

FANCY LOOM MAKING.

THE INVENTION OF THE LOOM. — LOOMS AMONG THE NATIONS OF ANTIQUITY. — FANCY LOOMS. — MR. WILLIAM CROMPTON. — HIS FANCY LOOM. — ITS FIRST PRACTICAL APPLICATION. — THE PROFITS FROM ITS USE. — MR. CROMPTON'S OTHER INVENTIONS. — MR. GEORGE CROMPTON. — THE CAPACITY OF THE CROMPTON LOOM WORKS. — IMPROVEMENTS IN "FANCY LOOMS." — THE CONSTRUCTION OF A FANCY LOOM. — THE PROCESS OF MANUFACTURE. — THE VARIOUS DEPARTMENTS IN THE CROMPTON LOOM WORKS.

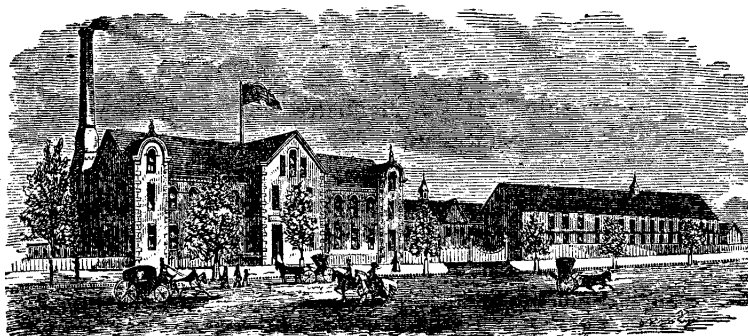
THE invention of a loom, or an instrument by which a continuous fabric is woven from threads, dates back to the pre-historic period of history, and was probably one of the first inventions made by mankind. On the tombs at Thebes, and upon other remains of Egyptian architecture, looms of a simple construction are still to be seen pictorially represented, and the cloths which have been found upon the mummies taken from the Egyptian tombs show, from the fineness and regularity of their texture, that the Egyptians had the art of doing better weaving than it would be supposed possible from the apparently imperfect character of the looms there represented.

In India, also, the use of the loom has been known from the earliest times, as it was also in Greece. Some of the fabrics from the looms of India are unrivalled even now for their delicacy of texture; and Homer speaks of a figured web, in which were the figures of a Gorgon and dragons, woven in the texture. It is beyond question that the diapered and figured textures made by the natives of India and the Greeks were excellent, notwithstanding that their looms were of a very rude description; but their industry, in this department, as in others, was not so inexorably bound as that of the modern world is, by considerations of money and time. Now, with the greater activity of our industrial occupations, the products of our fancy looms are not limited for their consumption to the few, but the increased demand has necessitated

such an increased production, that improvements in the looms have become a necessity.

The use of the loom in Europe was introduced in the early years of the Christian era, and Italy and the Netherlands were, for a time, the countries most distinguished for their skill in its use. The precise date of its introduction into England is not known, but about the period of Queen Elizabeth's reign the English began to attain the perfection for which they have so long been distinguished.

The term "fancy loom" is used to designate such looms as produce figures in the weaving. In the manufacture of fancy looms, the leading establishment of this country is the Crompton Loom Works, situated at Worcester, Mass. This house has an historic reputation for the production of its specialty, which, under



CROMPTON LOOM WORKS, WORCESTER, MASS.

the management of its present proprietor, Mr. George Crompton, it is destined to maintain and increase.

In 1836, William Crompton, a native of England, came over to this country. He was at this time about thirty years of age, and was an accomplished weaver and mechanic. With his practical knowledge of weaving and the necessities of the loom, together with his mechanical ability, he was enabled to invent a fancy loom, which supplied the want then seriously felt for this desideratum in the business of weaving. The looms then in use in England were the Dobby and Wizard and Witch looms, and both of these needed improvements. The Dobby loom only lifted the warp without depressing it, and the result of this imperfect mechanism was, that the threads of the warp were badly strained.

Mr. Crompton's invention to remedy this fault was of a very simple and ingenious character, and he obtained a patent for it, in the United States in 1837, and in England in 1838, under the name of John Rostron, his English partner. Having carried his loom to England in this year, it was there received with great favor. On his return to this country, in 1840, his attention was arrested by the fact that at that time the woollen goods made in the United States were manufactured on twilled looms. Calling upon Mr. Samuel Lawrence, the agent of the Middlesex Mills, this gentleman gave him an order to change the looms of the mill from plain to fancy ones. In six months the change was completed, and the company engaged in the making of fancy overcoatings, which was the first practical application of the Crompton loom.

