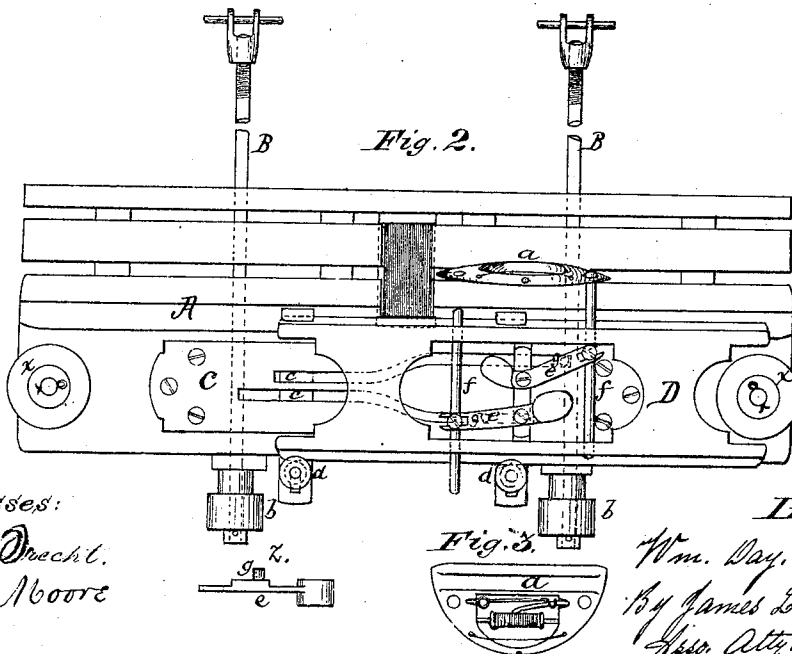
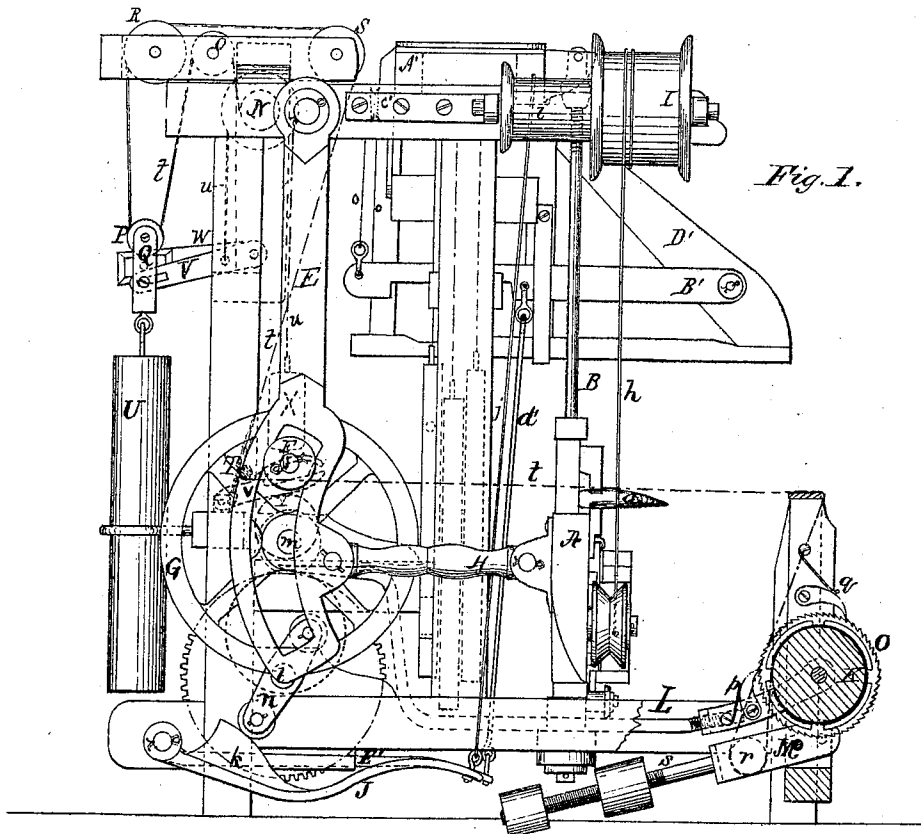


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Improvement in Looms.

No. 129,216.

Patented July 16, 1872.



