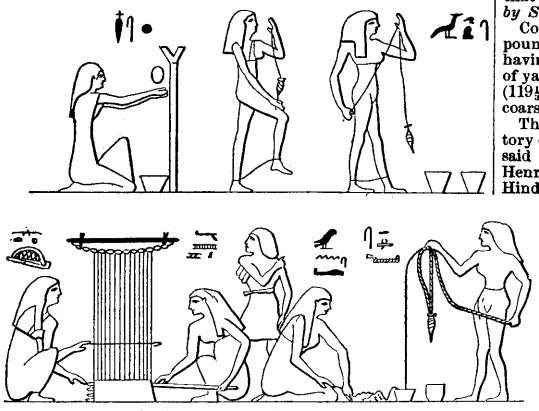
Spin'ning. The process of twisting fiber into a thread or cord.

The earliest representations of the art are in Egypt, to whose ancient inhabitants we are much indebted, and who have left on their temples and tombs enduring monuments of their arts and manners.

With the Egyptians, as with most other nations, the duty of spinning devolved principally on the females. The accompanying illustration is from a tomb at Beni Hassan. The woof was introduced by a hooked stick instead of a shuttle, and was laid double or single.

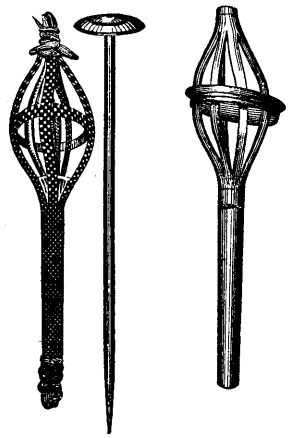
Fig. 5402.



Spinning and Weaving in Ancient Egypt.

The spindles of the ancient Egyptians were made of wood or cane, and the head was made of gypsum or other material, to make it more weighty to increase the impetus in turning. Some were of light plaited work, made of rushes or palm-leaves, stained of various colors. A number of them are in the museums of Europe. One of them, found by Mr. Wilkinson, had some linen thread adhering to it.

Fig. 5403.



Egyptian Spindles.

> "Well skilled to cull
> The snowy fleece, and
> wind the twisted wool."
>
> ILIAD, Book III. (*Pope's version*).

The earliest mode of spinning was probably by the distaff and spindle.

The distaff was a cleft stick, about 3 feet long, on which wool, flax, or cotton was wound. It was held under the left arm, the fibers being drawn from it and twisted by the thumb and forefinger of the right hand. The thread was wound upon a spindle, which was suspended and rotated by the action of the thumb and finger, descending as the thread lengthened until it touched the ground. The *length* was then wound on to the spindle, and the thread secured in a cleft of the reed which formed the spindle. See DISTAFF, page 710.

The notices of spinning in the Bible are restricted to a few passages, which show that the distaff and spindle were employed, and furnish us nothing beyond the practices of the Egyptians.

While the first worker in brass and iron, and the first handler of the harp and organ, are noted in Genesis, we have nothing in regard to the person who first spun and wove. There can be little doubt that it was a gradual work, the growth of centuries of trials; and we may infer that Tubal Cain and Jubal were distinguished links in a chain of inventors and improvers in the metallurgic and musical arts.

The extreme fineness of the Indian cotton fabrics is no new thing, for two Arabian travelers of the ninth century (A. D.) state that "their garments are wove to that degree of fineness that they may be drawn through a ring of moderate size." Marco Polo, in the thirteenth century, mentions the Coromandel coast, and especially Masulipatam, as the home of the finest work.

Tavernier (middle of seventeenth century) states of the turbans of the Indian Mohammédans, that "the rich have them of so fine a cloth, that 25 or 30 ells of it put into a turban will not weigh 4 ounces."

A piece brought to England, from Dacca, by Sir Charles Wilkins, in 1786, "weighed 343/10 grains; its length was 5 yards 7 inches, and it consisted of 196 threads. The whole length of thread was 1,018 yards 7 inches. This was about 29 yards to a grain; 203,000 yards to a pound avoirdupois of 7.000 grains; that is, 115 miles, 2 furlongs, and 60 yards." — *Memorandum by Sir Joseph Banks.*

Cotton yarn has been spun in England 350 hanks to the pound, each hank measuring 840 yards, and the whole pound having therefore a length of 167 miles. The extreme fineness of yarns for muslins spun in England is 250 hanks to the pound (119½ miles), but it is very rarely finer than 220, which is a little coarser than the thread of the Dacca "*web of woven wind.*"

The invention of the spinning-wheel was an era in the history of the art, but we have no name or date to record. It is said to have been introduced into England about the time of Henry VIII., say 300 years ago, but had been used for ages in Hindustan.

