THE MANUFACTURE OF STRAW HATS.

BY W. FRANK M'CLURE.

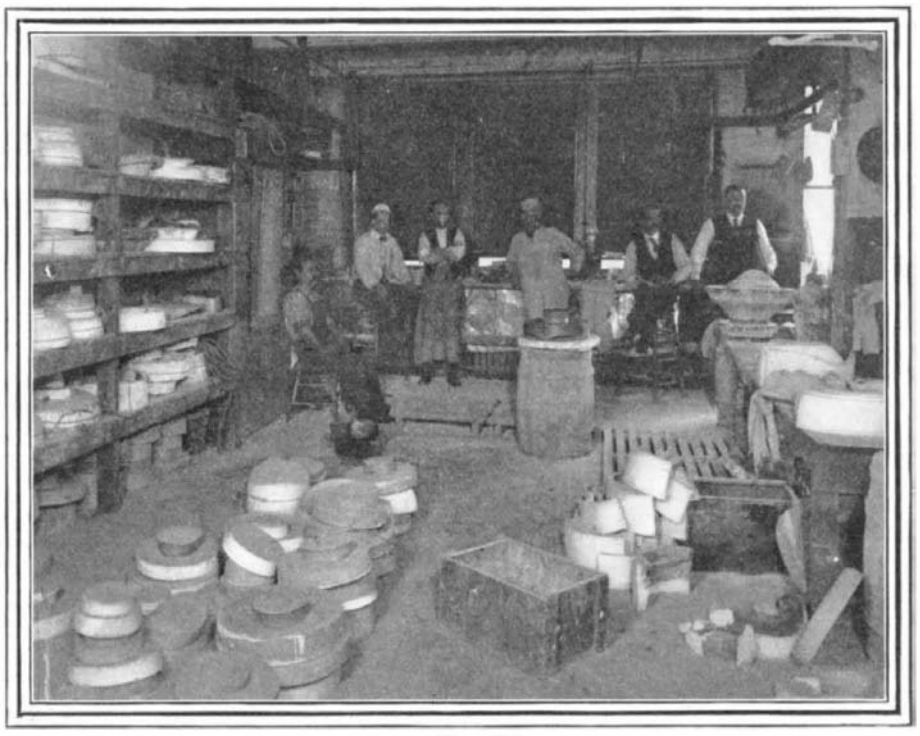
The first step in the making of modern woman's headgear is the importing of the braided or plaited straw or chip, principally from Japan, and the styles from Paris. The felt for fall and winter hats is bought of American manufacturers. When the styles have been decided upon, the molders in the basements of the hat factories begin the fashioning of quantities of plaster of Paris and metal into blocks and dies of many shapes. With the blocks made and the straw or felt on hand, the operations, among which are blocking, sewing, stiffening, and pressing, follow with the assistance of hydraulic presses and other machinery.

The factory stock room is an interesting place. For spring hats, the manufacture of which is begun in the fall, more than one hundred different styles of braid are used, all of which comes to the factory in its natural color. The larger factories do a great deal of importing themselves, while on the other hand a large per cent of these straws are brought here by the big importers of New York. Aside from Japan, braids are imported from Italy, Germany, France, and Switzerland, but it is to Japan belongs the credit for the greatest progress in the making of a fine quality of clean and light-weight braids. These braids come in pieces sixty yards in length, each such piece weighing not more than a quarter-pound. Where the style of braid is a particularly desirable one, a manufacturer will often order as high as ten thousand pieces of the one kind at a time.

The chip which is used is taken from the trees of Japan. The straw from that country is of a much whiter color than would be possible to obtain in this country. The moist atmosphere of Japan is conducive to the desired shades of the straw. The difference in fine and coarse straw is the difference between the straw at the roots of the growing stalks of grain and that at the top. In Italy many peasants raise wheat, not for the food crop, but for the making of hats solely. There, to improve its quality, it is sometimes cut before the grain is ripe. The straws are carefully cut so that the tops, the bottom portions, and the centers may be kept in separate piles, thus determining the different grades of the finished product.

Before proceeding to the methods of American hat manufacture, it may be stated that in England a large portion of the hats from braid are made in the homes, and that in Paris the hat manufactory buildings scarcely compare in size with those of the United States. In England many people are employed making hats in their homes, after obtaining the braids from the wholesale houses, and when their work is completed, it goes back again to the hat dealers.

