reached, the water is pounded up in the canal, and serves to furnish a supply for a good deal of second crop cultivation, besides the supply to the municipality. Between Kurnool and the head-works at Sunkasala, the canal is carried with a single bank, which has become well consolidated, and is now in excellent order. Several escapes have been constructed, the aggregate length of which, it was calculated, would be sufficient to discharge the surplus of any rainfall of which there was a record; but in the extraordinary storm of 1870, the canal was filled to overflowing, and the banks were breached in one or two spots; it has, therefore, been considered expedient to increase the water-way by lowering the crests of some of these works. Water is permitted to be drawn off by this section of the canal all the year round for the supply of the town of Kurnool, and for irrigation of the second crop, of which there are about 600 acres. The surplus is returned to the Toombuddra, over a waste weir just above the town.

The weir across the Toombuddra is a simple vertical wall, raised on the bed of trap rock which runs across the river, which at Sunkasala is divided into two branches. The weir, which is a fine massive work, is not built in one straight line, but follows the direction of the rock. An earthen embankment connects the wings of the two branches. The coping

WEAVING.—No. V.

HAND-LOOM WEAVING.

IN power looms for weaving cotton warps the operations of warping and dressing are performed by much more efficient means, and contrivances are applied for the purpose of stopping the machine in the event of the sticking or breaking of the threads. These machines will be hereafter referred to in connexion with power-loom weaving.

When the warp is placed on the beam it is ready for the loom, and it is then drawn or entered, each thread into its proper place in the loom, which will be better shown when describing the loom itself. When a warp has been woven, a short length of it is usually left in the loom, and the new warp is attached to it by *twisting* together the corresponding threads of the old and new warps. This process of "twisting in" is done with far greater rapidity than entering, and it is through the threads of the warp being kept in their consecutive order by means of the cross or lease, as before mentioned, that enables the weaver to pass from thread to thread with certainty and ease. When all the threads have been connected or twisted together, which is effected by the use of a little paste or gum applied between thumb and finger, they are then *drawn* carefully through the headles and reed of the loom, the strength of the thread not being weakened by the presence of the twisting; for the purpose of this operation is merely to save the greater amount of labour which entering them requires.

Fig. 19 represents a common hand loom, such as is adapted for plain weaving. It consists of four wooden posts framed together at the top by two long and two cross pieces. The long pieces C C are called the capes of the loom.

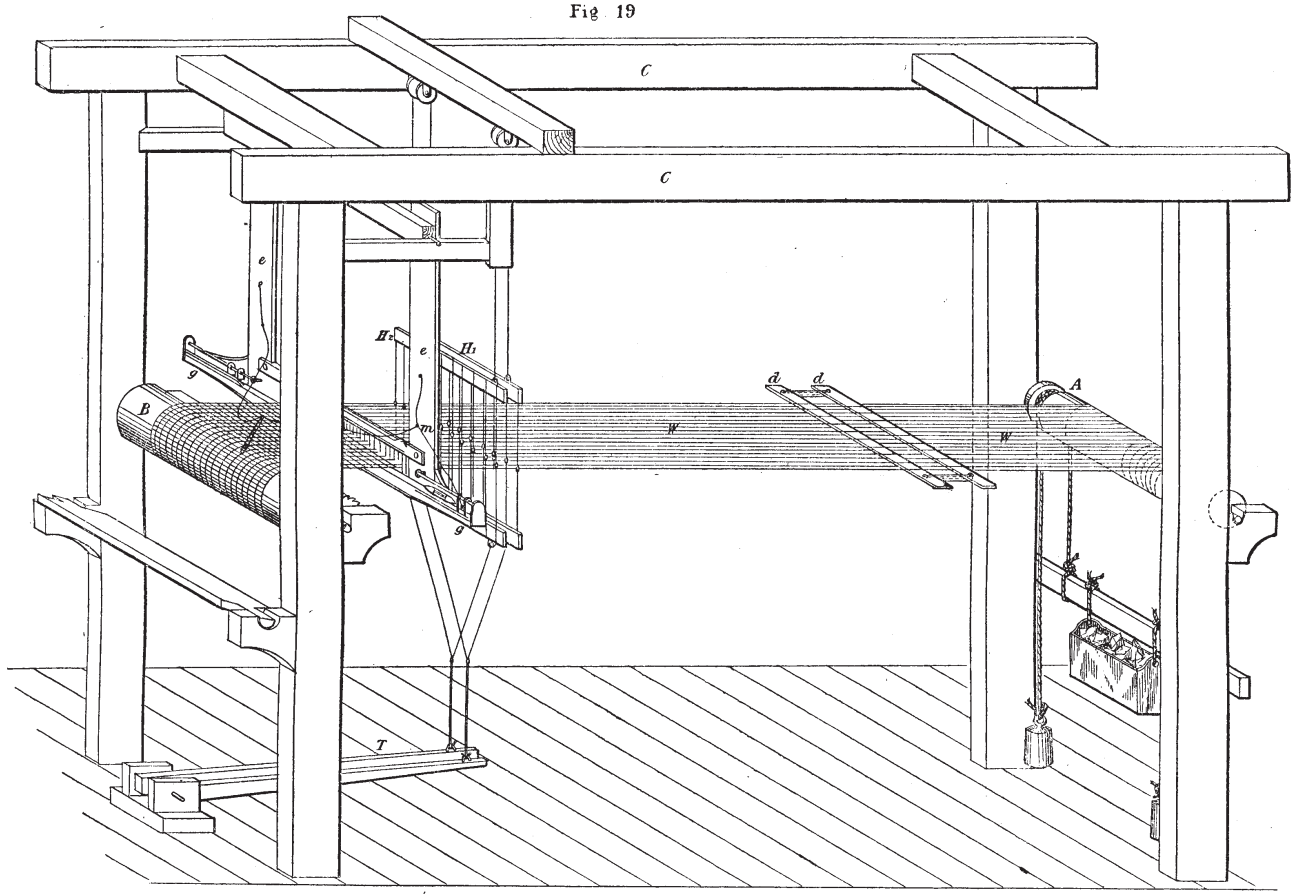
Between the two pairs of posts, forming the ends of the loom, are placed two cylindrical beams; the beam A being the warp beam, upon which the warp W is wound, and B the cloth beam, upon which the cloth is wound as it is woven.