The essential improvement consisted in a means for rotating the spindle, the fiber being either presented in carded rovings or from a distaff.

The usual practice with cotton was to card it with coarse wire brushes until the fibers were arranged in one direction, and to present the rovings thus attained, one by one, to the spindle, which was then rapidly revolved by the large wheel by means of a band which ran over the spool of the spindle. The roving was allowed to slip between the finger and thumb of the left hand, while the right turned the wheel, the roving being twisted as it became longer and harder, gradually assuming the condition of yarn or thread. It was then wound upon the reel, another roving attached to the end of the former one, and the spinning resumed.

This is the plan yet adopted in many country places with wool, where the supply for the family, for woolen clothes and stockings, is yet made into yarn by the spinning-wheel, the work being previously carded and made into rovings in the factories, with which the country is well supplied. See SPINNING-WHEEL.

The first successful attempt to spin cotton by machinery was by Wyatt of Lichfield, 1730.

Lewis Paul's patent for spinning by rollers	1738
Lewis Paul's second patent	1758
Arkwright's first patented spinning-frame	1761
Hargreaves' spinning-jenny patent	1763
Arkwright's water-frame patent	1767
Arkwright's combined machines	1775
Crompton's mule	1779
Cotton machinery introduced into France	1787
Cotton machinery introduced into America by Slater, at Pawtucket, R. I	1789
Hammond's application of the stocking-frame to the weaving of lace	1768
Horton's knotted-frame	1776

James Hargreaves, one of the "martyrs of scientific industry," invented the *spinning-jenny* in 1763. He was persecuted by his fellow-workmen, his machine was broken into pieces by a mob, and he was driven from his native town.

The *jenny*, as at first formed, contained 8 spindles, which were made to revolve by means of a band from a horizontal wheel. Subsequent improvements raised the number to 80 spindles. Then came the mob. After the work on the "jenny" had been resumed, the mob broke forth afresh, and destroyed the carding-machines and jennies throughout Lancashire.

Hargreaves derived the idea of the spinning-jenny from observing the action of a hand-wheel which had been accidentally upset. The spindle being vertical, and continuing to revolve, he drew the roving of wool toward him, into a thread. He then applied himself to invent a contrivance which should hold the roving as it was held by the finger and thumb, the contrivance to run backward on wheels and carry with it a number of threads from as many spindles. This he succeeded in doing. See SPINNING-JENNY.

Hargreaves' place in the history of spinning consists in his being the first to contrive a means whereby one person could attend to the making of several threads simultaneously. In the furtherance of this purpose, he set the spindles upright and held the rovings by a clasp, which answered to the action of the left hand of the spinster. See SPINNING-JENNY.

Still the cotton thread produced was of so soft a nature that it was only used for *weft*, the warp of all English-made cotton goods being of linen, although imported calicoes from the East Indies were of cotton, *warp and weft.*

The next improvement, in order of time, was Arkwright's

introduced in any mechanical operation. The cotton was in the first place drawn off from the skewer on which it was fixed by one pair of rollers, which were made to move at a comparatively slow rate, and which formed it into thread of the first and coarser quality; but at a little distance below the first was placed a second pair of rollers, revolving three, four, or five times as fast, which took it up when it had passed through the others, the effect of which would be to reduce the thread to a degree of fineness so many times greater than that which it originally had. The first pair of rollers might be regarded as the feeders of the second, which could receive no more than these others themselves took up from the skewers. As the second pair of rollers, therefore, revolved, we will say, five times for every one revolution of the first pair, or, which is the same thing, required for their consumption in a given time five times the length of thread that the first did, they could obviously only obtain so much length by drawing out the common portion of thread into five times the original fineness. Nothing could be more beautiful or effective than this contrivance, which, with an additional provision for giving the proper twist to the thread, constitutes what is called the *water-frame* or *throstle*.

Arkwright became very wealthy, built a fine castellated mansion, became high sheriff, was knighted, on two occasions gave £10,000 to each of his ten children, died in 1792, aged 60 years, leaving £500,000, was buried amidst the scenes of his history, a fine monument by Chantrey being placed over his tomb. See THROSTLE; BOBBIN AND FLY FRAME.

