draws in the raw mass of wool or cotton to be spun in pro portion to the velocity given to such rowlers, cillinders, or cones. As the prepared mass passes regularly through or be twixt these rowlers, cillinders, or cones, a *succession* of other rowlers, cillinders, or cones, moving proportionably faster than the first, draw the rope, thread, or sliver, into any degree of fineness which may be required. Sometimes these successive rowlers, cillinders, or cones (but not the first) have another rotation besides that which diminishes the thread, yarn, or worsted, viz., that they give it a small degree of twist betwixt each pair, by means of the thread itself passing through the axis and center of that rotation. In some other cases only the first pair of rowlers, cillinders, or cones, are used, and then the bobbyn, spole, or quill, upon which the thread, yarn, or worsted is spun, is so contrived as to draw faster than the first rowlers, cillinders, or cones give, and in such proportion as the first mass, rope, or sliver is proposed to be diminished.”

To appreciate rightly Wyatt’s invention, we must take into consideration the state of the art at his day. No ma chine, except the household wheels, already described, then existed, and their useful effect depended on the skill and dexterity of the spinner. Wyatt's invention contained the germ of a selfacting and self-regulating principle ; and the means which he used were so unlike any operation perform ed by the hands, that although unfortunately his success was only partial, he is yet entitled to our admiration for the originality of his genius. He did much for the art, if what he did prepared a foundation for Arkwright’s superstructure.

The next invention was one in which an effort was made directly to imitate the action of the spinster, as exemplified in the wool-wheel, in drawing away the roving of wool un til extended to the proper length, and, after having twisted it, winding it on the cope or spindle. This was the “ Jenny” of Hargreaves, a poor weaver of Lancashire.

If we imagine many spindles to be set in motion by one wheel, and the ends of the rovings connected with these to be inserted between two pieces of wood, which, like the jaws of a vice, would hold them firmly, and by which they could all be drawn back at one time by the left hand of the spinner, while with his right hand he could drive the wheel which gives the spindles their motion, we shall have a good idea of the first spinning-jenny, which was indeed, no more than this. In process of time, however, the machine was rendered very different from the one first constructed. The spindles were increased from eight (the number in Har greaves’s original machine) to eighty, and upwards; the clove or clasp by which the slivers or rovings were held was improved in form, and mounted on a carriage, and made to run on a railway in the framing, the effect of which was more perfect equality of the thread, and a greater degree of precision in the process. The yarn when spun was built up in a conical form on the cope or spindle by a pro per apparatus, and altogether the machine was very much improved. Still, with all its improvements, it was only a handwheel of many spindles. But as a handwheel it probably effected more good than it would have done had it been more complete. It still remained a domestic implement of small cost, and its use rapidly extended. The jenny was imperfect in so far that it could only be brought to act upon rovings, which required to be formed on the hand wheel already described. This defect was soon remedied by the introduction of the *slabbing billy,* in which the parts of the jenny were reversed, the place of the clove or clasp being supplied by rollers, and the spindles being mounted in a frame running on a railroad. The card rolls or slivers were in this machine placed continuously on an inclined plane, formed by a travelling canvas, which conducted them up to the feeding rollers, placed at its highest point ; and on passing through the feeding rollers the slivers were attached

to the spindles, which, receding from the rollers, twisted the slivers and formed rovings for the jenny. This machine is still used for forming the rove in wool-spinning.

The problem of automatic spinning, however, remained yet to be practically solved, and this solution was reserved for the genius of another man in poor circumstances,— Richard Arkwright.

The bad success of roller-spinning in the hands of Wyatt, a most ingenious man, would have deterred most men from again attempting it ; but partial failure appears to have ever stimulated the persevering Arkwright to fresh exertion. He, a poor man, a barber by trade, unaided, almost uneducated, and totally unacquainted with mechanics, perfected a system of machine-spinning which ultimately raised the manufactures of his country to a height unexampled, and obtained for him honour and wealth.

Arkwright’s principle of roller-spinning need not here be particularly described, as we shall have occasion to illustrate it more fully afterwards. It is only necessary generally to observe, that in this mode of spinning the material is ex tended to the requisite degree by rollers, and twisted and wound up by a flyer and bobbin, as in the small flax wheel, the drawing, the twisting, and the winding up being simultaneously carried on. Important as the invention of roller spinning is, it is not on it alone that the fame of Ark wright rests, but also on the power of mind displayed in remodelling the habits of people accustomed to desul tory working, and, in short, in establishing the factory system.

The next great invention was also produced by a man in humble circumstances,—Samuel Crompton, a weaver at Hall-in-the-wood near Bolton. This ingenious individual, combining the drawing roller of Arkwright with the jenny of Hargreaves, produced a beautiful, though somewhat complex, machine, to which he gave the appropriate name of the *mule-jenny.* In the mule-jenny the drawing rollers are mounted in a stationary frame, and the twisting spindles in a moveable carriage ; the rovings are passed through the rollers and attached to the spindles ; the rollers and spindles are then made to revolve, and the carriage to recede from the rollers, carrying away and twisting the attenuated rove. When a sufficient quantity of rove has been given out, the motion of the rollers is suddenly stopped and that of the spindles of the carriage increased to nearly double its former velocity, the carriage itself still receding from the rollers, but at about one-half its former speed ; thus the greatest extension only takes place as the rove receives twist to enable it to bear it

These machines were all the offspring of the cotton manufacture ; but it may be well supposed that the principle on which they act would soon be adopted in the spinning of wool, flax, and silk. It is not here necessary to trace the different steps through which, by slow degrees, the parts of these machines were brought to suit the peculiarities of other manufactures. We shall, therefore, proceed to the elucidation of the principles of spinning the various textile materials by machinery, observing first, that, to fit these materials for spinning, they are made to undergo several preparatory processes; the effect of which, when well performed, is to separate the fibres, to unravel those which are entang led, and, except in the case of flax, to present the whole mass in a continuous sliver or ribbon of an equal width and density throughout its whole extent. On this sliver the operation of spinning is performed.

If we take hold of a portion of euch a sliver with the hands rather farther apart from each other than the average length of the fibres of which it is composed, we shall find that, by the sliding of the fibres on each other, we can extend it a little without breaking it. Suppose then that we thus extend a few successive portions, and lay them together, and corn bine them by slightly twisting them, so that the tortion shall