



### KNITTING MACHINES.

NETTING AND KNITTING BY HAND. — ANCIENT HOSE. — FRENCH STOCKING KNITTERS. — THE FIRST KNITTING MACHINE. — WILLIAM LEE. — MACHINE-KNITTING IN AMERICA. — PROHIBITION ON EXPORTATION OF KNITTING FRAMES. — COXENDEFER. — MICHAEL TRAPPAL. — TIMOTHY BAILEY. — PROGRESS OF THE INDUSTRY. — THE LAMB KNITTING MACHINE. — WHAT IT CAN DO. — ITS AID FOR THE WOMEN.

THE generalizations of modern thought have led mankind to recognize in every interest or occupation which go together to make up what is known as the social forces, a steady process of growth, or progress, analogous to that which in the observation of the physical and mental growth of any child must strike any careful observer. The activity of the child, its ceaseless motions, and its insatiable curiosity are the means Nature takes to force upon him the necessity of becoming acquainted with his powers, and able to use his physical and mental faculties.

He must learn to use his legs and hands to become aware of what he can do and how best to do it. The growth of society is necessarily much slower than that of a child, but the history of the world shows that in government, in finance, in industry, and in every other department of human activity, the course has been the same. The wonderful industrial advance of the present century, the application of steam, of the telegraph, of science to the arts, are evidences that the race, or portions of the race, are becoming acquainted with their powers, and are beginning to use them. The application of machinery to performing the processes which formerly were carried on by the slow and tedious methods of hand labor, is a most striking exemplification of this general principle; and the inventors of modern times, by lessening the time and labor required for the production of the necessities of life, are doing a work that is equal, if not superior, to that of the

moralists, in aiding and stimulating the social and moral progress of society towards a more perfect organization of its forces.

The art of knitting, by which a continuous texture is made from a single thread, intricately joined by a series of loops, was probably in practice at a very early age in the history of mankind. We know that the analogous process of netting, in which the thread is passed over a guard, making the stitches longer and the texture consequently more open, was in common use from the earliest ages. Nets are frequently spoken of in the Bible, and as aids to the hunter and the fisher, are among the most common implements made by the various uncivilized nations at present in the world.

In modern times knitting has come to be the process upon which we rely for the production of various articles of clothing. Stockings were made of cloth, cut out in the required shape, and then sewed, even as late in England as the time of Henry VIII. Howell, in his History of the World, states that this king habitually wore stockings of cloth, "except there came from Spain, by great chance, a pair of silk stockings. K. Edward, his son, was presented with a pair of long Spanish silk stockings by Thomas Gresham, his merchant, and the present was much taken notice of. Queen Elizabeth was presented by Mrs. Montague, her silk woman, with a pair of black knit silk stockings, and thenceforth she never wore cloth any more."

The old term for the garment to cover the feet and the legs was *hose*, a word which is found in Anglo-Saxon, Old and New German, Danish, Lower Latin, and Old French, and which, with the use of the article itself, was derived from the people from whom these different nations descended.

In the middle ages the feet and the whole of the lower part of the body were covered by one garment, the *hose*, which was made entire, and intended to fit the person tightly. Our word *stocking* was introduced with the article itself, and is derived from the Anglo-Saxon word *stocken*, to stick, because the material was made with sticking-pins, or, as we now term them, knitting-needles. Our word *knit* is also derived from the Anglo-Saxon term *cnytan*, an equivalent for which exists in all the European languages, and shows itself how old must have been the knowledge of the art it describes.

On the continent of Europe, as we see in the quotation above given from Howell, the art of knitting stockings was practised long before it was in England. Buchanan, in his History of Inven-

tions, says that as early as 1527 there existed in France a guild of stocking-knitters. This fact shows that the trade had then been in existence long enough to have become of importance, though as to when it first began to be practised nothing is positively known.

In 1589 William Lee, an educated man, who had been expelled from St. John's College, at Cambridge, England, because he had infringed the collegiate rules by marrying a wife instead of remaining satisfied with being wedded only to the Muses, found himself so destitute that he was obliged to depend for his support upon the scanty earnings his wife could gain by knitting stockings. Observing her at work one day, he conceived the idea of making a machine to do the same work more expeditiously and easily. Having finally succeeded after years of labor in producing a machine which could do the work he designed it for, he made it public; but finding no encouragement in England, he took it to France, where he was seconded by Henry IV. and Sully, and where, after Henry's assassination, he died in 1610.

