

### MANUFACTURE OF STEARIN CANDLES.

Candles are cylindrical rods of solid fatty or waxy matter inclosing a central fibrous wick, and designed for giving light. The raw materials mostly used for candles are tallow and palm oil. Ordinary tallow candles are made from the fat of sheep and oxen. It is taken as soon as possible from the carcass of the animal, sorted, cut to pieces and melted. Tallow consists of palmitic, stearic and oleic acids, with glycerine, a substance which is unflammable. The melted tallow is run into large barrels or casks holding about 1,300 pounds and taken to the candle manufacturers, where they are rolled on a trough about 25 feet in length, 2 feet in width, and about 6 inches in depth. The cask is placed on the trough with the bung hole underneath. A steam pipe is then inserted into the hole, the steam turned on, causing the tallow to melt and run down into the trough, thence through the flooring to a large tub below. This tub is connected by means of a 4 inch pipe to what is called the "blow-up," which is 14 feet in length and 5 feet in diameter. The melted fat, to the amount of 7,000 pounds, is drawn from the tub and run into this apparatus. About 35 pounds of lime is then dissolved and added to the mass, which is then heated by steam until thoroughly mixed, forming a soapy mixture which separates the acids and the glycerine. It is then blown out by steam into a decomposer. This apparatus is made of copper, 32 feet in height and 4 feet in diameter. Steam at 100 pounds is then turned on and the acids allowed to boil. The water, which is always at the bottom of the mass of fat, is constantly drawn up by the aid of a steam pipe passing down through the center of the cylinder. The water, when it reaches the top, falls down on and through a perforated diaphragm containing about 300 small holes to the inch, where it immediately passes to the bottom. The heat and pumping operation continues for about 10 hours, which separates the glycerine from the acids. It is then tested. If the material when cooled becomes crystallized, it is ready for the next operation.

The dissolved glycerine and water is drawn off and the acids pass to another tub, where, by the means of sulphuric acid, the fatty acids are set free from the lime. Boiling water is then used to free the fatty acids from the sulphuric acid. The liquid then passes into large circular tubs called chargers. From the chargers the acids pass into a still, circular in shape and made of copper. It is 6 feet in height, about 7 feet in diameter, and holds about 5,000 pounds, under which a fire is kept constantly burning and a temperature of 550° given to the still. From the still it is then condensed and run down into pans to solidify. The cakes, which are about 12x20 inches

in size and one inch thick, are then wrapped in camel's hair cloth and put into a hydraulic press, which, with a 6,000 pound pressure to the inch, squeezes out the oleic acid. The cakes are then

a few inches above the mould beds are two perforated wooden clamps, the holes of which come directly over the moulds. The spools of cotton yarn or wick are placed in hollow circular tin boxes at the bottom of machine, directly underneath each tube. The wick is passed through the tubes and moulds and through the clamps above, where it hangs in the center to a piece of candle lying across the holes on the upper side of the clamps. When the moulds are ready to be filled the attendant pulls the wicks taut from the bottom, which causes them to hang directly in the center of the moulds. The melted material is poured in the beds at one end until the moulds are all filled. They are then allowed to cool about 15 minutes.

The movable platform containing the tubes is raised, which in turn shoves the candles upward out of the moulds and up into the clamps. The moulds are then refilled as before, and when cool, a knife is run along the top of the bed, cutting loose the first batch of candles, which are taken away and thrown into a tub of water to cool. The same operation is performed over and over again until 100 yards of wicking is run out.

The candles, when taken out of the water, are passed through the cutting and polishing machine. The attendant places the candles on a slotted wheel, which carries them to a fine circular saw about 6 inches in diameter, with  $\frac{1}{2}$  inch teeth, which cuts them the right length. They are then carried along and dropped on to a movable bed to be polished.

