

idea of the manner in which this is performed, see Weaving.
CLOTH.

WEAVING-LOOM, a machine for weaving cloth, silk, &c. by raising the threads of the warp in order to throw in the shoot, and strike it close. Of these there are various kinds, distinguished by the different sorts of cloths, stuffs, silks, &c. in which they are employed, and which are chiefly distinguished by the number and variety of the threads they raise in order to work the warp, either plain or in figures, by making more or less of the woof or shoot appear through the warp. In order to give a general idea of weaving, we shall here describe the parts of the common weaver's loom. Fig. 1. in which *e f, e f* are the front posts, and *g, g* the back posts of the loom; *l l l, m m, m m* are the *lams* in their place at *Q*, or, as they are called in some parts of Scotland, the *headles*, and in others the *slaves*. They are composed of strong threads, stretched between two horizontal bars, an upper and a lower. The threads of one lam are so disposed as to pass between the upper threads of the warp, while they admit the lower threads to pass through loops or small holes in them, and the disposition of the threads of the other lam is such, that while they pass between the lower threads of the warp, they admit the upper threads to pass through the small holes just mentioned. The lams are suspended from the cross bar or *lam-bearer* *HH*, by means of ropes *n, n* passing from the upper bars of the *lams* over the pulleys at *EE*, and balanced by weights at the other ends. From the lower bar of each *lam* or *headle* a rope passes to the *treadles* or moveable bar at *OO*; so that when a foot presses a treadle, the lam fastened to it sinks, while the other rises by means of the balancing weight suspended from the pulley at *E*. The workman then throws in the woof by means of the shuttle, and closes it by one or two strokes of the *lay* or *batten*, of which *WB, WB* are called the *swords*, *CC* the *cap*, or in Scotland the upper *shell*, *DD* the *block* or under *shell*, and *PP* the *reed* or comb contained between these shells. *LL* is the bench on which the workmen sit; for the loom which our figure represents is constructed for weaving cloth of such a breadth as to require two workmen, who have their quills in a box *d* on the middle of the bench on which they sit. Between the workmen's bench and the *batten* or *lay* is the *breast-bar* *I, I*, a smooth square beam, in which there is an opening to let the web through as it is wove. From this opening the web *SS* passes to the *knee roll* or *web beam* *GG*, round which it is rolled by means of the *spokes*, visible in the figure, and kept from being unrolled by a wheel with teeth and clench, visible likewise in the figure. In some looms the web passes from the knee roll to the wooden frame *X*, to be dried as it is wove. Opposite to the breast-bar, and on the other side of the *batten* or *lay*, is the *cane-roll* or *yarn-beam*, on which the warp is rolled when put into the loom, and from which it is gradually unrolled as the work proceeds. *TT* are hobbins filled with yarn of the warp to mend such threads of it as may be broke in the weaving; and *B b, B b* are clues of the same kind of yarn with the borders of the warp, to mend such threads as may there be broken.

Plate
DLXXV.
fig. 1.

Fig. 2. represents the common shuttle with the vacuity in the middle, in which the quill with the woof is placed on a spindle or axis. As this shuttle is thrown with one hand in at one side of the warp, and received with

WEAVING, the art of working a web of cloth, silk, or other stuff, in a loom with a shuttle. For an

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Fig. 3.

Fig. 4.

with the other hand at the other side, it is obvious, that when the web is of a breadth too great for a man to reach from one side of it to the other, two workmen must be employed and much time lost. To remedy this inconveniency, a new shuttle has, in this country, been lately brought into very general use, and called the *fly-ing shuttle*, because it flies through the warp with wonderful rapidity on two steel rollers RR (fig. 3.). This shuttle is not thrown with the hand, but moved backwards and forwards by a very simple piece of machinery, of which fig. 4. will give the reader a sufficiently accurate conception. To each end of the *batten* or *lay* L is fastened a kind of open box B, *b*, with the bottom or horizontal side exactly on a level with the threads of the warp of the intended web. In each of these boxes is a vertical piece of wood D, *d*, of considerable thickness, called a *driver*. This driver is moved easily on an iron spindle or axis from one end of the box to the other by means of a slender rope CCCD, and a handle H is seen in the figure. When the weaver is to begin his work, he lays the shuttle on its rollers in the box B with the iron tip T (fig. 3.) touching, or almost touching, the driver D (fig. 4.). Then moving the handle H, with a sudden jerk, towards the box *b*, the driver D forces the shuttle with a rapid motion through the warp till it strikes *d*, which is impelled by the stroke to the further end of the box *b*. The two drivers D and *d* have now changed their positions in their respective boxes; so that the driver which was at the front of its box before, is now at the further end of it, and *vice versa*. Then by a sudden jerk of the hand towards B the shuttle is driven back till it strike D; and thus is the work continued without the weaver having occasion ever to stretch his arms from one margin of the web to the other. That the shuttle may not, by the unsteadiness of the workman's hand, be driven *zig-zag* through the warp or out of the place in which it ought to move, the guiding or driving rope CCCD is made to pass through smooth holes or loops C, C, at the ends of the ropes EC, EC, suspended either from the cross bar on the top of the loom or from the swords of the batten.