From the profits made by these mills by the use of these looms, between the years 1840 and 1848, the company built another immense mill, which may be said to have been the foundation of the present city of Lawrence. The favor with which the Crompton loom was there regarded gave it a great reputation in other quarters. Soon after the Middlesex mills had got into operation with the Crompton looms, Mr. Crompton, being without ample means, sold to Messrs. Phelps and Bickford the exclusive right to manufacture them, for a royalty. This firm engaged in making these looms, adding to them the occasional improvements made by Mr. Crompton, while he himself was engaged in travelling, setting up the machines, and instructing the operatives in their use, and how to design patterns for the cloth to be woven by them. Many influential mill owners of to-day will remember the instructions they received from Mr. Crompton, the inventor.

Mr. William Crompton was also the inventor of various other machines than these looms which bear his name, and throughout his life has displayed a very rare faculty for mechanical combination and original invention. While the making of these looms proved lucrative to their builders, the royalty paid the inventor was so small that, up to 1851, at the expiration of the patent, Mr. Crompton had received only about fifteen thousand dollars. Meanwhile he had engaged in the manufacture of textile fabrics, which had proved unprofitable.

In 1849 Mr. Crompton became very ill, and up to this time has never fully recovered his health. In consequence of this illness, he retired from active business. In 1851 Mr. George Crompton, his son, having become of age, obtained an extension of the pat-

ent, and taking a partner, went into the business of manufacturing fancy looms in Worcester, Mass., including the improvements made by his father, and improvements of his own invention. In 1859 the firm was dissolved by the retirement of his partner, and Mr. Crompton, having erected his present works upon the site of the old establishment, has continued the business individually since. During the continuance of the partnership, Mr. Crompton found that his father's inventions were pirated by some leading loom manufacturers. Invoking the aid of the law to protect his rights, he, after considerable litigation, which drew heavily upon the funds of the copartnership, succeeded in maintaining the validity of the elder Mr. Crompton's patents, as well as of his own.

On the breaking out of the war of 1861, the loom business being limited, Mr. Crompton devoted a part of his establishment for a time to the manufacture of gun-making machinery for the United States and various large private armories. Finally, in 1863-4, the demand for blankets, etc., for the soldiers, being so great, Mr. Crompton resumed the building of fancy and plain looms for weaving woollens, extended the capacity of his works to the number of four hundred hands, and since that time the orders for his machinery have been constantly so pressing as to employ the entire capacity of his works.

The Crompton Loom Works are able to produce from two to four broad fancy looms a day, and are, in fact, the chief producers in the United States of this specialty. Mr. Crompton also manufactures fancy cotton and gingham looms, which, with four shuttle boxes, run at the unprecedented speed of one hundred and fifty to one hundred and seventy "picks" a minute, according to the size of the shuttle and bobbin used. Mr. Crompton also makes fancy cotton looms with a large number of spindle boxes, and an extensive number of harnesses adapted to the manufacture of fancy cottonades, gingham, poplins, shawls, etc.

In manufacturing the leading looms for woollens, Mr. Crompton preserved the configuration of the machine as built by his father, until 1865, when he discarded it for the "upright lever arrangement," for the harness motion, the exclusive right to manufacture which is under his control. But finally he discarded this, and has now adopted a principle in which no jack levers at all are used, and involving many important advantages over any loom hitherto built. These improvements are of Mr. Crompton's own invention, and are under his exclusive control, and are very popu-

lar among the manufacturers of fabrics, who frequently render voluntary testimony, by letters, to Mr. Crompton of its great value. Mr. Crompton has received over thirty letters patent for improvements in looms, and is constantly exercising his inventive talents in further improving the loom, and his other inventions.