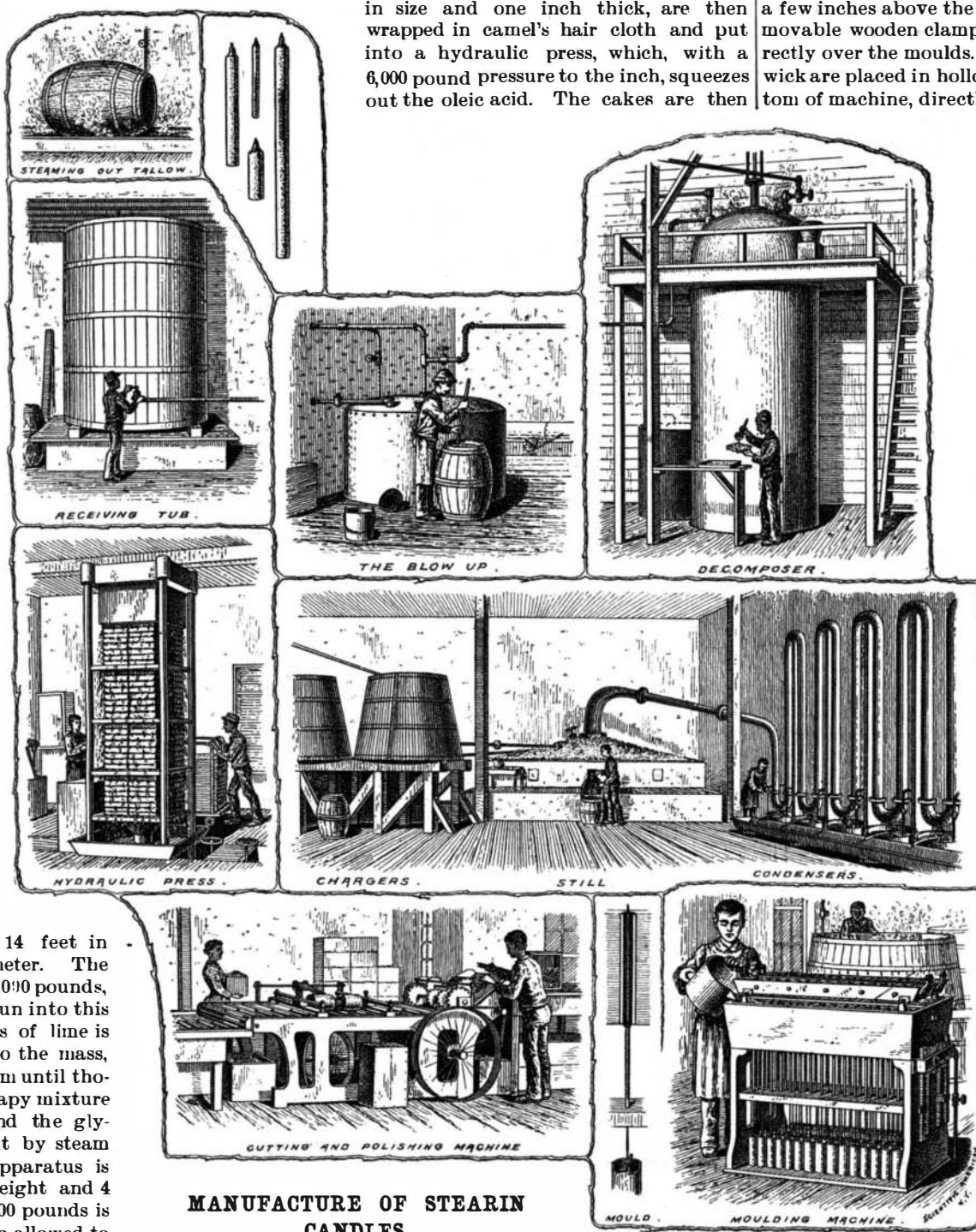
This bed consists of a number of circular iron bars or rods  $\frac{3}{4}$  of an inch in diameter,  $1\frac{1}{2}$  inch apart, and connected to a chain on each side of the machine.

Connected to the machine and running across the movable rods are two circular revolving bristle brushes making about 120 revolutions per minute. The brushes are about a foot in length and about 8 inches in diameter. As the candles leave the saw they drop down in between each rod, which pushes them ahead, causing them to revolve. They are then drawn under the brushes, which gives them a polished appearance. They are then packed into boxes for shipping.

Candles in large quantities are shipped to South America and Mexico. They are also used by grocers, plumbers, and miners; 39 hands, with 40 moulding machines, can turn out about 8,000 candles per day. They run in size from about 5 inches to 24 inches in length. Our sketches were taken from the manufactory of A. Gross & Co., N. Y.