This shuttle, we should think, a great improvement in every kind of weaving-loom, though some of the older tradesmen, with whom we have conversed on the subject, contend, that it is valuable only in what they call light work, such as cotton or linen cloth, or when the web, if woollen, is very broad.

But as the labour of weaving is pretty severe, Mr Robert Millar, an ingenious calico-printer in the county of Dumbarton, Scotland, wishing to lessen it, invented, some years ago, a weaving-loom, which may be wrought by water, steam, horses, or any other power, for which invention he received a patent in 1796. The following is his own description of his patent weaving-loom:

Fig. 5.

Fig. 5. represents a side view of the loom, AA, BB, CC, DD, being the frame. *a* is an axis (which we shall call the spindle) across the frame. On this axis is a sheeve *b*, two inches thick, having a groove round it, two inches deep, and half an inch wide. The bottom of this groove is circular, except in one part *c*, where it is filled up to the top; a lever *d* rests on the bottom of this groove, and is lifted up by it when the elevation *c* comes round to the situation represented in the figure. By this motion, the lever *d* acts on the ratchet-wheel *e*

by the catch *t*, and draws it forward one tooth, each revolution of the sheeve. This ratchet wheel is in an iron frame *g g*, which also properly carries the two catches *t* and *u*, which are connected with it at *v*. The catch *u* holds the ratchet-wheel in its position, while the lever *d* and the catch *t*, are moved by the groove *c* in the sheeve. On the arbor of the ratchet is a small pinion *h*, working in the wheel *f*; this wheel is fixed on the end of the roller *e* of fig. 7. On the side of the sheeve *b* is fixed a wiper *k*, which lifts the treadle *l*. This treadle turns on its joints in the sheeve E, which is fixed to the side of the frame A and D; it is kept pressing on the bottom of the groove in the sheeve by a spring *m*, fixed to the frame side A, and having a slender rod *n* from its extremity, joining it with the treadle at *l*. From the point of the treadle there goes a belt *o*, which passes over the pulley *p*, which is seen edgewise in this figure, and is joined to the top of the fly pin *q*, of fig. 6. At the end of the frame A is the short post F; on this rests the yarn-beam *j*, having a sheeve *r*, over which passes a cord, having a weight *s* suspended to it. The other end of this cord is fastened to the spring *v*; the weight causes the yarn-beam to stretch the web from the ratchet-wheel *e*, with its catch *u*; and the spring *v* allows the rope to slide on the sheeve as the ratchet is drawn round during the working.

Fig. 6.

Fig. 6. is a front view of the loom. *a a* is the spindle which carries the sheeve *b*, and the wipers *d* and *d*, which move the treadles *w, w*, of fig. 5. These use the treadles of the headles, with which they are connected by cords from the shafts of the headles *s, s*. From the upper shaft there go two leathern belts *f, f*, to the roller *y*, furnished each with a buckle, for tightening them at pleasure. The two wipers *c, c*, on the shaft *a*, which serve for taking back the lay, have the two treadles, *x, x*, in fig. 7. with a belt from each passing over the roller *h 2* of fig. 6. and fixed to the sword of the lay. From the swords of the lay forward is fixed a belt to each end of the roller *i*; from this roller there goes a cord to the spring *j*, which serves for taking forward the lay which is hinged on the rocking-tree *t*. The star-wheel *b* of fig. 3. and the sheeve *b* of fig. 1. are fixed to the opposite ends of the spindle *a* without the frame; and both the wheel and sheeve have a wiper *k* fixed to them for moving the treadles. In order to drive the shuttle, the belts *o, o*, go from the points of the treadles, over the pulleys *p, p*, to the top of the fly-pin *q*: This turns on a pin joint in a rail *r*, which goes across the loom. From its lower end there go two small cords to the shuttle drivers *g, g*, which slide on the iron rods *n, n*. A long iron rod *v* goes across the lay, and is hung on two centres at the ends. In this rod *v* are fixed two small crooked wires *w, w*, which are more distinctly marked in the little figure *w* above, which represents a section of the lay. The dot at the lower end of the wire *w*, in this figure, is the section of the rod *v*. The shuttle passes between these wires and the lay every shot, and lifts them up, causing the rod *v* to turn round a little. But if the shuttle should not pass these wires, nor lift them, it would be drawn home by the lay, and destroy the web. To prevent this, there is fixed on one end of the rod *v* a stout crooked wire *z*, having a broad or flat head, which naturally rests on a plate of iron, marked and fixed to the back of the lay. This plate has a slit in