In the factory where the accompanying photographs were made there are 75,000 square feet of floor.



Making the Blocks.

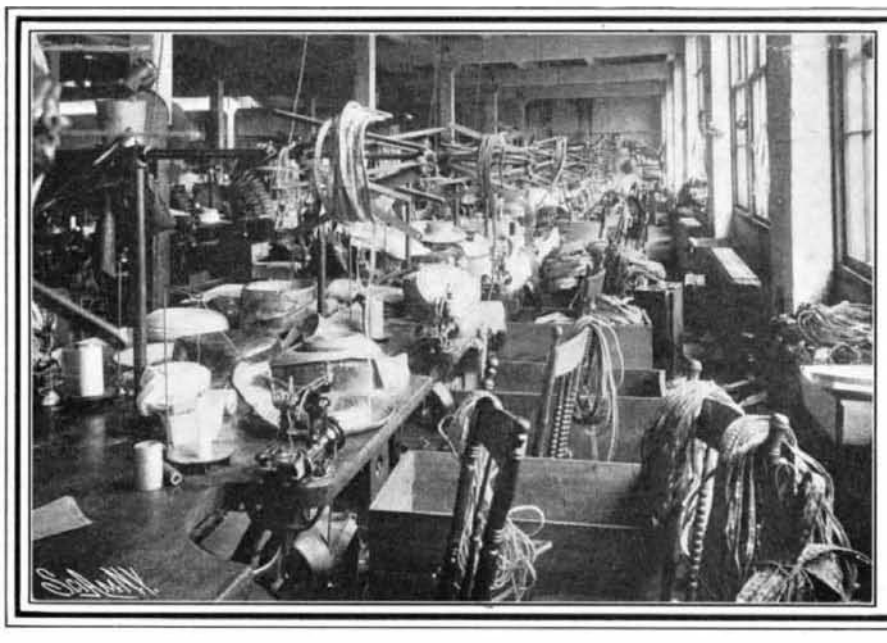
The methods and operations employed here are typical of modern American hat-making in general. Two hundred women are employed in the sewing department alone, which number is a little less than half the total number of employes in the factory.

With reference first to the making of hats from straw and chip braids, these braids, prior to being placed in the stock room, are dyed numerous colors. From the stock room they go to the sewing department, which represents a large and important department of every factory. There are some two hundred sewing machines in one large room, though much of the finer work is done by hand. The plan for shaping the straw as sewed is obtained from the blocks made in the molding department.

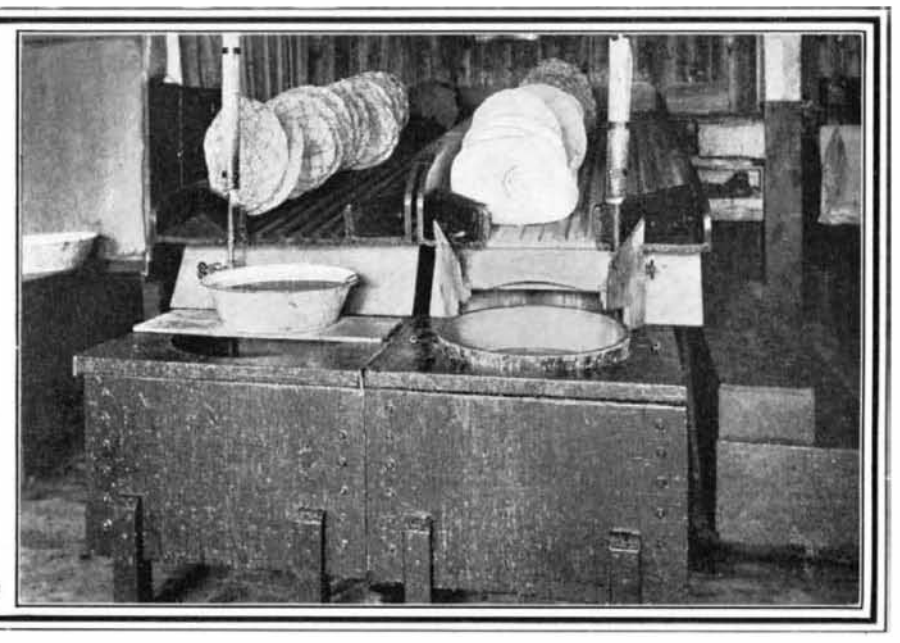
The blocks upon which the hats are shaped in the sewing room, as before stated, are made of plaster of Paris, which is brought in dray loads to the factory each month. The patterns for these blocks are first cut in wood. The metal dies are made of zinc spelter, and each die when completed has an average weight of 110 pounds. Tons of zinc spelter are thus used. The metal dies are used in the blocking and pressing departments of the factory.