It would be a tedious tale to tell of the various suits brought to support the claims of the Arkwright patents, — the one for the drawing-rollers, 1769; and the other for the combination of carding, drawing, and roving machines, 1775.

The case of Arkwright *vs.* Nightingale, and others in which he appears as plaintiff, occupy a prominent position in the records of patent-law decisions. The cases almost rival that of Jarndyce *vs.* Jarndyce, on whose "numerous difficulties, contingencies, masterly fictions, and forms of procedure there had been expended study, ability, eloquence, knowledge, high intellect, the power of the bar, and the matured autumnal fruits of the woolsack." Such is the opinion (paid for) of Counsellor Kenge, as reported by a distinguished writer, a good judge of such matters. Singular that the said author should have summed up the result as "Words, Wigs, Rags, Sheepskin, Plunder, Precedent, Jargon, Gammon, and Spinach."

Next in the list of public benefactors, who devoted himself to the art of cheapening fabrics and elevating labor, appears the name of Samuel Crompton, the inventor of the *mule-spinner*.

The mode of spinning by the drawing-frame subjects the thread to so great tension that it is not possible to draw it as fine as is required for many purposes. It became necessary, therefore, to make machinery more nearly approximating the action of the spinning-wheel, in which the human hand, the finger and thumb, allowed the fiber to escape gradually, giving a moderate twist to the roving as it issues from the hand, and giving the whole length a final twist after it has been sufficiently compacted to bear it.

Samuel Crompton, a youth of 16, worked upon one of the Hargréave jennies in 1769, and five years afterward constructed his spinning-machine, which was called a *mule*, as it was a kind of cross between Arkwright's machine and the Hargreave jenny. It cost him five years of labor, generally after his day's work at weaving was done.

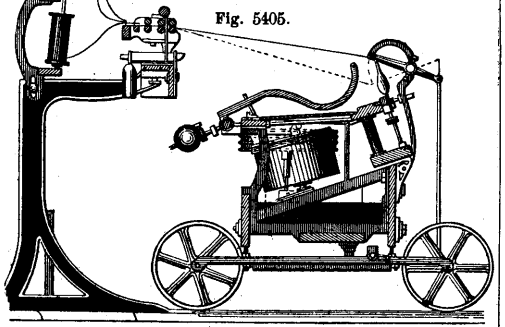
Crompton's first mule was completed in 1779.

He took his machine to pieces to avoid its destruction by the mob, but soon after he fitted the pieces together again, and its success was established, but not his own. Robert Peele and Arkwright used them in their manufactories; making large fortunes by their use. In 1812 the British government awarded him £5,000 as a mark of approbation.

Crompton's first essays were in the same line as Arkwright's, and consisted in sets of drawing-rollers. Mr. Kennedy states: —

"Crompton's first machine contained only about 20 or 30 spindles. He put dents of brass reed-wire into his under rollers, and thus obtained a fluted roller. But the great and important invention of Crompton was his spindle-carriage, and the principle of the thread having no strain upon it till it was completed. The carriage with the spindles could, by the movement of the hand and knee, recede just as the rollers delivered out the elongated thread in a soft state, so that it would allow of a considerable stretch before the thread had to encounter the stress of winding on the spindle. This was the corner-stone of the merits of his invention."

Fig. 5405.



Crompton's Mule.

Crompton worked at home in his residence, "Hall in the Wood," and made such fine yarns that competitors resorted to all mean artifices to ascertain the secret of his success. Finding it could not be kept secret, he concluded to abandon it to the public for a small consideration, subscribed by parties interested. This did not exceed $300. Some of these parties even refused this when the time came to pay.

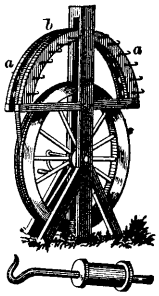
Crompton died June 26, 1827, aged 74. See MULE.

(*Flax.*) The spinning of flax resembles the throstle-spinning of cotton, but the filaments do not adhere together so readily, and, for fine qualities, it is necessary to keep the fiber damp. Water at 120° Fah. is used in preference to cold. The water is contained in a trough the whole length of the spinning-frame, and is thrown off in a dewy spray by the rapid motion of the spindles.

(*Hemp.*) Fig. 5406 is the machine used for spinning hemp into rope-yarns.