its

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its middle about an inch deep. In this slit rests the rod *a 2* of fig. 7. on which is a short stud, which is caught by the wire *z* when the wire *w* is not lifted back by the passing shuttle. This will stop the lay from coming home, and will set off the loom.

Fig. 7.

Fig. 7. is another side view of the loom opposite to fig. 5. On the spindle *a* is the star wheel *b*, on the outside of the loom frame, on the arms of which wheel is fixed the wiper *k*, as the similar wiper is fixed to the sheeves on the other end of the spindle. The wipers which drive the shuttles are fixed on opposite squares of the spindle, and work alternately. Below the star-wheel is a pinion *c*, which is on a round spindle, turned by the water-wheel, by means of a wheel on this spindle. In a wheel on this spindle are two studs, on which the pinion *c* slides off and on, as the loom is set off and on by the lever *d*. At the farther end of this lever is the weight *s*, hanging by a chord which passes over a pulley *t*, fixed at the outer end of the spring-catch on which the lever *d* rest; and thus the loom is drawn in at the upper end of the lever *d*. But when the shuttle does not lift the wire *z*, it catches on the stud on the rod *a 2*, which is connected with the spring-catch, and the lever *d* flies off with the weight *s*, and the loom stops working. On the head of the post *F* is the yarn-beam. The rollers *e* and *f* are cylinders, pressed together by a screw-lever, and take away the cloth between them at a proper rate. In the roller *f* is a groove for a band for driving the roller *g*, on which the cloth winds itself as it is wrought. Wherever springs are mentioned to be used in the above description, weights may be used in their stead, and to the same effect, and more especially upon the treadle of fig. 5. for driving the shuttle.

Fig. 8.

Fig. 8. is a representation of a ribband loom. 1. Is the frame of the loom. 2. The castle, containing 48 pulleys. 3. The branches, on which the pulleys turn. 4. The tires, or the riding-cords, which run on the pulleys, and pull up the high-lisses. 5. The list-sticks, to which the high-lisses are tied. 6. The high-lisses, or lists, are a number of long threads, with platines, or plate-leads at the bottom; and ringlets, or loops, about their middle, through which the cords or cross-threads of the ground-harness ride. 7. The plate-leads, or platines, are flat pieces of lead, of about six inches long, and three or four inches broad at the top, but round at the bottom; some use black slates instead of them: their use is to pull down those lisses which the workman had raised by the treadle, after his foot is taken off. 8. The branches or cords of the ground harness, which go through the loops in the middle of the high-lisses: on the well ordering of these cords chiefly depends the art of ribbon-weaving, because it is by means of this contrivance that the weaver draws in the thread or silk that makes the flower, and rejects or excludes the rest. 9. The batton: this is the wooden frame that holds the reed or shuttle, and beats or closes the work: where observe, that the ribbon-weaver does not beat his work; but as soon as the shuttle is passed, and his hand is taken away, the batton is forced, by a spring from the top, to beat the work close. 10. The shuttle, or reed. 11. The spring of the batton, by which it is made to close the work. 12. The long-harness are the front-reeds, by which the figure is raised. 13. The linguas are the long pieces of round or square lead, tied to the end of