In the sizing room the hats are stiffened by means of glue, after which they dry before going to the blocking room. The blocks upon which they are placed are heated by steam. In the pressing room of the factory there are twelve hydraulic presses and twenty-six steam presses. The former are used for hats requiring a smooth finish, and the steam machines are used where rough effects are desired. Under the hydraulic presses straw hats are subjected to a pressure of 75 to 100 pounds. The pressure upon a felt hat is often as high as 500 pounds. These machines stiffen the hats and give them a high polish. Straw hats on coming from the presses are given a coat of varnish, and after being wired are ready for the trimmers.

Felt comes to the hat manufacturers in the form of

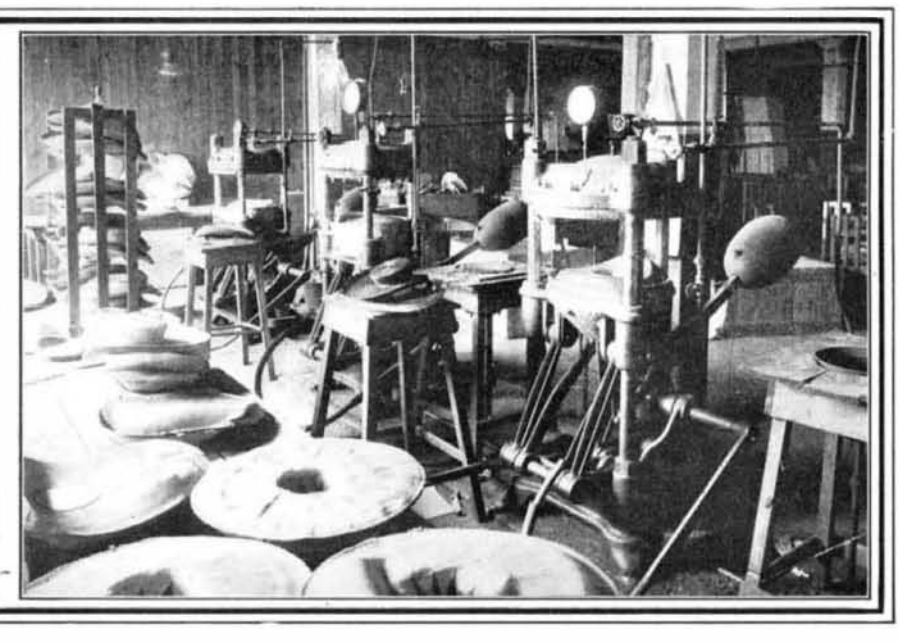


The Sewing Machines.



The Stiffening Room

Blocking the Hats.



The Press Room.

THE MANUFACTURE OF STRAW HATS.

rolls, which can be cut into sheets, or else it comes in the shape of cones. When in sheets, a first operation is to cut the felt in accordance with the sizes of the hats as dictated by the styles. Next the felt is stiffened, but, instead of simply glue being used, the preparation is part glue and part shellac. The felt hat is given its shape by means of heated dies and mechanical presses. When it comes from these it looks like a hat, save that the edges are often irregular. These edges are trimmed off, and the hat is combed and pounced. The comb is used so that the nap of the goods will run in one direction. The pouncing is done with a kind of sandpaper. The hat is then wired and bound and finally placed in the hydraulic presses, as in the case of the straw hat.

The output of a large factory is from four hundred to five hundred hats per day. While large quantities of untrimmed hats are sent to the markets of the United States, and subsequently furnish employment to thousands of milliners, still there are factories which have trimming departments of their own, and which send out the finished product in the shape that it is to be worn by the purchaser.