### THE COLUMBIAN EXPOSITION—A "MOONSHINER'S" PLANT.

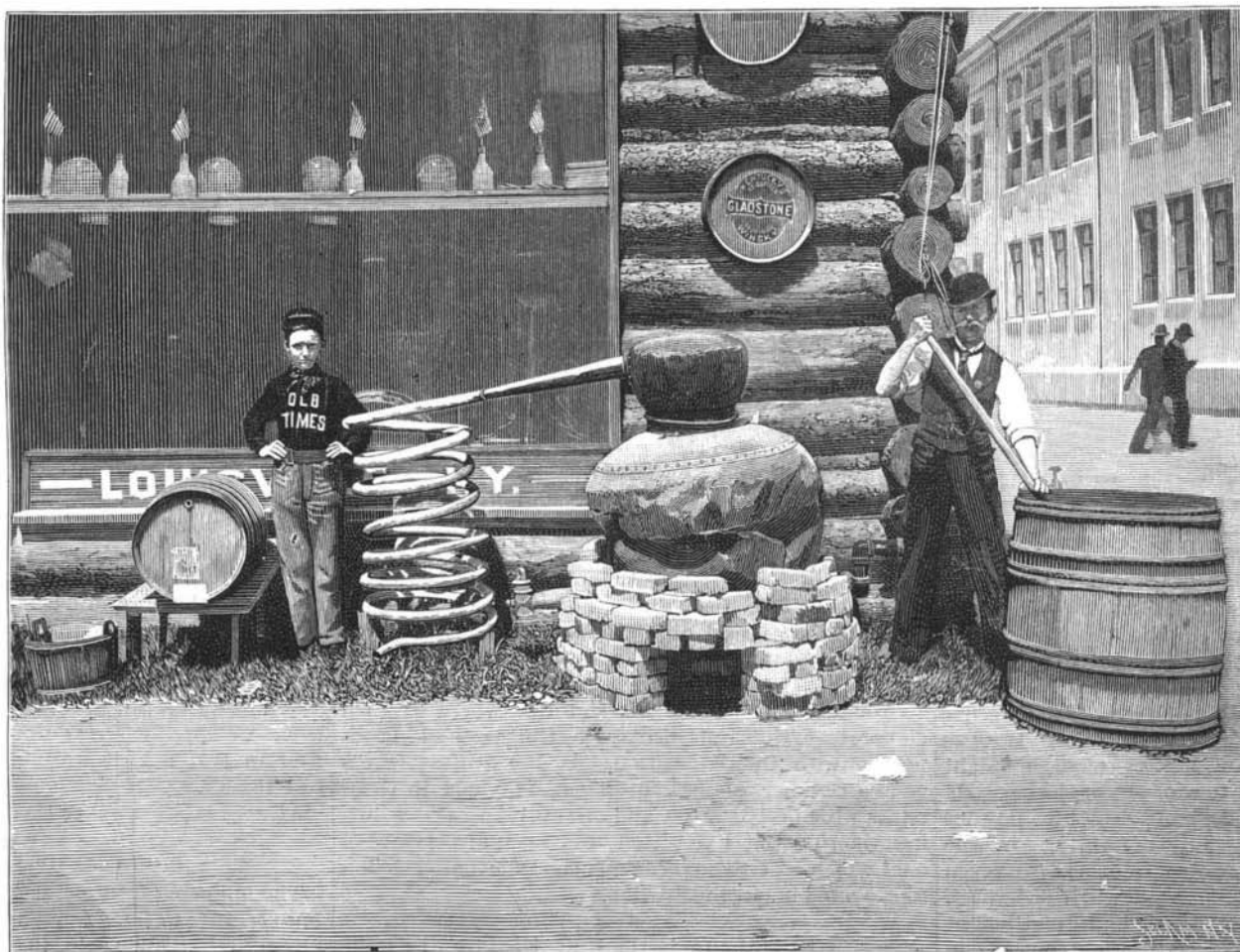
In a corner of the grounds of the Columbian Exposition, in the part called the "back yard," stood one of the most cu-



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remelted and ready to be formed into candles. Each moulding machine contains about 96 moulds.

They are made of a composition of lead and zinc and rest in an iron bed, surrounded by water for cooling purposes. Underneath each mould is a hollow tin tube the upper end of which is conical shaped, and fits inside the lower end of mould. The bottom end rests on a movable platform. Connected to the machine



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