

almost in the exact position it is to occupy in the fabric, removing the friction upon the warp yarns produced in other looms, due to the backward and forward traverse of the reed to allow of the crossing of each pick of weft. The Poyser looms are capable of running at a speed of about 390 picks per minute.

MAINE'S WOOD NOVELTY MILLS.

BY GEORGE E. WALSH.

Summer visitors to the woods find rare sights in the most unexpected places these days, and whether the trail leads along the watercourses or strikes directly across country into the very heart of the great spruce and hardwood forests, it is pretty apt to bring up to some mill where queer modern machinery is busy at work in cutting up the timber at one end and spouting out articles of commerce at the other. The great machinery chewing up forest trees of spruce to make paper for printing our books and periodicals can never quite lose its attraction to the uninitiated, and the scene of one of these modern mammoth paper mills is always a center of attraction.

But there are other mills in the Maine woods which we hear less about, and which in recent years have become remarkable institutions. We do not hear about them often, but every day of the year we use some of their products, utilizing them so often and commonly that our wonder about their manufacture ceases. These wooden novelty mills, as they might be called, are the outcome of Yankee genius in utilizing waste material by the invention of new machinery. It was found that the lumber mills of Maine were wasting enormous quantities of wood. The white pine trees furnished lumber in various sizes, but the trimmings were nearly all waste. Such immense piles of this waste wood accumulated at the various mills that it became a great inconvenience. It was difficult to burn it without setting fire to the mill, and to cart it away was both inconvenient and expensive.

Some enterprising pioneer then started in to utilize this waste lumber by manufacturing it into small commercial articles, and to-day this work has spread and multiplied so that the novelty mills are in great numbers and importance all through the Maine woods. One of the first mills established was to manufacture wooden toothpicks. A small machine was invented which would cut out of the soft pine wood hundreds of these toothpicks at one stroke. So important has the manufacture of these become that the annual output of the Maine woods to-day is over 500,000,000 toothpicks. The smallest pieces of waste wood can be used for this purpose, and the cost in raw material is practically nothing. Following these, other common articles were made at the same mill. There are a score or two of the novelty mills in Maine to-day, and their total output is enormous, including nearly all of the common articles of use. The long wooden skewers which butchers use to hold their meat together are manufactured in the mills at the rate of half a million a week. One mill alone will turn out in the summer season 5,000,000 skewers, and 50,000,000 toothpicks, besides a great number of other articles.

A common article made at these mills is the spool for cotton and thread. The spool factories number nearly a score, and they turn out something like 250,000,000 spools a year. One can hardly realize what this amount means. On them some fifty billion yards of cotton or thread can be wound. Laid in a row they would stretch across the whole State of Maine, and piled up one on another they would make a slender tower that would reach up in the air ten times higher than the tallest mountain peak. Only white birch is used by the spool factories, and they consume immense quantities of this timber. To make the annual output of spools over 15,000,000 feet of white birch timber are needed. In addition to this immense quantities of the white birch timber suitable for spool manufacturing are shipped to factories in England and Scotland.

There is a common saying that the spool factories and hoop pole hunters saved Maine's woods from being overrun by white birch saplings. At one time countless millions of deer and rabbits roamed through the Maine woods, and they subsisted largely in the spring and winter on the sprouts of the white and gray birch saplings. There is no more prolific growth than the birch, and in Maine if left unrestricted the trees will soon spread everywhere and crowd all else out of existence. The destruction of the rabbits and deer destroyed nature's nice balance, and the birch trees threatened to rule everywhere. When the trees were about to monopolize all the Maine woodlands, the hoop pole hunters and the spool manufacturers discovered that the birch was the best wood for their purposes. The result has been that an enormous industry has been built up with an inexhaustible supply of raw material, and the birch saplings have been kept within certain restricted areas.