The hat-making industry, like the majority of American industries of the present day, is growing noticeably in size with the increase of population. Within the past two or three years a number of the leading hat factories of the country have increased the size of their establishments, thus admitting of a larger output. Though the busiest portions of the year aggregate about eight months, nowadays there is activity at the hat factories the year round. With the spring hats all on the market, the making of fall and winter hats for 1904 and 1905 will begin as early as the first of July next. New styles will then, of course, require new molds and new dies. The old plaster of Paris molds are considered useless, and are thrown on a scrap pile.

INTERIOR OF OIL STORAGE RESERVOIR IN CONSTRUCTION.

THE PETROLEUM RESERVOIRS OF CALIFORNIA.

BY H. A. CRAFTS.

During the year 1903 California's product of crude oil amounted to 25,000,000 barrels. Of this amount the Kern River fields, four miles from Bakersfield, produced 16,000,000 barrels, or nearly 66 2-3 per cent of all the oil produced in the State. And this in spite of the fact that the Kern River fields cover a territory hardly more than five miles square, and of the additional fact that the fields have been in operation but little more than four years. Even as early as 1901 Kern County shipped 52.7 per cent of all the oil produced in the State, and this with only 233 wells in operation.

Now there are 876 active wells in the Kern River fields, and the daily product of the individual wells ranges from thirty to four hundred barrels. The average product to the well is said to be one hundred barrels daily. But this is probably in excess of the actual product, for at that rate the total product for the year 1904 would be over thirty-two million barrels, or twice the total output for the year 1903.

In spite of the fact that the daily shipments of oil from Bakersfield are 60,000 barrels, while the home consumption is large, there are immense quantities of petroleum accumulating at the fields. The Standard Oil Company, which has established itself there as a buyer, refiner, and shipper, has not less than six million barrels in storage; to say nothing of the oil held in reserve by the various operating companies.

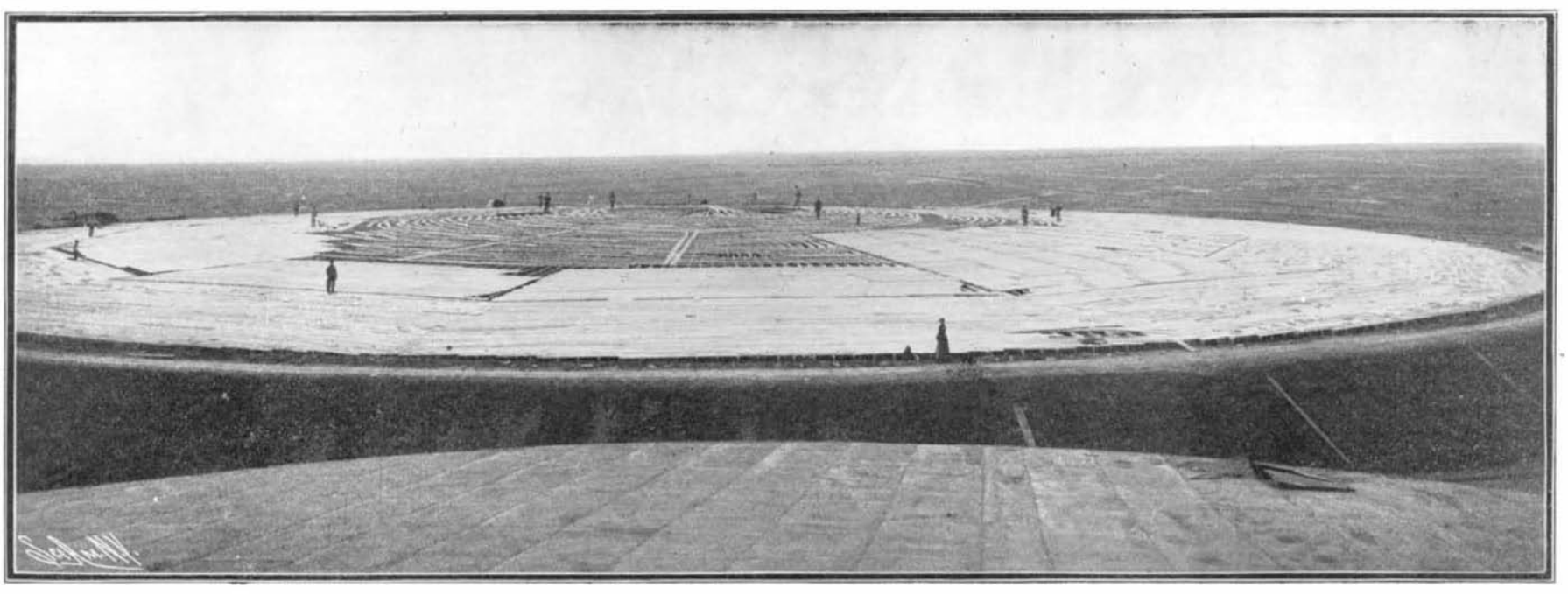
Consequently, the ingenuity of the oil people has been greatly exercised to secure adequate facilities for storing the surplus product of oil. Naturally, the Standard Oil Company is the larger storer of oil. It began by erecting the regulation tubular steel tank, but gave up the idea when it came to realize the actual producing capacity of the fields. Then it began constructing the earthen storage reservoir, which means but little more than a hole in the ground. The size of these reservoirs increased as the prodigious product of the wells was contemplated by the builders.