His workmen, having returned to England with the machine, succeeded finally in introducing its use in London and its vicinity; and shortly afterwards the manufacture of stockings by the stocking frame, as the machine was called, was introduced into Nottinghamshire, which soon acquired the reputation it has retained for this industry. Since then there have been various improvements introduced into this branch of manufacture, until the number of stocking frames in England has increased to over fifty thousand, giving employment, in Nottinghamshire alone, to about forty thousand persons.

By the machine, as originally invented by Lee, the thread was knit in a straight flat web, which, being cut into the proper lengths, was sewed together to make the stocking. An improvement upon this method, the origin of which is unknown, was knitting a circular web, which was afterwards fashioned into the heel and foot in various ways. This process is supposed to have been brought to America by a German who immigrated from Belgium, and settled in Connecticut in 1835.

During the century before, as late as 1784, the existing penalty of forty pounds for exporting a stocking frame from England had been so greatly increased that it had been difficult for the colonies to obtain them. The date of the settlement of this country was almost coincident with the introduction of knit stockings in Eng-

land. Yet Felt, in his *Annals of Salem*, gives a list of articles to be exported to New England in 1629, among which are eight hundred pairs of stockings, two hundred pairs of which were to be Irish, at thirteen pence a pair in Dublin, and one hundred pairs of *knit*, at two shillings four pence a pair; also "500 pair of redd knit capps, milled, about 5d. apiece," together with "sutes of dublett and hose of leather lyned with oyled-skin leather, ye hose and dubletts with hooks and eyes," and "breeches," or "leather drawers," which for a long time, in New England, took the place of knit hosiery.

The prohibition on the exportation of knitting frames from the mother country forced the colonists to depend upon hand labor for the domestic supply of the demand for stockings and other articles of hosiery. Naturally, too, this labor fell upon the women, and nobly did the mothers and grandmothers of those days meet the responsibility. Up to quite the present century the chief supply of hosiery for the inland population of the country, was produced by the busy fingers of the women in the odd moments of leisure they could snatch from more pressing duties during the day, or during the long evenings of winter.

The subject early engaged the attention of the colonial governments. In 1662 the Virginia Assembly voted a premium of ten pounds of tobacco, the currency of that day, for every dozen pairs of woollen or worsted stockings. When the approaching Revolution intensified the patriotism of the land, the same state offered fifty pounds for every five hundred pairs of men's and women's stockings produced, and worth from one shilling to three shillings a pair, with the privilege of buying them at an advance of seventy-five per cent. upon these prices. Among the German settlers of New York and Pennsylvania this branch of domestic industry flourished naturally. The knitters of coarse yarn stockings in Pennsylvania are said, in 1698, to have received half a crown a pair.

