

**Jacquard Loom.** (*Mach.*) A loom fitted with an apparatus for pattern-weaving, named after its inventor, M. Jacquard (*q. v.*) The Jacquard apparatus can be adjusted to almost every kind of loom, its office being merely to direct those movements of the warp-threads which are required to produce the pattern, and which previously were effected by the weaver's fingers; its arrangements generally are very complicated, but its principles are remarkable for their extreme simplicity and certainty. In ordinary weaving the alternate threads of the warp, or longitudinal arrangement, are raised so as to enable the weaver to throw the shuttle containing the weft-thread transversely across from his right to his left hand between the warp threads so raised and those left at rest. When the weft is so passed through, the raised warp threads are lowered, and the other set raised, the shuttle having then passed through from left to right. This is the most simple idea of plaiting or weaving. If, however, a pattern has to be produced either in plain materials or varied colors, it is necessary, instead of raising and depressing the whole threads of the warp, in two sets, as above described, to raise only such as are required to develop the various parts of the figure, and this, of course, must be done with great exactness, as the position of every thread tells upon the formation of the pattern. The *J. L.* is for the purpose of regulating these movements, and its mode of action is as follows: The warp-threads are each (as in the common weaving process) passed through a small loop in the lifting thread, so as to be raised by means of the treadles, which act directly upon the lifting-bars; these lifting threads (Fig. 1429, *z, z, z, z*) are

restores it to its place as soon as it is freed from pressure. In the diagram (Fig. 1429), this pressure is supposed to be exerted upon three of the lifting wires, C, C, C; consequently if the lifting-bar A is simultaneously raised, those three wires are missed, while the other two, B, B, being in position, catch the projections *k, k*, on the bar, are drawn up with it, and thus raise the threads of the warp to which they are attached. Now, the regulation of this pressure upon the horizontal needles is effected by a revolving square roller, which has each of its four sides perforated with rows of holes, which, like the needles and lifting wires, correspond in number to the threads of the warp. This roller, when in its place, receives into one row of perforations the whole row of needles where they project through the frame at *h*, and it has a motion given by the machinery which brings each row on its four surfaces in regular order into the same position, and if no impediment is offered, all the needles are undisturbed, and the upright wires lift the entire set of warp-threads to which they are attached. But in order to produce the necessary variations of motion required by the pattern, a set of cards are made, each of the width of the square roller; these also are so perforated that when placed on the surface of the roller their perforations correspond with those on the roller; hence, when the roller *L* (Fig. 1429) is brought up to the frame *h*, some of the needles will find entrance into the holes of the roller through the corresponding perforations in the covering card, seen in section *M*, (Fig. 1423); but others will be prevented entering by the absence of such perforations, and the card, by the resistance it offers, will force the needles thus opposed back upon the springs, *E, E, E*, removing thereby the hooks of the lifting-wires from the action of the lifting-bar. The cards are looped together at the corners, and move as one endless chain on the rollers, and the entire set of perforations on the whole chain of cards exactly represents the pattern to be produced; the same as the notes represent the air in a piece of music. Of course the simple operations here described require mechanical arrangements of great nicety to regulate them, and these are so complicated that mere verbal description would hardly help much to explain them; indeed, even with the loom and its apparatus, and its cumbersome arrangement of hundreds, and even thousands of cards before us, the unpracticed eye finds great difficulty in comprehending its movements. *Ch. Eacy.*—The divers contrivances lately proposed as simplifications of the *J.* loom will be found under WEAVING.

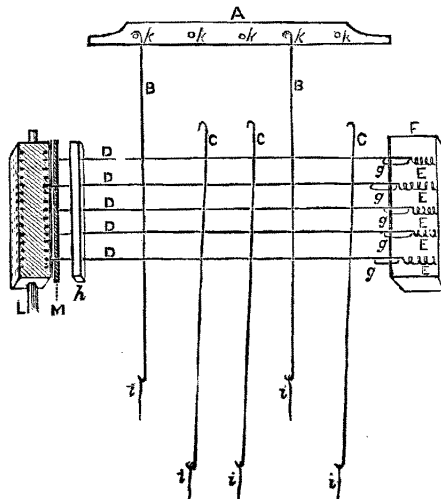


Fig. 1429. — JACQUARD LOOM.

attached to certain wires in the *J. L.*, which form a rigid continuation ending in a hook, which, when nothing interferes, is caught and raised by each upward motion of the lifting-bar; thus, A is the lifting-bar, and it has five projections (*k, k, k, k, k*) upon which the hooks of the wires catch when in a straight position, as at B, B, but which miss them if they be thrown out of the perpendicular, as at C, C, C. There are only five of these wires given, to prevent confusion, but practically there must be one for every thread of the warp—that is, one for every thread in the width of the cloth to be woven. Each of the lifting wires passes through a horizontal needle placed at right angles, D, D, D, D, which has a loop formed for the purpose, thus, at F (Fig. 1429). This needle passes freely through an opening, in the frame at *h*, and is so looped on to another rod, *g*, on the spring-box F, that it moves freely without fear of displacement, and if pushed back into the spring-box, is made to press upon one of the spiral springs E, which