

THE DEVELOPMENT OF HOSIERY MACHINERY.

The invention of the stocking frame in 1589 by William Lee, of Calverton, Notts, has been the means of providing for us the most comfortable, durable, and easy style of hosiery underwear that we can possibly obtain, and all the improvements made by man in this direction, and in the production of various kinds and classes of machinery, have been upon the groundwork and principle of Lee's idea, which consisted of a series of loops made by a set of needles in a horizontal direction, thus giving to the material the great elasticity that it possesses. This is one reason of its great adaptability for the manufacture of goods for underwear; another is the capability of this frame in making the article to fit the shape of the human body. Elasticity is very essential for a class of clothing that is required to fit somewhat closely to the body of the wearer, and it renders this fabric easy and suitable for this purpose, as it gives way with every action and movement of the body. If, on the other hand, the underclothing were made from a non-elastic material, such as that produced on warp machines, where the loops are formed in a vertical direction and have not the elasticity of the horizontally-formed loops, and have therefore a tendency to drag and not to give with the movements of the wearer, it would prove less suitable for use next to the body.

Before the introduction of this looped fabric many hose were worn made from cloth which was sewn together, but could not be made to fit the legs so well, and were not so easy for wear as the knitted and shaped hose. Prior to the invention by W. Lee, the knitting by hand of hose had been introduced into England from Spain during the reign of Edward VI., and at that period many ladies made and wore knitted silk hose.

The hand frame for hosiery, as invented by Lee, was very much improved by his brother, James Lee, and a man named Gaston. These hand frames were built up to the year 1844, which was the culminating point in the history of this class of machinery. At this time it is estimated that there were in England 48,462 frames, and out of these nearly 20,000 were worked in the town and county of Leicester, the manufacture of hosiery having been first introduced into Leicester in 1670. It was found impossible to make sufficient hosiery from the hand frame to meet the increased demand, and, besides, the price of the hand-made goods placed them out of the reach of the poorer classes of the people. Manufacturers consequently turned their attention to inventing machinery on a similar principle to that of Lee's, but with a greater production for the same amount of labor, and we find that in 1769 a frame called the rotary frame, working on the same principle, was invented for the production of four or six hose at one time, instead of one as on the original hand frame; but it was not until the year 1837 that the rotary frame was perfected for general use by a man named Coltman.

Notwithstanding this introduction, it was found

necessary with the largely growing trade in hosiery, and the demand for a greater, quicker, and cheaper production, to bring out some machine to meet the difficulty; and we find that a Frenchman named Brunel, in 1816, invented a circular machine having horizontally-fixed needles. This was very little used until A. Paget, of Loughborough, adapted it for use in England. In the year 1849 Moses Mellor, of Nottingham, converted this machine into the English circular machine working with needles in a perpendicular position, and moved by power. This latter class of machines, with numerous improvements and additions, has been very largely built and worked in all hosiery centres. The production of these machines, worked by steam power, is such as to have glutted our markets with the cheapest styles of hose, half-hose, shirts and pants, etc., that it is possible to have made.

It remained for the late William Cotton to invent, in 1864, a machine known as "Cotton's Patent Rotary Frame," which caused a revolution in the trade, and was the downfall of the old hand and rotary frames. This invention was exactly on the same principle as W. Lee's original invention, and is simply a series of hand frames thrown upon their backs and combined into one machine, worked by steam power, and producing in most modern frames 12 legs at one time. Any one of the frames can be put out of action by means of a lever whilst the other legs are being made. They are built in gauges varying from the coarse eight-gauge to a fine 50-gauge, which is about the finest fabric that is used in the trade.

Since the patent was taken out for this invention it has been improved in every possible way, and has had many additions made to it, until it has reached such a state of perfection as to produce goods which none but an expert can distinguish from those made on the one-at-once hand frame. From simply making hose with the ordinary narrowings in the feet and legs, there have been added, to work by automatic appliances, the splicing tackle for the heels, instep, and knees when required, the double, or crowfoot, narrowings in the feet to represent a wrought hose, and the marking by eyelets or letters in any part of the article. By an extra machine, to which is attached an extra row of needles, called the machine needles, which work in conjunction with and opposite to the frame needles, a one-and-one ribbed fabric is produced, and by the alteration of the quantity of needles used on the machine a two-and-one rib is obtained. Also there are produced from this class of machinery ribbed tops, which are of a very elastic nature, and are adapted specially for the purpose of placing (by means of running on) on the legs of half-hose and socks, the sleeves of shirts and vests, and the legs of pants, etc., etc., to keep the different articles in their proper position on the body. Half-hose are produced in great variety on this class of machinery, and some very beautiful designs are produced by varied colored yarns forming stripes, which are made with the assistance of an extra wheel attached to the end of the frame, known as