The warp threads are placed parallel to each other, as before described, and are carried from the warp beam A and attached to the cloth beam B. This is done by threading the knotted ends of the threads upon a small rod or lath, and wedging it into the slot or groove, formed in the beam B for that purpose, which is shown at X in section (Fig. 20).

In order to keep the threads in their relative position and parallel to each other, two rods are inserted between the warp threads *d d* in such a manner that each thread passes *over* one of the rods and *under* the other alternately, as shown. Thus a cross or lease is formed by the threads between the two rods, which not only keeps the threads in proper order but enables the weaver to detect with ease the proper position of any broken thread he may have to repair. This arrangement of the threads is formed during the process of warping, as before described.

After the warp has passed the lease it is then passed through the headles, as shown at H^1 and H^2, Figs.

Fig. 19



19 and 20. The headles are composed of a number of threads stretched between two laths, and they have loops made in the middle of them, or an eye called a mail is threaded upon them instead. These loops or eyes are for the purpose of passing the warp threads through. There are two headles shown, one of which receives every alternate thread of the warp, and the other receives the remainder. Consequently, by their means, if either of them be raised, it will also raise the warp threads which have been threaded through the loops or mails of it. Thus an opening or shed, as it is usually called, is made for the passage of the shuttle.

The arrangement of the warp threads, and the various parts of the loom which operate upon them, may be best understood by referring to Fig. 21, which is a diagram showing each warp thread separately. Fig. 20 is a section of Fig. 21, and Fig. 19 represents the same parts as they are connected to the frame of the loom.

Headles are made of various forms, materials, and strength, according to the particular fabric or purpose for which they are required. Fig. 22 represents two common modes of forming them, one with a loop, and the other represents an ordinary eye or mail. For weaving silk warps the mails are usually made of glass, but for cotton and other materials, steel or brass are generally used. The healds, whether

formed with loops or with metal mails, are made by means of very ingenious machines, known as heald knitting or making machines, to which we may hereafter refer.

The upper laths of each headle are connected to

Fig. 20.

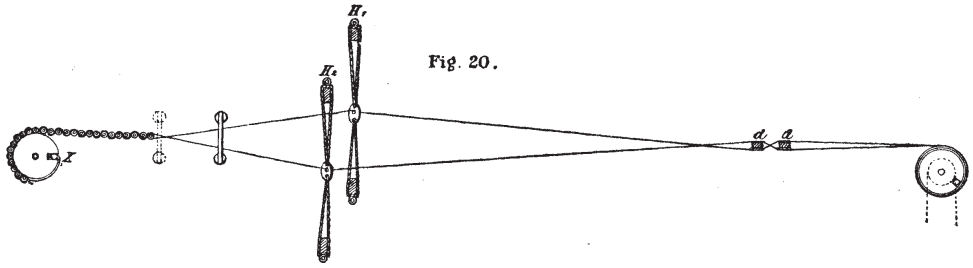
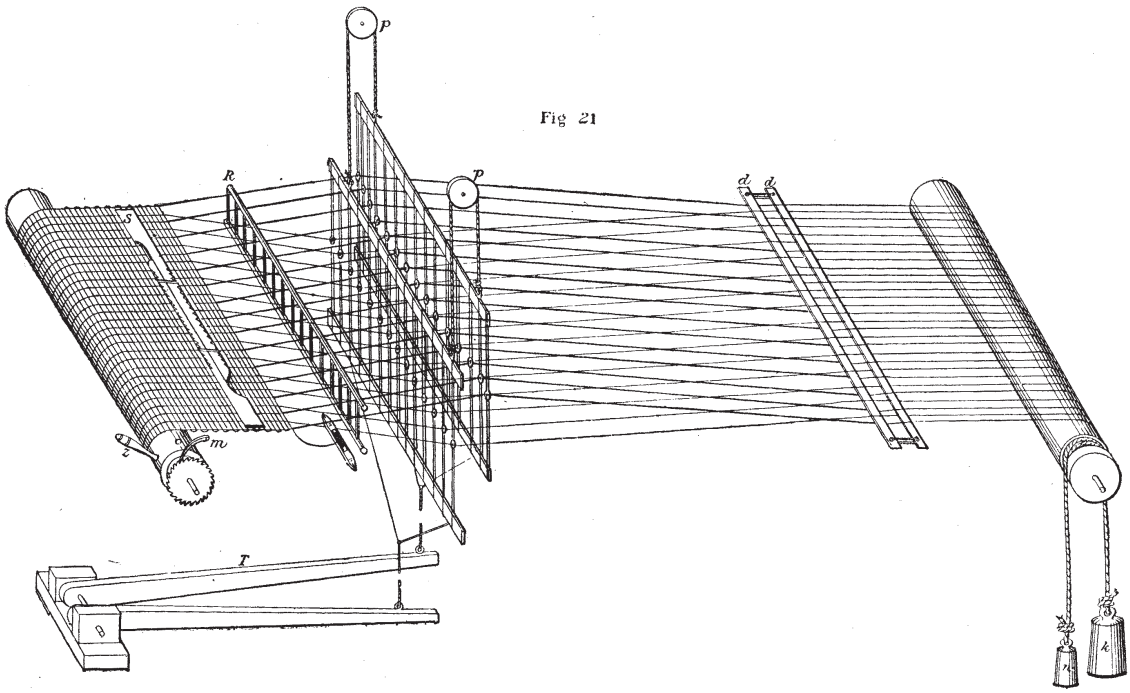