The larger of the storage reservoirs constructed and operated by the Standard Oil Company has a total capacity of 500,000 barrels. These reservoirs are circular in form, and their diameters vary from 400 to 500 feet, and their depth from 14 to 16 feet. The first of the reservoirs to be constructed were cemented, over their beds, to prevent the oil from seeping. But even that expedient is considered too expensive now, and the earth composing the beds is now merely tamped well before the oil is turned in.

The reservoirs as soon as excavated and tamped are roofed over with inch boards, nailed upon framework, and the boards are covered with tar paper, in order to protect the oil from the elements. Then the reservoirs are ready to receive oil.

The regular quoted price of petroleum at the Kern River oil fields is twenty cents per barrel, but it is reported that some sales have been made recently as low as fourteen cents per barrel; and there is some talk of shutting down a portion of the wells until the surplus oil on hand has been worked off, and the market assumes a more healthful aspect.

The oil from these fields is not of the illuminating variety, but is a heavy oil, with an asphaltum base. It is used principally for fuel, for the manufacture of asphaltum, and for lubricants. It has had the effect to stimulate manufacturing all over the State, and is rapidly taking the place of coal as a fuel on railroad and steamship lines. It is said to be equal in cheapness at present prices to coal at 70 cents per ton; and as California has to pay from $7 to $8 per ton for coal, the value of her petroleum as a fuel may be easily approximated.



ROOFING OVER AN OIL STORAGE RESERVOIR.

The Discoverer of Latent Heat.

On the occasion of "Commemoration" at Glasgow University on April 19, Sir William Ramsay gave an address on Joseph Black, the distinguished chemist and physician, who spent his life between Glasgow and Edinburgh as student and professor in the latter part of the eighteenth century. Medicine, said Sir William, suggested Black's first step in advance toward chemical discovery. Certain curious remedies—in which eggshells, snails, and sundry strange fruits were ingredients—were supposed to be beneficial to those troubled with the stone. Black, then studying for his M. D. degree, endeavored to find some milder solvent for calculus than those generally in vogue, and this led him into an investigation of magnesium sulphate as a substitute for the solution of lime which had, up to then, been used as a remedy. He did not, indeed, demonstrate that "fixed air," as he named the gas with which lime combined to form calcium carbonate, was a compound of carbon, but he did show that a gas can be retained by a solid and made to escape by treatment either with acid or by heat. Later came the discovery of "latent heat," and Black even made a rough determination thereof. His conceptions as to the action of pressure on the boiling point and the absorption of heat by vapor were utilized by James Watt, and effected a revolution in the structure of steam engines. Black's investigations, said Sir William Ramsay, not only laid the foundations of modern physics and chemistry, but profoundly changed the whole of our industrial and social life.

Sewage is treated in Brünn, Moravia, by a chemical process utilizing a reagent composed of 1 kilogramme of organic carbon, 20 to 30 grammes of lime, and 10 of zinc dust per cubic meter of sewage. The carbon is obtained by dry distillation in gas retorts of offal from abattoirs. After mixing with the proper dose of the reagent, the sewage flows into a settling basin, from which the deposited mud is pumped to filter presses. The press cakes are distilled dry and a part of the reagent can be recovered. From the settling basin the turbid water flows to a filter consisting of superposed layers of brick, coke, and carbon. From this filter the clarified effluent is turned into the river.