cot. There would also be no spring or cushioning effect in the roller and one of the most important points aimed at in connection with roller covering would be lost.

In selecting roller cloth, it is a mistake to conclude that very white cloth is necessarily a good one, since the reverse is frequently the case; if inferior wool or waste is used and a white fabric is desired, a greater amount of bleaching is necessary, a feature which to some extent is detrimental to the durability of the fibres, and for which reason, in this instance, the unbleached roller cloth is superior. Although not so sightly it will wear better.

It is the general practice in preparing the cloth for the roller, to tear it up into strips of the required width, but which is a bad practice, because the tearing has a harmful effect upon the edges of the cloth for quite half an inch inwards, as the web is disturbed, the strands being drawn out of position and elongated, besides leaving the edges soft, raw and fluffy, the result of which is that, when mounted on the roller, the cloth gradually tapers at each end and thus produces an uneven covering. For this reason the cloth should be cut with a sharp knife, either on a cutting board or mechanically. By cutting the cloth, the web is undisturbed and the exact width may be cut so that the edges do not require trimming, thus saving material. Cut cloth, when mounted on the roller forms a true surface, and the full width of traverse may be taken advantage of; the rollers may also be ended more neatly.

ROLLER LEATHER.

The proper selection of roller leather requires a knowledge of the merits of the various kinds of skins to be found in the market, although the price of the skins may have to be taken into consideration, to some extent, to assist in the selection. It is practically impossible to have two makes of leather exactly alike, owing to their difference of manufacture, and when consequently the working qualities of the leathers will be different. Before buying the skins, if possible, it is a good plan to get samples of the leather, and after properly marking the cots thus made from them, so that they may be afterwards easily recognized, cover rollers with them and allow the different sample cots, if possible, to be run on the same machine, and noting which samples wear the longest. A good idea of the quality of the leather is gained by this means, although it must not be taken always for granted that the sample represents the quality of the entire lot of leather under consideration.

Then again, certain qualities of leather are more adapted for one or the other machines where cots are needed, so that before selecting the leather for covering rollers, we must ascertain where they are to be used, and then we may make use of certain practical rules. For low or coarse counts of yarn, a cheap quality of skin will answer satisfactorily, for medium counts, select a medium quality of skin, while for high or fine counts, only the best and finest skins should be selected. Rollers for the drawing frame, and for the preparatory machines in combing, require the heavy, large skins, the side portion of which may be used for the rollers in the slubber or intermediate. For slubbing, intermediate; and roving frames, for coarse work, the medium heavy large skins are used, whereas for fine intermediate, roving, jack, and detaching rollers, medium heavy, but small skins are most adapted. These are also largely employed for coarse ring frames. For fine ring frames and the mule, fine, light, small skins are best.

Large size skins are always of thick substance, from the fact that a healthy sheep will naturally have a thick skin, and it is a bad policy to ask for large skins of thin substance, because when skins are made thin by shaving, the fibrous structure of the skin will suffer in strength. When a skin of thin substance is wanted, get a lamb's skin which is fine, thin and delicate, and very suitable to be used for working fine fibres, whereas the skin of a full grown sheep is thick, coarse and rough, and should be used on rollers in the preparatory machines, like sliver and ribbon lap machines, combers and drawing frames only.

CHRONOLOGICAL TEXTILE EVENTS.

(*Continued from page 19.*)

1813. The most interesting event of this year was the incorporation, in February, of the Boston Manufacturing Company, and the completion, late in the year, of the cotton manufactory at Waltham, Mass., with about 1,700 spindles, in which the successful use of the power loom and all the operations for converting raw cotton into finished cloth, were for the first time introduced in the United States, and probably in the world. Cotton mills in the United States up to this time had been built principally for spinning, the weaving being done elsewhere, on hand looms; in England, power looms were used in separate establishments. This Waltham enterprise, from which the cotton manufacturers on a large scale in the United States dates its origin, was mainly due to the genius and energy of Francis C. Lowell. To that portion of Chelmsford, where his associates afterwards transferred their operations, the name of Lowell was given by them after his death, as a fitting acknowledgment of his agency in the undertaking Nathan Appleton, whose long connection with the cotton manufacture began here, was associated with the enterprise from the first, and was an original stockholder to the amount of $5,000. The stock of $400,000, only one-fourth of which was designed for immediate use, was principally taken by Mr. Lowell, Patrick Tracy Jackson, of Boston, an enterprising merchant, who relinquished trade to take the management of the concern, and the brothers of Mr. Jackson. The company purchased the water power of Bemis' paper mill at Waltham, and built the factory originally for the purpose of weaving cotton fabrics by the power loom. It was, however, deemed more profitable to do their own spinning, and the mill was started for that purpose. The power loom invented by Mr. Lowell, and patented by him and P. T. Jackson in 1815, was added in 1814, and worked quite successfully from the first. The engineer department of the mills was entrusted to Paul Moody, a machinist of acknowledged skill. The loom, which was the principal feature of this establishment, was