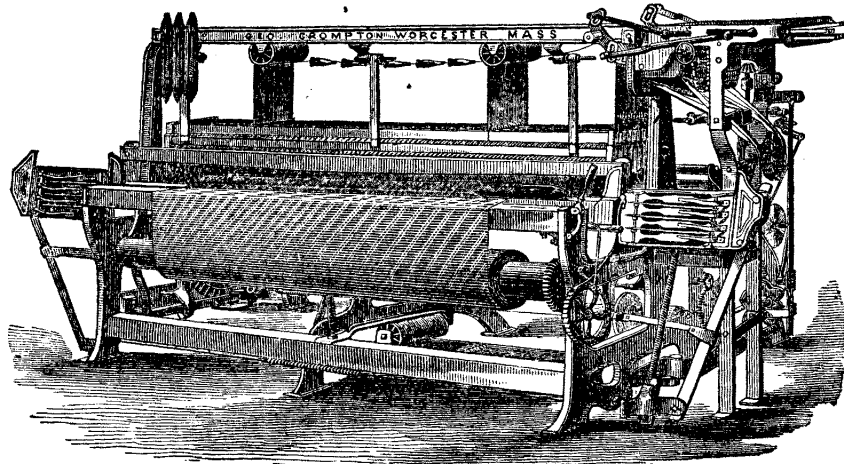
The number of pieces in a broad fancy loom for woollens is two thousand four hundred and forty-one, consisting of the framework, the harness motion, the treadles, the drop box apparatus, the lathe, warp beam, etc. The cost of a large loom with four drop boxes is about four hundred dollars. The frame, and all but the shafts, are cast.

Portions of the cast-iron pieces are ground and polished on large grindstones and emery wheels. The works are provided with self-feeding chucking lathes, which were invented in the factory, and which not only guide themselves, but stop when their work is finished. The "picker spindles," cut of the proper length from rods of steel, are made perfectly round and smooth in an ingenious machine, called the "spindle polisher," by which, at the same time, the spindles are, if necessary, pointed and polished with great accuracy. The power for the works is obtained from a Corliss engine of thirty-horse power, made by the Corliss Steam Engine Company, of Providence, R. I., and which has been supplemented by another of twenty-horse power for doing the grinding and polishing required in the various processes of manufacture.

After the castings are cleaned, they are first passed through the self-feeding chucking lathes, and bored with the requisite holes. Then they are subjected to the operation of planers, and the picker slots and the drop-shuttle boxes are made perfectly true and parallel with the lathe, in order that the shuttle may be thrown with accuracy through the warp. In the shafting room, the shafts and crank shafts, the driving pulleys, beam heads, and gearing of the looms are turned, polished, and fitted. In this shafting room are various other mechanical appliances of the same character. In the finishing room are many machines for turning, drilling, screw-cutting, etc., required for the small work of finishing the looms. In the punching room are numerous machines for making washers, and other necessary parts, and also for filing the small boxes made of malleable iron. In the shuttle room, where the shuttles are made, these necessary portions of the loom undergo nineteen operations before they are finished, such as sawing out, slabbing, squaring, burring out, pointing, heading, etc.

The "fancy loom" is distinguished from the common "cam loom" by its "harness" mechanism, by which the operator of the loom is enabled to arrange it at will so as to produce any required combination of the twenty-four harnesses, in order to weave the various patterns of fancy cassimeres, for example, or any other variety of fabric which is manufactured in it. The ordinary loom produces plain cloth alone.

The movable, or "drop-shuttle" box, containing the different colored fillings in the shuttles, and the pattern chain, for producing the different interweavings of the warp and woof, are the chief distinguishing features of the fancy loom, as compared with the



IMPROVED FANCY LOOM—HORIZONTAL HARNESS MOTION.

plain loom. The shuttle boxes, one in each box, are made in four parallel divisions, into each of which a given color of "filling" is put. The "chain" is a series of small spindles, united by links, or flexible joints, and set parallel to each other. These may be of any required number, from two to several hundred, upon which are strung a number of small iron "rolls," or wheels, divided from each other by washers. By any of the rolls or links of the twenty-four on a spindle of the chain, it is determined whether a particular part of the warp shall go in the upper or lower portion, or "shed," as the technical term is, which is formed for the passage of the woof, or filling.

The chain is set on the end of the loom, in such connection by

the harness bars with the several harness frames, as to lift a particular one at a given time, or depress it at the instant when the proper shuttle is ready to pass through the woof. The number of harnesses may be twenty-four, in each of which may be set from any number to two thousand "treddle" wires, in each of which is an eye, or loop, through which a thread of the warp passes. These harnesses occupy a space of nine inches, so that within the space of an inch several hundred combinations of color are possible.

