

and the weave is marked on it, but too often one has to guess at the weave. Secure a sharp-pointed tool and a piece of paper. Then loosen the threads at the top of the sample. If the first warp thread at the right is found to be beneath the first filling thread, then mark it on the paper as "down." That is, the warp thread is down. "Down" on the paper is represented by a cross (X). Now the next four-warp threads are found to be "up" over the filling thread. Mark these four-warp threads with four marks (////), because black represents the warp threads that are up. Next two-warp threads are down and are marked by two crosses. Next warp thread is up, and marked so. This is the end of the repeat. Then begin with the next filling thread, and do the same. Then take the next and so on. A good deal of trouble is experienced with samples made of soft spun yarn. Samples woven by the use of a complicated weave are hard to pick out. Of recent years the demand for fancy figured designing appears to have no limit. All the way from two to forty harness patterns are made in large numbers. The following suggestions are given: (1.) If the piece be woven by the use of an intricate pattern chain, it is a good plan to remove the "nap" by submitting it to a flame, or by the use of a sharp knife or razor. (2.) Much trouble is obviated by ascertaining which is the warp and which is the filling. *A*—If there are any "reed lines" in the goods, the direction of the warp can be easily known. *B*—A piece of listing on the sample shows the direction of the warp. *C*—The hard-twisted threads are the warp, and the soft-twisted the filling. *D*—If the pattern is striped, the stripes will run in the direction of the warp. *E*—Sometimes particles of sizing will be found adhering to the warp threads never to the filling.

Flocks are a soft, fiberless substance cast out from the different machines during the processes of manufacture. Fulling flocks are the most important, and are found in the fulling mill. If they are white, they have a high market value, being serviceable in combination with wool in several grades of woolen fabrics. Colored fulling mill flocks find their way into colored yarns, and are also adapted to certain classes of woven fabrics. Shear flocks are the superfluous nap or wool cut from the cloth in the process of shearing. They are sometimes used to increase the weight of goods while in the fulling mill.

Loom flyings are worn from the threads of the warp by its unceasing motion during the process of weaving. The constant rising and falling of the harnesses at the rate of 80 to 100 movements per minute causes a fine powder-like fiber to fall to the floor beneath the loom. Frequently it accumulates to the depth of one-half inch to an inch in a single day. Flyings from the loom are utilized by first passing them through the dusting process and adding them in small proportions to wool mixes.

Burr waste is obtained from the carding machines, and consists of the refuse material removed by the burr

cylinder. A long box adjusted to the frame of the card on a level with the burr cylinder receives all the lumps, burrs and substances too hard and bulky to pass into the carding machine, and which are knocked out by it. This refuse matter is periodically removed from the box and subjected to the dusting process, which removes all the dust and dirt. It is then in the form of a mass of curly locks and lumps of wool, which can be reduced to a fibrous condition by passing it through the steel-toothed cylinders of the garnett machine, and thus prepare it for final use in combination with pure wool.

THE HISTORY OF THE READY-MADE CLOTHING TRADE.

(Continued.)

The history of the sewing machine is one of the romances of the age. The "Song of the Shirt" was chanted over the hopeless slavery of the needle, wielded by the fingers of tens of thousands of seamstresses, who dimmed their eyes by working seventeen and eighteen hours a day, living on tea and dry bread, and caring for their families, all to earn as much in a week as a good machine can earn now in a day. The same wail might even now be chanted over slum workers in the clothing trade, when one has had to witness the struggles of pauper foreign labor, the underlings of low-class sweaters, or the incompetent workers in delicate health or with unhealthy surroundings. But wherever the sewing machine has been set in motion, under the control of capital and skill, clothing factories, separated from the sweater and the speculator, vie with any other great factories in their sanitary, wholesome, and even pleasant surroundings, their moral influence, and their satisfactory pecuniary return to the employee.

But if the wails of the "Song of the Shirt" came from the garret, so, indeed, might it be said that the pangs of victory of the sewing machine came from the same stuffy quarter, for it was in a lonely garret at Cambridgeport, Massachusetts, United States, that Elias Howe, the inventor, constructed and finished the first automatic sewing machine that ever saw the light. This was in the year 1845. Previous to that date several attempts had been made to introduce a machine for the purpose of supplanting hand-labor, but none of them had been of any practical utility. The invention of John Duncan, for which letters patent were granted in England May 30th, 1804, was the first deserving of notice at all. This, however, was only a sewing machine in that it was an apparatus for loosely interlocking threads. It could not make a seam, and was intended only for ornamenting, tambouring, or embroidering, and even for that purpose had very little value.

In 1807, and again in 1821, James Withers took out English letters patent for what were termed "improvements in sewing machines." Both these patents were for stationary clamps, similar to saddlers' clamps, for the purpose of holding gloves for hand-sewing, but they bore no resemblance to Howe's invention. Amongst other patentees who followed might be mentioned the names of Henry Lye, of Philadelphia, in 1826, who invented a machine for sewing leather, but who did not leave any model of his contrivance; M. Thimonier, July 17th, 1830, who invented a machine for making tambour "stitches" by means of a crochet hook, and an instrument which was called an "accrocheur" in the patent. It was, however, defective because of its lack of power to fasten two pieces of material together; it had no feed motion; and its uses were extremely visionary. A model of another machine was deposited by Alexander Temple in 1844, and John J. Greenough, on February 21st, 1842, and again on February 12th, 1846, but all shared a similar fate to their predecessors.

The only real competitor with Howe was undoubtedly our countryman, John Fisher, jr., of Nottingham. The primary idea of Fisher was set forth in the specification of the firm of Fisher & Gibbons, when they took out the patent, viz., that it was machinery for making ornamental figures or designs on lace, or

* This machine may be seen at the South Kensington Museum.