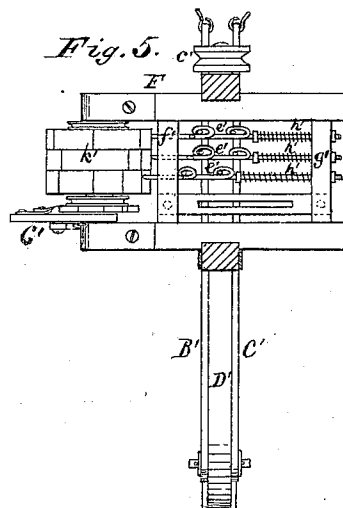
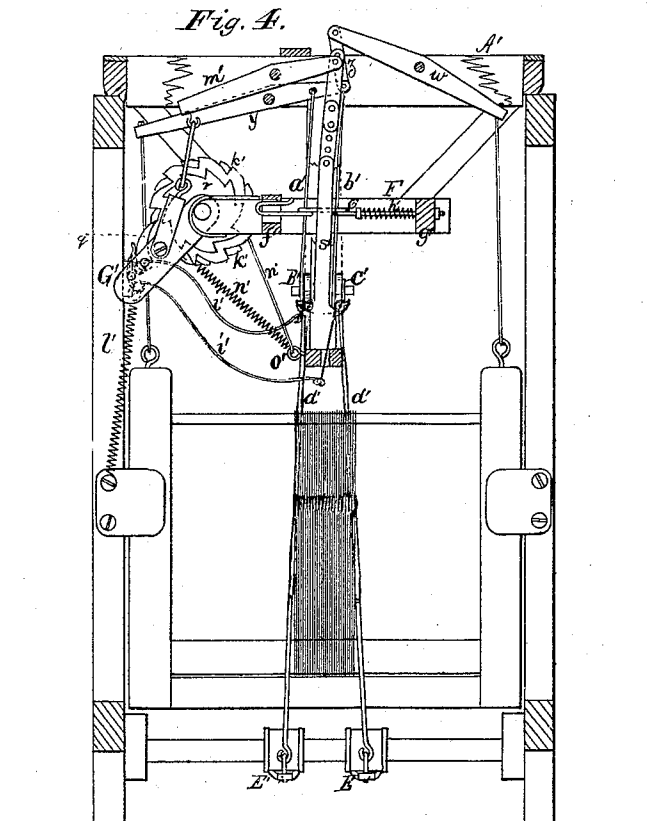
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UNITED STATES PATENT OFFICE.

WILLIAM DAY, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. 129,216, dated July 16, 1872.

Specification describing certain Improvements in Looms for Weaving Narrow Fabrics, invented by WILLIAM DAY, of the city of Newark, in the county of Essex and State of New Jersey.

This invention relates to certain improvements in looms for weaving narrow fabrics; which improvements consist, first, of mechanism for operating the shuttle; second, of the "take-up" mechanism; third, of the "let-off" mechanism; and, fourth, of the mechanism for operating the harness, all as hereinafter more fully set forth and claimed.

Referring to the drawing illustrating my invention, in which similar letters of reference indicate like parts in the several figures—

Figure 1 is a side elevation of my loom, showing part of the "take-up" mechanism in section. Fig. 2 is a front view of the shuttle-operating mechanism. Fig. 3 is a top view of the shuttle. Fig. 4 is a transverse section through the loom, showing the harness and harness-operating mechanism in front elevation. Fig. 5 is a top view of the needles, cams, and knives, being a part of the harness-operating mechanism.

In the mechanism for operating the shuttle, shown best in Fig. 2, A is the batten, suspended from the top of the loom-frame by rods B B, which pass through it and have rollers *b b* on their ends, which move along the sides of the lower part of the frame and serve to ease and steady the motion of the batten. Suitable races are provided in this batten for shuttles *a*, one or more of them being used, as desired. C is a plate secured to the batten and provided with irregular grooves *c c*. Over this plate a driver, D, is secured in grooves or guides, and on rollers *d d*, in such manner as to traverse the batten. Two rods, *f f*, are passed vertically through the driver, and have imparted to them alternately an up-and-down motion by levers *e e*. As said rods are alternately raised they enter openings in the shuttle and carry it back and forth through the warp. The levers *e e* are pivoted to a post on the driver, have one end forked to embrace pins on the rods *f*, the other ends weighted to aid in bringing the rods down at the proper moment, and are provided with studs *g*, (see Fig. at Z,) which fit in the grooves *c c* in plate C. As the driver is moved across the batten

the rods *f* are alternately raised and lowered by the movements imparted to the levers *e e* as they traverse the irregular grooves *c c*, these grooves being so made that a rod moving in one of them will not release the shuttle until the other rod has engaged with it, so that each rod carries the shuttle the entire distance across in one direction.

The necessary oscillating or back-and-forth motion is imparted to the batten by the following means: Arms E E are secured to bearings or journals on the top of the loom-frame, each arm having a curved slot formed in its lower end, in which rollers F are made to work, said rollers being fastened eccentrically on fly and driving wheels G. Pitman-rods H are used to connect the slotted ends of arms E with the bed of the batten, and to transfer the motion to said arms by wheels G to the batten.