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each thread of the long-harness to keep them tight. 14. The broad piece of wood, about a foot square, leaning somewhat forward, intended to ease the weaver as he stoops to his shuttle; it is fixed in the middle of the breast-beam. Some weavers, instead of this, have a contrivance of a cord or rope that is fastened to the front-frame, and comes across his breast; this is called a *stopfall*. 15. The seat-bench; this leans forward very much. 16. The foot-step to the treadles. 17. The breast-beam, being a cross-bar that passes from one of the standards to the other, so as to front the workman's breast: to this breast-bar is fixed a roll, upon which the ribbon passes in its way, to be rolled upon the roller, that turns a little below. 18. The clamps, or pieces of wood, in which the broaches that confine the treadles rest. 19. The treadles are long narrow pieces of wood, to the ends of which the cords that move the lisses are fastened. 20. The treadle-cords are only distinguished from the riding-cords by a board full of holes, which divide them, in order to prevent the plate-leads, which are tied to the high-lisses, from pulling them too high when the workman's foot is off the treadle: which stop is made by a knot in the treadle-cord, too big to be forced through that hole in the board. 21. The lams are two pieces of thin narrow boards only used in plain works, and then to supply the place of the long-harness. 22. The knee-roll, by which the weaver rolls up his ribbon as he sees proper, or by bit and bit as it is finished. 23. The back-rolls, on which the warp is rolled. It is to be observed, that there is always as many rolls as colours in the work to be wove. 24. The clamps, which support the rollers. 25. The returning-sticks, or, as others call them, the *returns*, or the *tumblers*, or *pulleys*, to which the tiers are tied, to clear the course of cords through the high-lisses. 26. The catch-board for the tumblers. 27. The tire-board. 28. The buttons for the knee-rolls and treadle-board, described in N^o 20.

It is stated in the proceedings of the National Institute of France, that a report was presented to that body concerning a new machine for weaving ribbed stockings. The advantages which this machine possesses are said to be, that it may be erected at one half of the expence of the English stocking frame, and that its movements are much lighter. The experience of its operations for two years has confirmed these advantages. Of the nature and construction of this machine we have had no opportunity of obtaining any information; but we thought it worth while to insert this short notice, with the view of directing the attention of such of our readers as may be interested in the improvement of such manufactures.

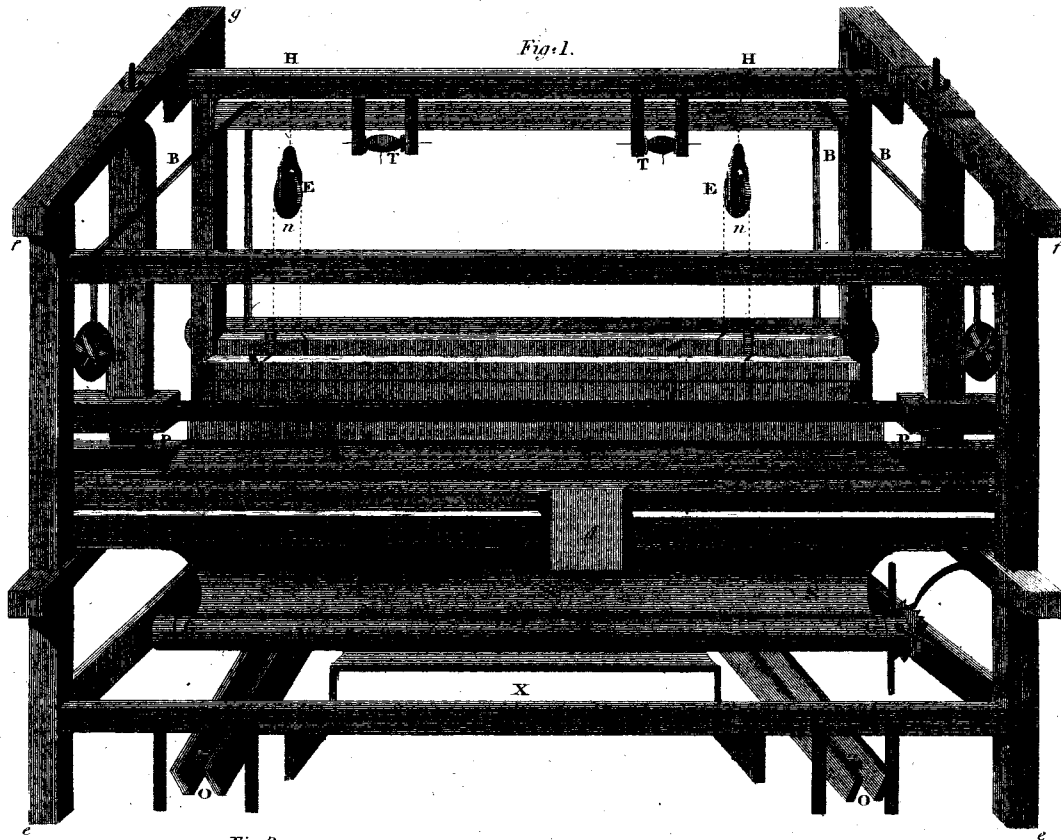


Fig. 3.