The barrel hoops made out of the birch saplings and brown ash in Maine each year number some 35,000,000, and the demand is constantly increasing. Their manufacture cannot be said to belong to the so-called novelty mills exactly. They are made and gathered by hoop

pole hunters, who go through the woods, and cut and shave them for market. The price they receive for these hoops averages \$1 per thousand for the smallest size to \$1.25 for the largest. A good man can cut and haul two thousand poles per day. When these are split, shaved down, and cut the right length, they will make about four thousand hoops. A man must, then, work pretty lively to make from \$3 to \$5 per day at this work. Some of the old hunters, however realize the latter amount during the dull season of the year when there are no summer visitors to guide or board. In the summer the hoop pole business is quiet, and few men attempt to gather the birch and ash saplings when they can make several dollars a day simply guiding people through the woods. Some two thousand men are engaged in hunting barrel hoops in the Maine woods, and the total gross income from this source is estimated between \$40,000 and \$50,000.

The novelty mills proper make their income from manufacturing very small things on a large scale. A bunch of wooden toothpicks, which sells in the city for a fraction of a cent must net to the manufacturers a ridiculously small sum, but when they are made and sold by the millions and billions there is money in them. Likewise the cheap wooden checkers are inexpensive articles of commerce, but in the novelty mills they pay a good profit, for one factory alone will receive an order for five million checkers. On such a scale it is possible to figure out a profit, but not unless the raw material is cheap, and the machinery invented for the work so thorough and quick that the little round pieces of wood can be made at a marvelously rapid rate. Indeed the checker pieces spout out of a funnel so fast that they quickly form a huge heap. The piece of timber is first shaved off the right size, and then as it is forced through a funnel knives cut it into small pieces just the size of the checkers.

Another product of some of the mills are small dice boxes, which are manufactured for the trade out of small pieces of timber that are discarded for building purposes. One might gather some faint idea of the gambling business in this country from the statement that some half a million of these dice boxes annually come from Maine's mills. They are shipped to all parts of the country. Backgammon, checker boards, domino boxes, and all conceivable kinds of games and boxes are made in great quantities. The same mill will have machinery for making half a dozen different kinds of novelties. There is one novelty mill in Oxford county which manufactures fifty different varieties of novelties. It is by such combinations that large profits are made. The wood which is nothing but waste after the large boxes are made is utilized for toothpicks, skewers and similar articles. In this way all the trimmings find some use.

Wooden bicycle rims are important articles of the novelty mills, and tables, desks, sleds, swings, and toys by the million swell the total output each year. Christmas toys have in recent years been made great features of the mills. This trade promises to become one of the most important. The millions of wooden toys which are sold at Christmas time can be made at the novelty mills far cheaper than in almost any other part of the world. Machinery is being made and perfected every year for cutting out toys for children, and instead of being "made in Germany," we may soon see "from the Maine woods" stamped on all our wooden toys and Noah's Arks. Recently efforts have been successfully made to paint these toys by machinery so that the cheap hand labor of Germany and Switzerland can be offset. The possibilities in this direction are very promising, and mill owners are carefully studying new methods of manufacture by machinery which will bring the cost down to the lowest figures. The supply of waste timber is almost inexhaustible, and it remains for the inventors and manufacturers to find means of utilizing it in commercial ways. So far Yankee genius has been very successful, and within a decade the output of the novelty mills may be doubled several times over.

One of the most important steps to establish aerial telegraphy stations at a distance from the coast and thus communicate with approaching ships is to be shortly carried out. The floating station will be placed in the open sea at the point 49 deg. 40 min. north latitude and 8 deg. west longitude by an English company which has been recently formed at Liverpool. This point is 110 miles west of Cape Lizard, and the station will be in constant communication with the latter point. As the distance is within the limits of good operation there is no doubt that the messages will be regularly and accurately received. The vessel which is to be anchored here will serve different purposes. It will be equipped as an electric fliership, a telegraph and postal station, a life-saving post and also as a supply station which will furnish food, coal, etc., to ships which are in need. The vessel will also be of value as representing an advance maritime post for England. There may be some difficulty in the way of anchoring such a vessel, as the ocean depth in this locality reaches 400 feet. The ship will need

to be of a considerable tonnage in order to carry out the requirements, as well as to resist the force of the Atlantic during the winter season. In this exposed situation the vessel will certainly be subject to some rough treatment.