The driver D is given the proper motion by the following means: Cords *h* are secured at opposite ends of the driver, thence pass over pulleys *x x* at the ends of the batten, and are then carried up and secured to and wound partially around drums I at the top of the loom-frame. Cords *j* are secured to and wound once around small drums *i*, revolving with large drums I, and extend thence downward and are attached to the ends of levers J, which are pivoted to the lower part of the loom-frame, or secured on a shaft passing through it, and are provided with curved inclines *k*. A shaft, *l*, passes through the lower part of the loom-frame, and bears on its outer ends arms *n*, having attached to their extremities rollers, which, as the shaft *l* revolves, alternately press upon and release the inclines, so that the arms, through the medium of the cords, cause the drums to revolve, and they, in turn, by means of cords *h*, draw the driver back and forth across the batten.

The "take-up" mechanism for receiving and rolling up the fabric as it is woven consists of a roll, K, hung in a frame in front of the batten, means for operating said roll, and a "compensator" for giving the proper degree of tension to the fabric, so that it will be wound around the roll evenly and tightly. The roll has a ratchet-wheel, *o*, secured at one end, and a long arm, L. This arm extends toward the rear of the loom, and is bent in such shape (see Fig. 1) as to rest upon an eccentric on

shaft *l*. A spring-pawl, *p*, is attached to arm *L*, and also one, *q*, to a standard of the roll-frame; and as the arm is raised by the revolving of the eccentric the pawl *p* moves the roll *K* the distance of one tooth or more around, and as said arm is lowered the pawl *p* is disengaged from the roll and the pawl *q* serves to hold it in the position last given by pawl *p* until it is moved again by said pawl. This serves to wind the fabric around the roll as it is woven. The necessary motion is imparted to shaft *l* by suitable gearing connection with shaft *m*, to which latter motion is primarily given by any suitable power. The "compensator" or device for producing the proper degree of tension on the fabric as it is woven consists of a bracket, *M*, hinged or pivoted to the roll-frame underneath the roll, provided with a roll, *r*, around which the fabric passes from the loom to the roll *K*, and a threaded or other rod, *s*, on which a weight (one or more) is adjusted. To give the proper degree of tension on the fabric, the weight on arm *s* being for this purpose, the "compensator" should be elevated closely to arm *L*, as said weight is then most effective. The compensator and arm *L* act conjointly as the roll *K* is operated by said arm *L*, for, when said compensator is drawn up so as to just touch the arm *L*, said arm will receive the full action of the cam actuating it, and will turn the roll around the distance of, say, from one to three teeth of the ratchet; but, as the compensator is elevated by the action of the arm *L*, its action on the roll is less until said arm will be elevated above the cam and will not be operated by it, and hence the roll will not be rotated. This can be obviated, if desired, by releasing the roll from its retaining pawls. By these means a number of fabrics, being woven at the same time on the same loom, are "taken up" independently of one another without the attention of the workman, and as the compensator preserves a uniform tension on the fabrics they are more evenly woven.

The "let-off" mechanism I construct as follows: The warp *t*, Fig. 1, passes from warp-roll *N* up over pulley *O*, secured in frame-work on top of the loom-frame; thence downward around a pulley, *P*, secured in a clevis, *Q*; thence upward over pulleys *R* and *S*; then downward again under a rod, *T*; fastened in the frame; and thence through the harness and reed, and properly adjusted for weaving. A weight *U* is suspended from clevis *Q*, and an arm, *V*, having a slotted end, is connected with said clevis by a pin passing through the clevis and slot, the opposite end of said arm being pivoted to the frame-work. A cord, *u*, is secured by one end to arm *V*, and is then wound once or twice around a pulley on the end of roll *N*, its other end being secured to a weight, *X*, shown in dotted lines, Fig. 1. A cam-lever, *v*, is pivoted to the frame and is secured loosely to the lower part of a weight, *X*. This lever is caused to rise and fall by an eccentric, *Y*, on shaft *m*. When the fabric is so taken up

as to cause the warp to draw up the weight *U* the elevation of the weight *X* by the cam *Y* will lessen the tension on the warp-roll, and sufficient warp will be "let off" to allow the weight *U* to fall, thus rendering the let-off motion automatic, the warp itself being drawn off regularly by the take-up mechanism. The elevation of lever *v* and weight *X*, in point of time, will be in proportion to the elevation of weight *U*. The higher the weight *U* ascends the lower will the weight *X* and arm *v* descend, and the longer will be the action of the cam *Y* on the arm *V* to slacken the cord *u*. The weight *U* and the pulleys before described impart the proper degree of tension to the warp, and the slot in arm *V* is to allow said arm to rise and fall with the weight.

