

ELECTRIC LOOM. This extremely ingenious contrivance, in which the usual Jacquard cards are replaced by an electrical arrangement worked by a pattern prepared in tin foil with insulating varnish, is the invention of Cavaliere G. Bonelli of Turin. A simple metal plate, perforated with holes, each of which is provided with a kind of piston, successively plays the part of each successive paper card in the usual arrangement. The pistons fill up every hole that is not required, but are withdrawn by electro-magnets from those holes which require at each beat of the loom to be kept open. This is effected as follows: A sort of metal comb, each tooth of which is the terminal of a separate insulated conducting-wire, rests on the prepared pattern. Whenever a tooth touches the tin foil, a circuit is completed through its conducting-wire; but when a tooth rests on the varnish, the circuit is broken. Each conducting-wire includes in its circuit an electro-magnet. The pistons already spoken of are each composed of a small iron shank and brass button-shaped head, and are all held horizontally in a frame, one opposite each electro-magnet. In one position of this frame, the heads of the pistons project through the openings of the metal card or perforated plate; the diameter of each hole is a little larger than the head of the corresponding piston, each piston being exactly in the centre of its corresponding hole. In this same position all the soft-iron shanks touch the poles of the corresponding magnets, and the metal comb rests on the prepared pattern. A certain number of the magnets corresponding to the uncovered portions of the tin foil are therefore active or attract the shanks, but the others exert no attraction. The frame with the pistons is now pulled forward away from the magnets: those pistons which are opposite the active magnets are held back, sliding in their frame, so that the button-heads pass behind the perforated plate; but the other portions come forward with the frame, leaving the magnets. The perforated plate then drops a little way, and by this simple contrivance all those piston-heads that were in front of the plate are retained there, whatever pressure comes against them, for they are now eccentric from the holes. The plate in this condition presents a perfect analogy with the common prepared card: a certain number of holes corresponding to the metallic part of the pattern are vacant; the rest of the holes are blocked up and present an unbroken surface, by which the proper hooks of the Jacquard loom (see LOOMS) are acted on during one stroke. The perforated plate is then brought back to the position first described, the prepared pattern is moved on a little step, and the same process is repeated. When shuttles with several different colors are to be used, the pattern is subdivided into insulated portions corresponding to the separate colors by removing a very thin outline of foil around each; all the parts corresponding to one color are afterward connected. As each shuttle is thrown, the battery is brought in contact with the appropriate series of insulated patches of tin foil, producing a succession of different cards, and the pattern is not shifted forward until all the colors are exhausted. After the completion of each fresh combination on the perforated plate, the battery circuit is broken by a proper contact-breaker, and the injurious spark is thus avoided, which would otherwise occur when the comb is lifted from the pattern prior to a shift.