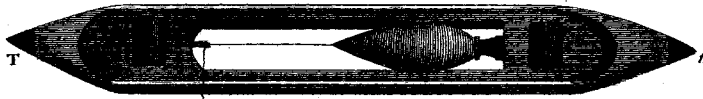


Fig. 2.

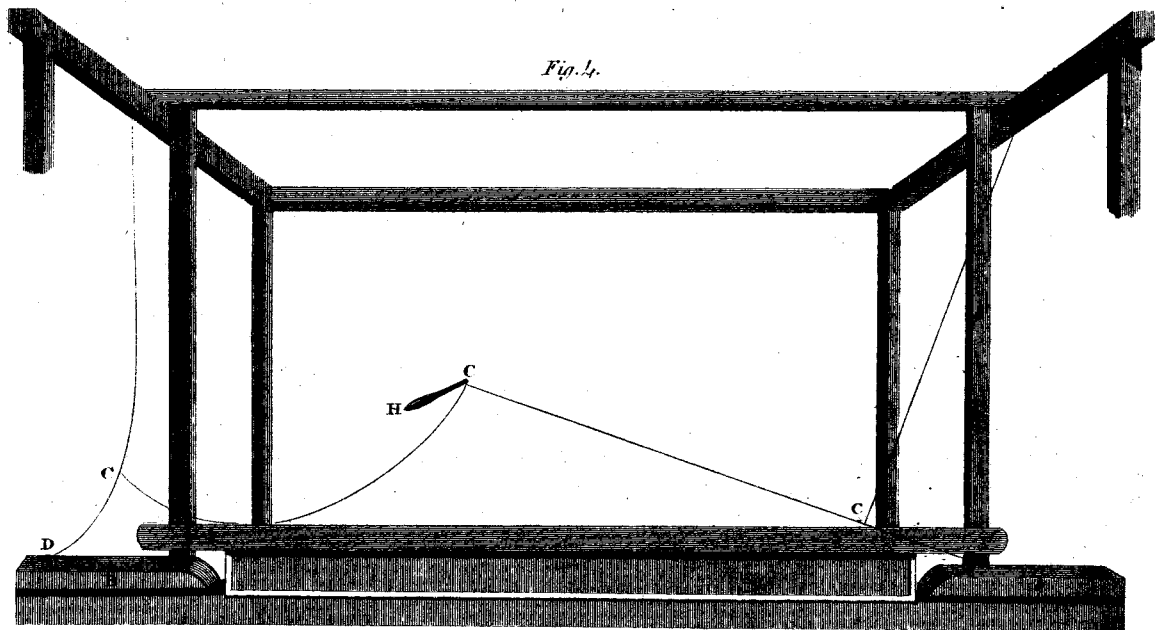


Fig. 4.

Fig. 5.