The harness-operating mechanism is constructed as follows: In an adjustable frame, *A'*, Fig. 4, secured on top of the loom-frame, a number of levers, *w* and *y*, are hung on separate shafts passing through their centers—one lever, *w*, and one lever, *y*, for the opposite ends of each harness. Cords depend from the ends of said levers and are attached to the harness for the purpose of communicating the proper movement to it. The inner ends of these levers are connected by links *z*, so that said levers shall move in unison. Rods *a' b'*, having their lower ends hook-shaped, depend from the inner ends of levers *y*. These hooked rods or hooks engage with two knives, *B' C'*, which are secured at one of their ends to a beam, *D'*, Fig. 1, extending from the frame *A'* and their opposite ends are supported by a cord, *o*, passing over a pulley *e'*, Figs. 1 and 5, on the rear of frame *A'*. The knives are moved up and down alternately by means of rods *d' d'*, which extend downward, and are attached to the ends of levers *E'*, which are similar to levers *J*, are arranged on the same shaft with them, and are operated by revolving rollers secured to a pulley, two being arranged on each side of the pulley; or they may be operated by eccentrics, or devices similar to those actuating levers *J*. As the levers *E'* are alternately pressed down they draw knives also down, and by means of the hooks *a' b'* engaging with said knives the levers *w* and *y* are operated, and impart the proper motion to the harness. In order that the hooks may engage with and be disengaged from the knives, I secure a number of needles, *e' e'*, corresponding in number with the hooks, longitudinally in a frame, *F*, which is suspended in the loom-frame by braces, &c., a little below frame *A'*. Each of these needles has two eyes, through which the hooks pass; one end is looped and extends through a slot in a cross-piece, *f'*, of the frame, and the other end projects through a hole in bar *g'*. A spiral spring, *h'*, is secured on the needle between the right-hand eye and bar *g'*, and presses the loop ends of the needles against the revolving inclines or tappets *k'*. These cams or inclines *k'* are arranged at regular intervals on a drum or roll hung in the frame *F*, which is rotated

by means of a spring-pawl, *g*, engaging with a ratchet, *r*, on one end of it, and said pawl is secured in an arm, *G'*, hinged to the frame *F*, which arm *G'* is drawn down by a spring, *h'*, and is raised to cause the pawl to engage with the ratchet by links or other connections with a lever, *m'*, secured on the frame *A'*. From the other end of said lever *m'* a double hook, *s'*, depends, which is drawn down first by one knife and then the other as they alternately descend, thus giving the proper motion to lever *m'* in actuating the cam-roll, the descent of each knife causing the roll to be rotated the length of one ratchet-tooth. *i i'* represent springs securely attached to an upright of the loom-frame, and connected by their free ends with the ends of hooks *a' b'*. Each of these hooks is kept up to the front part of the loops in the needles by means of these springs, in order that the knives may not engage with them in their descent, except when said hooks have been so acted upon by the inclines or tappets *k'* as to place them in such position as to come in contact with the knives at the proper moment, for the purpose of operating the harness. By means of these needles and the cam-roll, the hooks are placed in position to engage with the knives, and hence the operation of the harness will be continuous and uniform. The cam-roll is prevented from slipping back when the pawl is disengaged from the ratchet by elastic cords *n'*, Fig. 4, which pass around pulleys on the ends of

the roll, and are secured to a part of the frame as at *o*.

Any of these several devices as a whole may be applied to other looms with good results.

What I claim as new, and desire to secure by Letters Patent, is—

1. The shuttle-operating mechanism, herein described, consisting of the combination of the driver *D*, weighted levers *e e* pivoted to the same shaft, rods *f f*, plate *C*, grooves *c c*, shuttle, and motive power, when arranged and operating as set forth.

2. The "take-up" mechanism, consisting of the roll *K*, arm *L*, and its operating cam, pawls *p q*, in combination with the compensator-roll *r* and adjustable weighted arm, constructed, arranged, and operating as set forth.

3. The "let-off" mechanism, consisting of the warp-roll *N*, pulleys *O P*, clevis *Q*, weight *U*, pulleys *R* and *S*, arm *V*, counter-weight *X*, lever *v*, and eccentric *Y*, all constructed, arranged, and operating as set forth.

4. The levers *w* and *y*, hooks *a' b'*, springs *i i'*, knives *B' C'*, rods *d' d'*, levers *E' E'*, and operating cam or cams, in combination with frame *F* with its needles, constructed as described, and cam-roll and its rotating devices, constituting the harness-operating mechanism, the whole arranged and operating as described.

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