, to leave the box in a perfectly bleached condition. The emerging stream, which is of about two thirds of an inch in diameter, passes at once upon a long trough of sheet metal, J, which, heated interiorly and underneath by steam supplied through the pipes shown, serves to raise the temperature of the liquid to a degree not exceeding 194° Fah., by a condensation of 32° or 33° Baumé. Beneath this trough, at K, is arranged suitable apparatus for altering its degree of inclination at pleasure, thus hastening or retarding the flow.

Passing next through a connecting canal, the juice, in a stream half an inch in diameter, exits upon a second trough or box, L. This conduit is arranged similarly to the trough, J, and the liquid is here heated up from 212° to 220° Fah., and thereby condensed to 40° or 45° Baumé. When it reaches the lower end of the incline, occupying from 10 to 12 minutes in the transit, the stream has a thickness of one third of an inch. At this point, in order to carry off all the vapor, hasten condensation, and prevent the boiling of the juice, a steam fan, M, is produced. By the effect of this appliance, together with that of the processes to which it has already been subjected, the liquid becomes so thick as to necessitate the use of a scraping apparatus, N, which consists of an endless band, passing over pulleys and provided with transverse blades, placed at suitable distances apart. This is set in motion by the engine and serves to convey the material to another inclined plane similar to those already described, where it is acted upon by a second fan, O. Finally the sugar, now in a crystalized condition, is removed by hand into the last receiver.

When it is desired to produce molasses, a small percentage may be obtained by making the incline of the troughs steeper, thus hastening the process and preventing the perfect drying of the sugar by the action of the two ventilators. The molasses thus made is said to be of the best quality and of the finest color. The entire period of time occupied by the juice in passing through the apparatus is stated to be in the neighborhood of forty-five minutes.

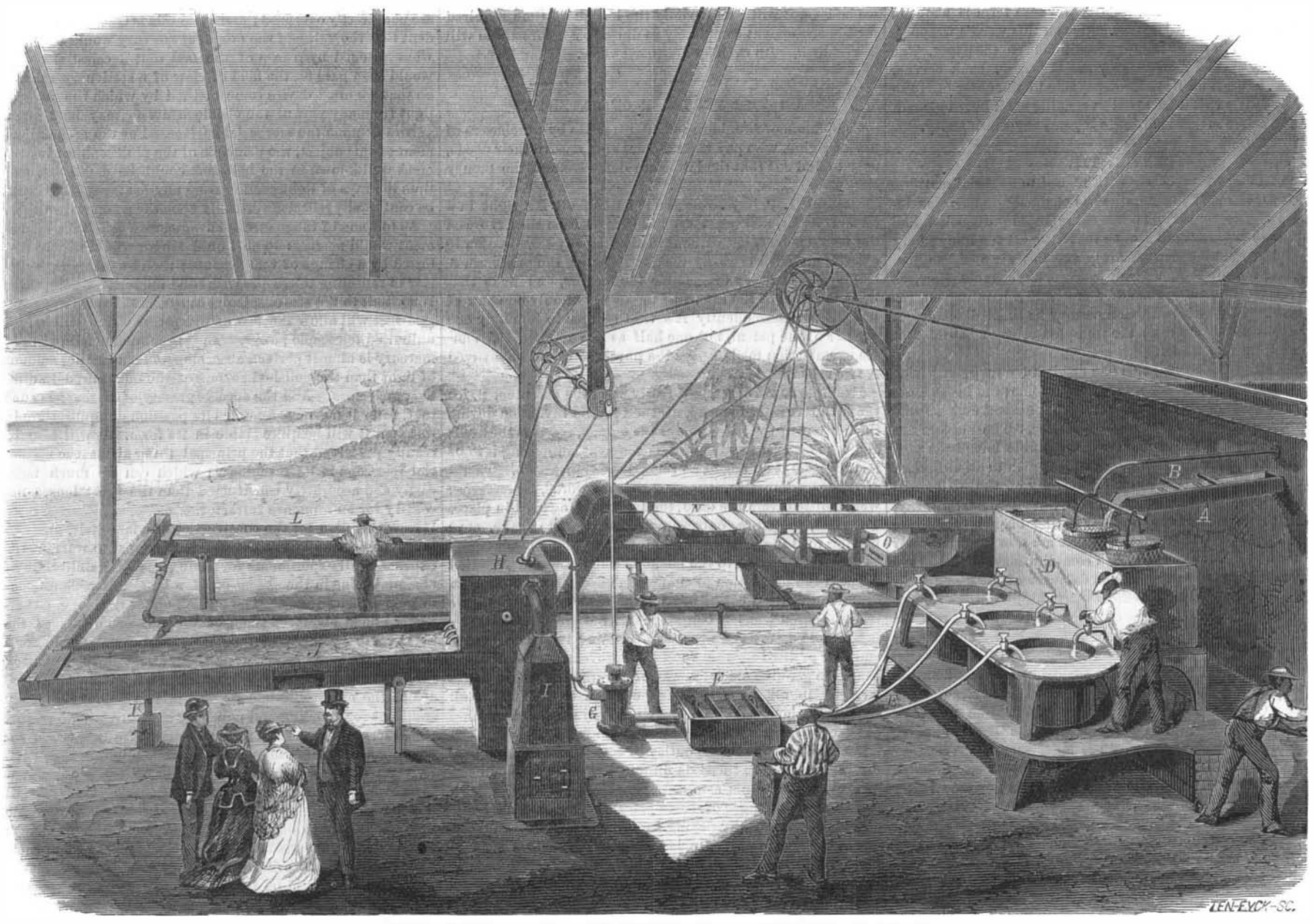
As regards economy, we are assured that the percentage of fuel saved is remarkably large—a fact which may be justly inferred from the advantageous and ingenious arrangement of heating surfaces, etc.

The patent for this invention, the credit of which is due to Dr. H. M. Aschenbrenner, is now pending, in the United States, through the Scientific American Patent Agency. For further information, address Mr. T. Masac, care R. Matthies & Co., 525 Apartado, Havana, Cuba.

Depression in Railway Bonds.

Fifty-five railroad companies in the United States are now reported as in default for non-payment of interest on their bonds. The total amount of these bonds is $217,959,311, or about thirteen per cent of the whole amount of the railroad bonds now outstanding.

With but few exceptions, the cause of the delinquency is due to the tightness of the money market and not to any inherent defect in the roads or their management, and the difficulty, therefore, will be only temporary.



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