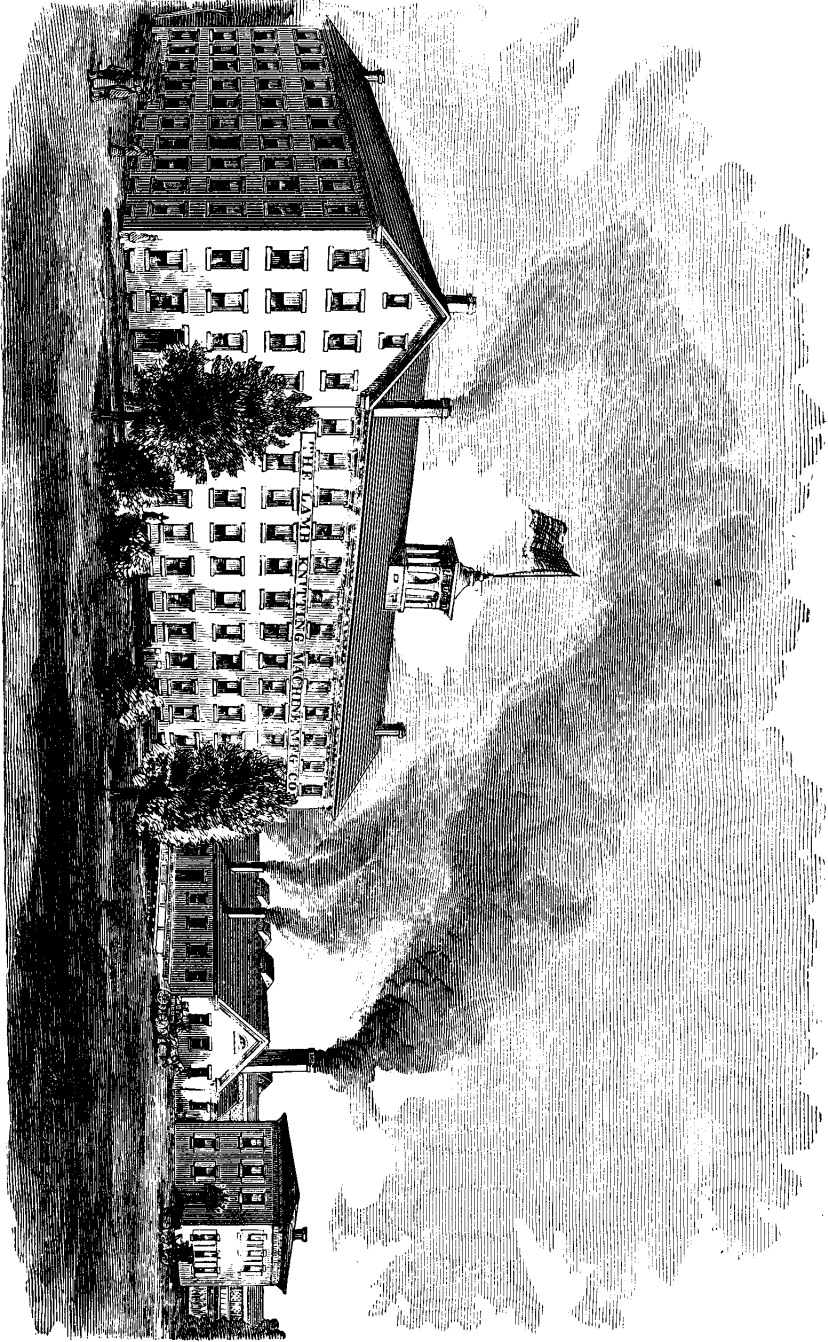
Despite the prohibition upon the exportation of stocking frames, knitting by their aid was introduced into the colonies before the Revolution. The machines were probably introduced by the Germans. The earliest mention found is an item in Bradford's *American Weekly Mercury* for 1723, which speaks of Matthew Burne, of Chester County, Pennsylvania, as having served John Camm one or two years at stocking-weaving, during which time Camm's stockings obtained some repute. In 1776 the Committee of Safety

in Maryland appropriated three hundred pounds to Mr. Coxendefer, of Frederick County, to establish a stocking manufactory. In 1766 the Society of Arts, established in New York, offered a prize of ten pounds for the first three stocking looms of iron set up that year, with five pounds for the next three, and fifteen pounds for the first stocking loom made in the province.

In 1794 Michael Trappal, of Newark, New Jersey, petitioned Congress for an additional duty on hosiery, or some other encouragement of the industry. In the census of 1810 the returns from ten states and territories reported a manufacture of four hundred and eighty-one thousand three hundred and ninety-nine pairs of stockings, valued at five hundred and seventy-two thousand seven hundred and forty-two dollars. Of this Virginia had made almost one half, Pennsylvania, next in order, nearly one quarter, and third, Connecticut.