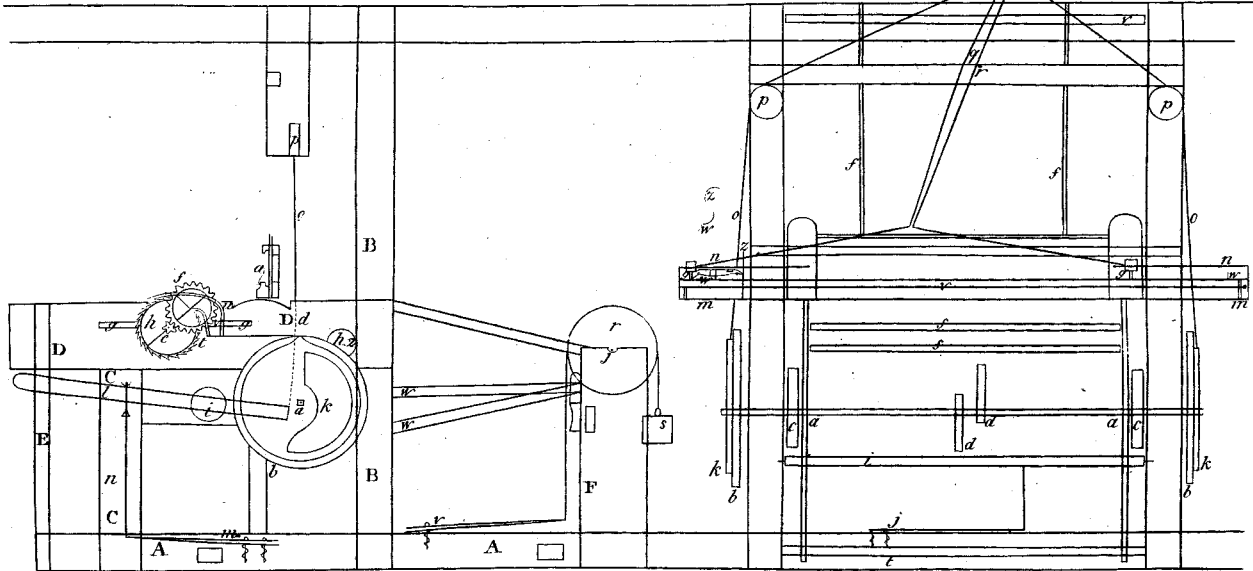


Fig. 6.

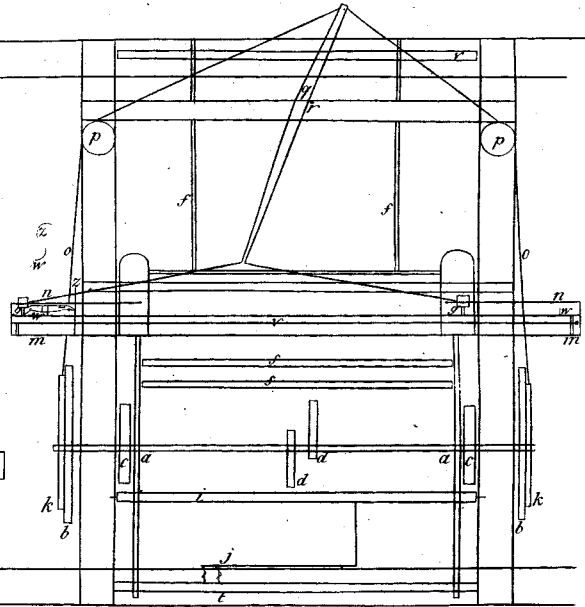


Fig. 8.

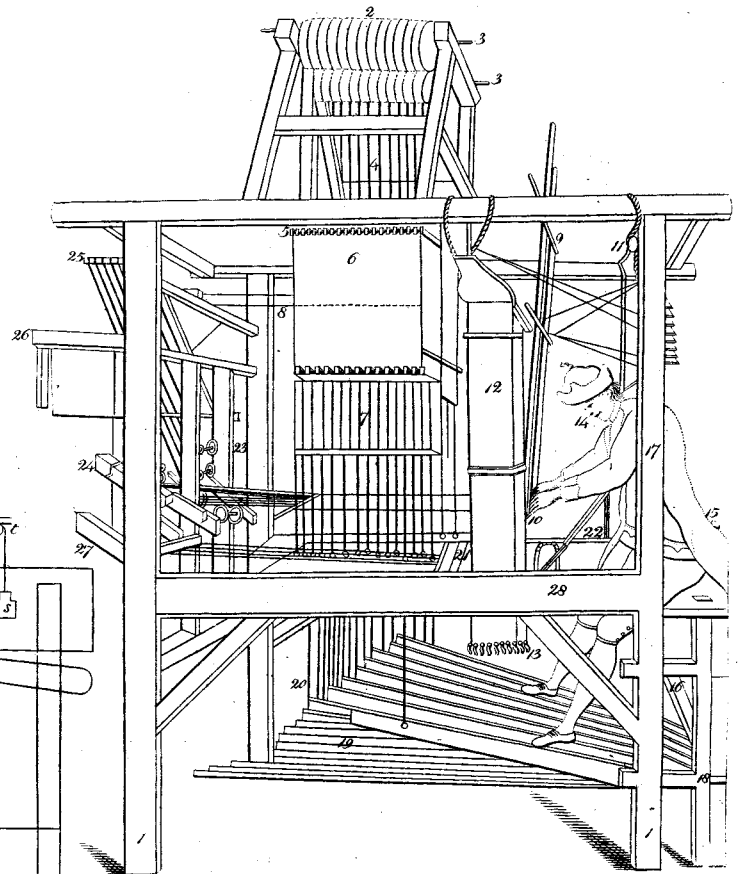


Fig. 7.