found to differ considerably from English power looms. The principal movement was by a cam, revolving with an eccentric motion, which afterwards gave place to the crank motion. The dressing machine of Johnston and Radcliffe, of England, and of which Mr. Lowell had procured a drawing, was added, as a necessary accompaniment of the power loom, and received essential improvements by Lowell and Moody which more than doubled its efficiency. The stop motion for winding on the beams for dressing, also originated with this company. Other valuable improvements were made in the machinery, of which a most important one was the double speeder, to regulate the movements of the fly-frame in filling the spool, and for which Mr. Lowell performed the best mathematical calculations. This, with other improved mechanism, was constructed by Mr. Moody, and patented in 1819, and the two following years.

NATHAN APPLETON.

It gave rise to several law suits for infringement of the patent. The goods first made by this company, at Waltham, was heavy unbleached sheetings of No. 14 yarn, 37 inches wide, 44 picks to the inch, and in weight something less than three yards to the pound. They were of the kind which formed the staple of American cotton manufactures for domestic use and exportation. They were offered at the only shop for the sale of domestic goods, then kept in Boston, that of Isaac Bowers, on Cornhill, but though praised, they found no purchasers. They were then sent to the store of B. C. Ward & Co., importers of British goods, of which Mr. Appleton was the capitalist, and by them were offered by auction, through a Mr. Forsaith, who sold them rapidly for something over 30 cents, at which they long continued to be sold. B. C. Ward & Co. became the selling agents of the Company at the low commission of one per cent, which continued to be the established rate, large sales making it profitable. Mr. Lowell died in 1817, at the age of forty-two, after having introduced into the Waltham factory, of which he was the leading spirit, all the arrangements for the complete manufacture of cotton cloth in the same building.

James Cummins' wool carding machine factory, James Arthurs' woolen factory; and George Cochrane's flannel and blanket factory, comprised Pittsburg's textile plants.

The town of Scipio, Cayuga county, N. Y., produced about 2,500 skeins of sewing silk. The white mulberry was introduced here, by Samuel Chidsey, at its first settlement.

An extensive broadcloth factory was this year erected at Walcottville, Conn., in which Governor Walcott of that state was a principal owner. Another manufactory of woolen cloths was established at Goshen, in the same county, by Louis M. Norton, and two associates, with a capital of $6,000, of which upward of one half was expended in its erection. They purchased wool at $1.50 per pound, and sold broadcloths for $8 to $12 per yard, one invoice of 178½ yards, having sold for the sum of $1,769.33, and another, of 255 yards, for $2,551.15, or upwards of $10 a yard. Notwithstanding the high prices obtained for their cloth, this little factory did not long survive the peace, and in common with many others, succumbed to the immense influx of English cloths which followed. Broadcloths rose the next year to $14 per yard, and during the war were as high as $18 per yard, but wool also advanced in the next year to $3 to $4 a pound, and indigo to $4 a pound. As the labor of mechanics was scarce, because everywhere employed to the utmost, there is reason to believe that the percentage of profits was not increased in a ratio with the price of cloths.

One of the earliest broadcloth mills in Massachusetts was about this time erected by E. H. Derby, of Salem, who, two years before, shipped at Lisbon, Portugal, a flock of 1,100 merino sheep, of the Montarco breed, of which two-thirds reached New York, and were sent to his farm at Ten Hills, near Boston.

A company was incorporated for the manufacture of woolens at Bellingham, Mass., with a capital of $400,000.

The woolen manufactures of the country were still insufficient to meet the sudden demand for articles suitable for the army and navy, and the government was compelled, in the course of the year, to purchase of foreign manufacturers, at the current high prices, naval and army cloth blankets, etc., to the value of $593,076.

Cotton goods was this year manufactured by Phineas Whiting and Josiah Fletcher, in Chelmsford, Mass., the eastern part of which is now the city of Lowell. They erected, at a cost of about $3,000, a large wooden factory, on the Concord river, at Wamesit Falls; five years after they transferred the building and water privilege to Thomas Hurd, who erected a brick structure, and converted both into a woolen factory, which run 50 power looms; in 1826 it burned down and was then rebuilt on a larger scale by Fletcher, Whiting & Co. In 1828 it became the property of the Middlesex Company, and Fletcher, Whiting & Co. transferred their business to Northbridge, Worcester county, Mass.

A cotton mill was built this year at Plympton, Mass., and another at Enfield, which was sold, in 1821, to D. & A. Smith; having been burned in 1836,

it was rebuilt, and in 1852 became the property of the Swift River Company, for the manufacture of woolen goods. The mill is still running under that name, Edward Smith, proprietor.