It consists of two upright posts with a wheel between them, the band of which passes over a number of rollers or wheels *a*, turning on pivots, with hooked ends, journaled in the semicircular frame *b*. By turning the wheel, these hooks are caused to revolve rapidly. The spinner wraps a bundle of hemp around his body sufficient to finish a yarn, draws out as many fibers as the thickness of the yarn demands, and twists them, attaches the bight to one of the hooks, and walks backward, gradually drawing out the proper supply of fibers from the bundle with his left hand, and allowing them to pass through the two middle fingers of his right hand, so as to regulate the amount delivered to the wheel, which is turned by an assistant. The thickness of the yarn depends on the quantity of hemp which passes through the spinner's hands in a given time and the velocity of the wheel, which governs the degree of twist.

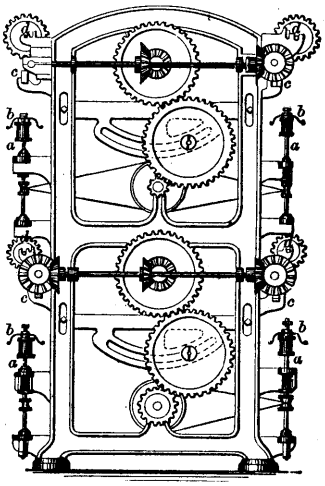
Fig. 5406.



Spinning-Machine.

(*Silk.*) The twisting of silk into a thread is accomplished by machinery substantially similar to that employed for cotton, but the thread of silk being continuous, the *drawing* devices, which gradually attenuate the sliver of cotton, are not called for in the silk-spinner. The bobbins of cleaned silk are mounted on a horizontal rail, and the silk filaments are passed to other bobbins rotating on vertical axes and furnished with flyers, through the eyes of which the filaments are passed. See SILK; SILK-MILL, etc., pages 2179–82.

Fig. 5407.

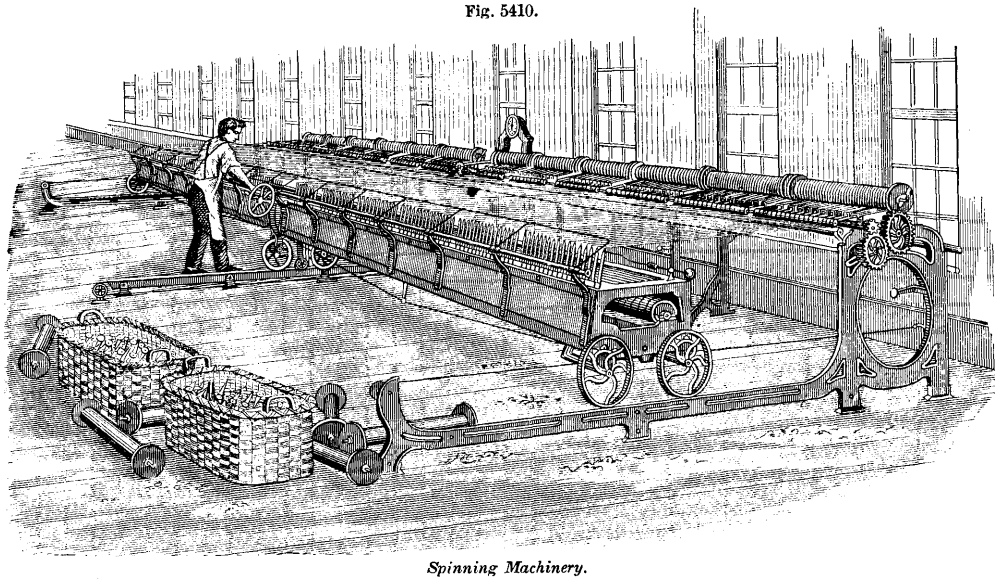


Silk-Spinning Mill.

The silk-spinner is a machine for twisting silk threads, either single or double. An end elevation is shown in Fig. 5407. There are two rows of bobbins and spools on each side, one above the other, driven by two

pulleys and belts operating through bevel gearing and spur wheels, one set of which rotates the bobbin-spindles and another the spools. *a a* are the bobbins on which the silk to be twisted is wound; these have flyers *b b* whose rotary motion imparts the twist. Each thread passes through one of a series of guides on guide-bars *c c*, to which a limited traversing motion is imparted, so as to wind it evenly and uniformly upon the spools arranged on the shafts *d d*.

Fig. 5410.



Spinning Machinery.