Jacquard Loom. (Mech.) A loom fitted with an apparatus for pattern-securing, named after its inventor, M. Jacquard (p. 48). The Jacquard apparatus can be adjusted to almost every kind of loom, its object 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 as 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 picking or weaving. If, however, a pattern has to be produced either in plain materials or varied color, it is necessary, instead of raising and depressing the whole threads of the warp, in two sets, as above described, to use 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 this purpose, of regulating these movements, and its mode of action 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. 1449, b, b, b, b) are attached to certain wires in the J. L., which form a rigid continuation ending in a hook, which, when holding the pattern, is caught and raised by each upward motion of the lifting-bars; thus, A is the lifting-bar, and it has five projections (h, h, h, h, h) 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 opening at right angles, D, D, D, D, D, which has a loop formed for the purpose, thus, at F (Fig. 1450). This needle passes freely through an opening in the frame at h, and is so looped on to another rod, p, on the spring-box E, that it moves freely without fear of displacement, and if pushed back into the spring-box, it is made to press upon one of the spiral springs K, which restores it to its place as soon as it is freed from pressure. In the diagah (Fig. 1452), the 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 raised, while the other two, B, B, being in position, catch the projections h, h, on the bar, as drawn up with it, and thus raise the threads of the warp to which they are attached. Now, the regulation of the 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, revolves 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 cords are made, each of the width of the square roller; these cords 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. 1452) 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 cord, seen in section M, (Fig. 1450), but others will be prevented entering by the absence of such perforations, and the cord by the resistance it offers, will force the needles thus opposed back upon the springs, E, E, E, removing there by the hooks of the lifting-wires from the action of the lifting-bar. The cords are looped together at the corners, and move as one endless chain on the roller, and the entire set of perforations on the whole chain of each exactly represents the pattern to be produced; the same as the noise represent the air in a piece of music. Of course, the simple operation here described require mechanical arrangements of great dexterity to regulate them, and these are so complicated that verbal description would hardly help much to explain them; indeed, even with the loom and its apparatus, and its various arrangement of hundreds, and even thousands of cords before us, the impracticable eye finds great difficulty in comprehending its movements.

Every-The divers contrivances lately proposed as substitutes of the J. loom will be found under W. weave.