The manufacture of cotton and wool cards commenced at Enfield, Mass., and there continued until 1851 when it was removed to Holyoke, Mass.

T. Norton and G. Biddies, Milford, Pa., obtained a patent for carding, spinning and roping This machine carded and spun wool at one operation, without making it into rolls, at the rate of a pound in 25 minutes, with 17 flyers, in its imperfect state, before it was patented.

Thomas Blanchard, of Sutton, Mass., obtained a patent for a horizontal shearing machine.

William Shotwell, and Arthur Kinder patented a haircloth, spun from the hair of neat cattle. The patentees had in operation at Rahway, N. J., early in the same year, a large factory for making coarse fabrics, called Taurino cloth and carpets, from the hair of cows and oxen, with a small admixture of sheep's wool. They had a capital of $400,000, and in the infancy of the business were capable of making 500 yards of cloth daily. The plant was continued for a number of years.

Eb. Harrick, Stockbridge, Mass., patented the first stocking loom in the United States, and Eb. Jenks, Colebrook, Conn., patented elastic steel card teeth.

The lace loom (known as Lever's Lace Frame) invented by John Levers, of Nottingham, England.

The manufacture of shoddy or rag wool, invented by Benjamin Law, of Batley, England.

THE RING FRAME.

Notes.

POWER CONSUMPTION.

(*Continued from page 16.*)

Spindles after a year's running should show considerable reduction in power, other things being equal. However, this improvement may be entirely nullified by allowing the collection of dirt or sediment in the bearings. Most of this dirt or sediment is the iron ground out from the bearings by friction, caused by spindles that are not properly oiled, or which are allowed to run partly dry, in turn grinding out considerable metal in course of time. Part of the dirt may be the sediment usually contained in the oil, which amount varies in accordance with the kind of oil used and the care taken to keep dirt, etc., out of the oil cups. This dirt, whatever its nature, has a bad effect, as it thickens the lubricant and increases the friction in the bearings, thereby increasing the amount of power consumed. The collection of dirt and sediment can be prevented by the liberal use of oil when a new frame is started, the wear then being greatest, thereby flooding the dirt out with an excess of oil. If the sediment, etc., be allowed to collect in such a quantity that it cannot be flooded out, the only other method effective is to remove the spindle and bearings, clean the base with a suction pump or swab, wipe off all parts carefully and put them back in place, then oil freely. Cleaning spindles by taking them apart and out of the frame, is a frequent custom abroad, but has never become the custom in this country to any marked extent. If clear, light oil, and plenty of it be used, and dirt be kept out of the oil cups, it will seldom be necessary to take the spindles apart for cleaning, unless they develop an unusual amount of friction and wear from tight bearings.

Calculations of the band pull appears to be an easy problem, but in reality, it is one very difficult of solution. The bands, made of pliable yarn or roving, are capable of great stretch, and are constantly affected by changes in temperature and humidity, being greatly affected by the moisture in the air of the spinning room. Bands also absorb oil thrown out by the spindles, or spilled through carelessness, and they are liable to considerable contraction when the machine is stopped for doffing, repairs, or over night. When a spinning frame is started up in the morning, it may consume over 10% more power than it will later in the day when the bands have been stretched by a few hours' running. A slight rain storm during the day can also put the power consumption up over 10% until the bands regain their normal conditions. The boys who tie on the bands are rarely held accountable for getting them too tight, and as they are responsible for any troubles arising from too slack bands, the tendency is to put them on with too much tension. The spinning overseer of a spinning room ordinarily has very little interest in the amount of power taken from the engine room by his machines, since this does not show in his own cost of production. The prevention of a little slack yarn is too often accomplished at the cost of tons of coal in the power plant and wear on the machines, equivalent to years of use. The general evils of the banding system can probably only be cured by an entirely new method of application or new construction or substance in the bands themselves, or by an entirely new method of driving spindles by the direct application of the driving power.

The power required to drive spinning frames depends greatly upon the speed, and increases at a greater ratio with the speed given the spindles. The Draper Co. in the interest of their business, have given special attention to the subject of spindle power ever since the Sawyer spindle was invented. The tests during this period have included many comparisons to determine value of different inventions, many of which have never been seen by cotton mill men. Their general conclusions of these comparisons, in order to prevent repetition of useless experiments by inventors are given by the Draper Co., thus:

"Ball bearing spindles offer an interesting field for power tests, and there is no question but that ball bearing spindles can be made to run with light consumption of power; but they are expensive in construction, and it is difficult to make them in large lots so that they will run uniformly. Oil-less bearing spindles have been found to consume little power, but their bands wear out rapidly, and there are objections not yet met satisfactorily. Anti-friction step bearings are quite common as inventions, but the vertical friction of a spindle is so little that it is hardly per-