A TEXTILE NOVELTY.

BY WILLIAM VON BRENNERBERG.

The great forward strides which Germany is making, not only in the chemical and electrical industries, but in almost all technical branches, deserve the careful attention of American manufacturers.

The object of the following lines is to call the attention of American textile manufacturers to a new industry which has recently been started in Germany and which offers considerable prospects and possibilities, i. e., the wood-pulp or cellulose tissues made by the Patentspinnerei Actiengesellschaft at Altdamm near Stettin.

The spinning of wood-pulp or cellulose is the patented invention of Mr. Gustav Türk, manager of the cellulose works at Walsun on the Rhine, and the well-known inventor Dr. Carl Kellner, of Vienna.

The spinning process is a comparatively simple one. The fibrous materials are first treated in the usual manner, for instance in the rag engine, i. e., they are first macerated or decomposed and thereupon passed through a specially constructed machine, resembling the sieve-cylinder machine used for paper making.

The novel feature of this machine, however, is that the fibrous material suspended in water is not worked on the whole breadth of the sieve-roll so as to form a broad gauze, as is usual in paper making, but is immediately separated in strips of suitable breadth, which form a thread of rowing after being rolled up. Thus the gauze divider which was necessary hitherto is entirely avoided.

The sieve-roll of this apparatus is such that narrow strips of material acting as a sieve, such as wire gauze, alternate with strips of solid material.

In consequence of this construction of the sieve-roll, the fibrous or pulpy material adheres only to the strips of wire gauze. The continuous movement of the water in the vat contributes to remove all fibers extending beyond the edges of the wire-gauze strips, the thickness of the strips of fibrous material adhering thereto is thereby increased toward the edge, while the revolving movement of the sieve-roll tends to lay the fibers of the fibrous material in a longitudinal direction parallel to one another.

The strips formed in this manner are then taken off the sieve-roll in the usual manner by means of a band of felt and brought between pressure-rollers, where the water is squeezed out of the same. The strips of paper or fibrous material adhere to the smooth upper roller. They are then taken off this roller and passed between two sets of rubbers moving to and fro, where they are rolled up in their length.

These rowings are then passed to the fliers, where they are treated in the usual manner.

As will be seen, the process is a continuous and very simple one. In this manner fiber of only 2 to 8 millimeters length can easily be spun into yarns of considerable strength.

Another advantage of this process is the simplicity with which the dyeing can be effected.

For this purpose it is only necessary to put the dye into the vat containing the water in which the fibrous material is suspended; in this way every single fiber will be dyed before the rowing is made therefrom, and therefore the whole complicated and costly dyeing and drying process is considerably simplified.

If it is taken into consideration that the process itself is considerably cheaper than the usual method of making yarn, that even the shortest animal or vegetable fibers can thereby be easily spun into yarn, and that the price of best quality of wood-pulp is only about one-third of that of ordinary cotton, the advantages and possibilities of this process are evident.

The objection might be raised that yarn of fibrous materials of only 2 to 8 millimeters length cannot be strong or fine enough; however, this objection is futile, as there are quite a considerable number of textile fabrics where the strength and thinness of the single threads are of not so much importance as the handsome color, pliability, comparative strength and cheap price, such as carpets, draperies, furniture covers, etc. Besides, in the case of wood-pulp, the strength of the yarns can easily be increased by submitting them to a chemical treatment, and finally, if such short-fibered yarns are used as wefts in combination with cotton or linen threads as warp, every single fiber will be tied down at least three times by the warp, and therefore such tissues will be almost as strong and durable as pure cotton and linen fabrics.

Doubtless yarn made according to this process will in the future replace to a considerable extent woolen, linen, cotton and especially jute yarns, especially in the cheaper grades of tissues and for such tissues where pliability and handsome color are of main importance.