

Cotton-ma-chin/er-y. The progress of a bale of cotton to the condition of thread or yarn may be briefly stated as follows : —

1. *Sorted* and mixed, to give uniform quality to a given lot. The cotton is piled in layers in a *bin*, and, in taking it from the side of the heap, the cotton of the several strata is an average of the whole.

2. *Scutched* or *willowed*, to tear the matted masses apart and open out the fibers.

3. *Cleaned* and *batted* by a combined tearing and blowing action.

4. The bat is farther treated in a similar manner, the filaments being more divided, received on a wire-gauze drum, pressed into a thin sheet, and delivered as a *lap* upon a roller.

5. *Carded*, to straighten the fibers, which are delivered in *fleeces* or *slivers* by the *doffer*; that is, in broad or narrow films or transparent sheets of fiber; or the *fleece* is reduced to a *sliver* by being passed through a funnel and consolidated by rollers.

6. *Doubled* and *drawn*, to complete the parallelism and elongate the ribbon. By the repetition of this process, the possible inequalities of separate ribbons are lost by throwing them together and re-drawing again and again, and depositing in cans.

7. *Roving*, to attenuate and slightly twist the spongy cord and wind it on bobbins.

8. *Fine-roving* and *stretching* by the *bobbin-and-fly* frame or the *stretcher-mule*, delivering on bobbins.

9. *Spinning* in the *throstle*, which continuously *draws*, *twists*, and winds the yarn (for warp); or in the *mule*, which *draws* out and *twists* lengths of about 56 inches, and then winds upon the spindles (for weft).

10. *Winding*, *doubling*, and *singeing* the yarns, to fit them for the weaver.

11. Packing.

12. Dressing.

13. Warping.

14. Weaving.

N. B. There are many varieties and differences in machines and processes, and some even in the order of details. Much difference also exists in the machines for finer or coarser work, so that, while the above list is substantially accurate, it will not be found to agree with the order of all factories, and perhaps not in every respect with any one.

The inventions involved in the treatment of cotton by machinery are about as follows : —

Fly-shuttle, John Kay, of Bury, 1738.

Carding-machine, Lewis Paul, 1738.

Drop-box, Robert Kay, 1760.

Spinning by rollers, Lewis Paul or John Wyatt, 1738.

Spinning-jenny, Hargreaves, 1767.

Water-frame, Arkwright, 1769.

Power-loom, Rev. D. E. Cartwright, 1785.

Cotton-gin, Eli Whitney, 1794.

Dressing-machine, Johnson and Radcliffe, 1802-1804.

Power-loom, Horrocks, 1803 - 1813.

Mule, Samuel Crompton, 1774 - 1779.

Self-acting mule, Roberts, 1825.

See COTTON, FLAX, WOOL, HEMP, SILK, ETC., APPLIANCES, p. 631.

A cotton-factory cited by Ure has machines in the following proportions : —

1 *willow*, 1 *blowing-machine*, 1 *lap-machine*, capable together of cleaning and lapping 9,000 pounds of cotton per week.

21 *cards*, *breakers*, and *finishers*; joint capacity 5,000 pounds per week of 69 hours.

3 *drawing-frames* of 3 heads each.

2 coarse *bobbin-and-fly* frames.

7 fine *fly-frames*.

12 self-acting *mules*; 404 spindles each.

10 *throstle-frames*; 236 spindles each.

7 *dressing-machines*.

236 *power-looms*.

2 *warping-mills*.

300 *warp-winding* spindles.

The rovings have four hanks in the pound, and are spun into yarn No. 38 on the throstles as well as by the mules.