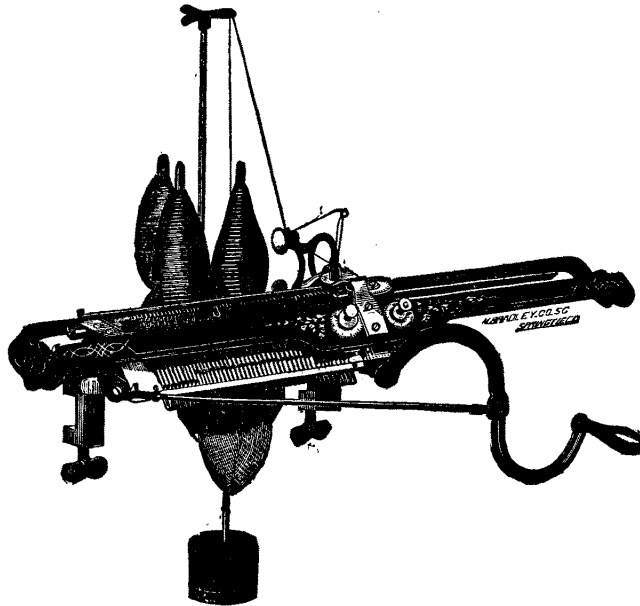
In 1831 Timothy Bailey, of Albany, succeeded in applying power to the old stocking frame of Lee, thus making it a power loom instead of a hand loom. This improvement had been repeatedly tried in England and on the continent, but had been abandoned as an impossibility. This, with the introduction of the machine for knitting a circular web, by which the necessity for a seam in the leg of a stocking was done away with, gave great impetus to the production, since the cheapening, consequent upon this saving of time and labor, greatly increased the consumption. The attention of the inventors being thus turned in this direction, numerous improvements were patented, which were generally intended to improve the machines for factory use.

It is thus that within the last fifty years or so the production of articles of hosiery has been changed from a domestic to a factory industry. Formerly a workman with one of the old hand-power machines could produce in a week about a dozen pairs of cotton hose: now one of the best rotary round power-frames can produce in the same time about two hundred dozen pairs. Against such competition as this the knitting needles, even in the hands of the most skillful grandmother, are powerless. But on the other hand, this method of manufacturing in factories, while it has certainly been of great benefit by cheapening the prices of hosiery, has also done much to deprive the women of a branch of employment of which they had once nearly the monopoly. There is but one remedy which clearly meets this case, and that is the invention of a machine which they could use themselves.



WORKS OF THE LAMB KNITTING MACHINE MANUFACTURING COMPANY, CHICOPEE FALLS, MASS.

This result has been attained by the Lamb Knitting Machine, the invention of Isaac W. Lamb, a Baptist minister of Michigan. This invention gives the women the power to successfully contend against the competition of the factory, without being forced to leave their own firesides, or desert the more congenial sphere of their own homes for the crowded factory. While so simple in



LAMB KNITTING MACHINE.

its construction that any intelligent person can readily become acquainted with its working, it combines the merits of the stocking frame and the circular machine, with the important advantage over both of forming a tubular web in such a manner that it can be narrowed or widened, — “fashioned,” as the technical term has it. This result has never been obtained previous to the invention of the Lamb Machine. This, with any variety of plain and fancy ribbed webs, is accomplished by arranging the self-acting latch needles in two parallel rows, and at pleasure, by simple adjustments effected in an instant, operating either row, a part singly for plain flat webs, alternately for tubular, and both together for ribbed or seamed work, and narrowing or widening either web by adding to or subtracting from the number of needles in operation. This is usually done at the ends of the

rows, thus locating the fashioning at two points; but, by manipulating the stitches on the needles, a web can be fashioned at as many points as may be desirable; and this has been applied to a branch of manufacture heretofore done *only by hand*, namely, *heeling and toeing* the ribbed web made on circular machines for mens' and boys' socks. In the ribbed webs, by different arrangements of needles, and transferring stitches, the most beautiful designs can be produced, limited only by the imaginative ingenuity of the operator.

Thus it will be seen that this wonderful little machine (only twenty-six inches long by nine inches wide) will knit all kinds of hosiery, gloves, mittens, &c., completing them with less hand labor than any other machine ever made, and, at the same time, all the fancy articles of wearing apparel, such as scarfs, hoods, jackets, shawls, cardigans, clouds, nubias, &c., and is truly called the companion of the sewing machine. In short, it makes the women, who are the chief consumers of the five or six million dollars' worth of knit goods which are yearly imported into this country, able to produce them for themselves.