Fig 21



through the headles are then passed through the reed R, Fig. 21, which is composed of narrow strips of metal or flattened wire. They were formerly made of strips of reed—hence the name—which is now applied to the metallic substitute.

few dents per inch to as many as 120 and upwards. They are constructed by machines well adapted for the purpose, and the regularity of gauge, upon which the evenness of the cloth depends, is therefore insured.

Fig. 22.

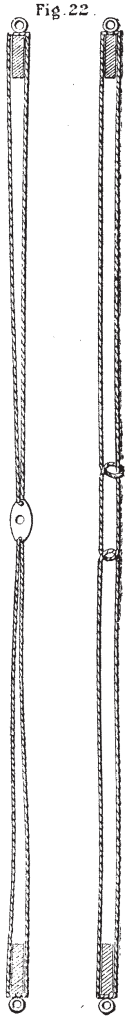


FIG. 23

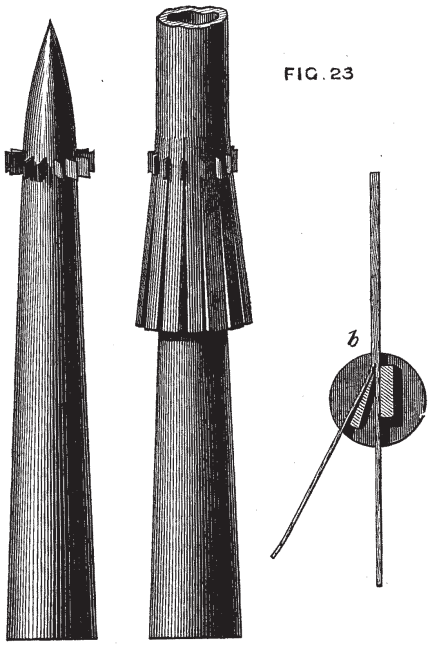
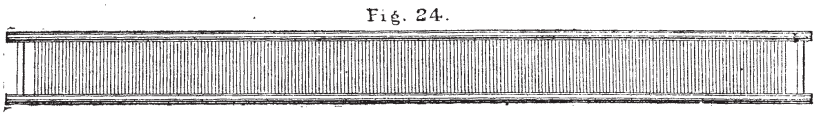
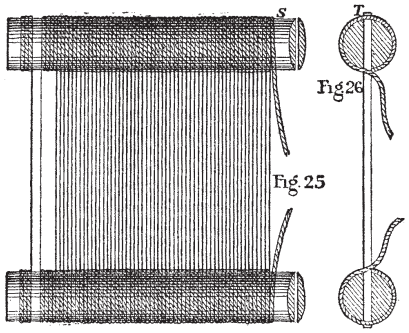


Fig. 24.





cords which pass over pulleys *p p*, Fig. 21, and thus they balance each other. The lower laths in like manner are connected with the treadles, as shown at T, Figs. 19 and 21; consequently by using the treadles the headles are raised and sunk alternately.

The warp threads, after they have been threaded

Fig. 23 represents the old method of cleaving the reed into strips by pressing short lengths upon a taper spindle, into which radiating blades were fixed. The strips were then passed through a gauge plane, as shown at *b*. The reed or comb (Figs. 24, 25, 26), is formed by placing a number of the strips, whether of reed or metal, between half-round laths, and they are bound together by a waxed thread passing between and round each strip and at both ends, as shown enlarged at S and T. The number of the strips vary according to the different degrees of fineness of the fabric to be woven, varying from a