2 Sheets—Sheet 1.

J. M. FLAGG.

Vertical Looms.

No. 198,765. Patented Jan. 1, 1878.

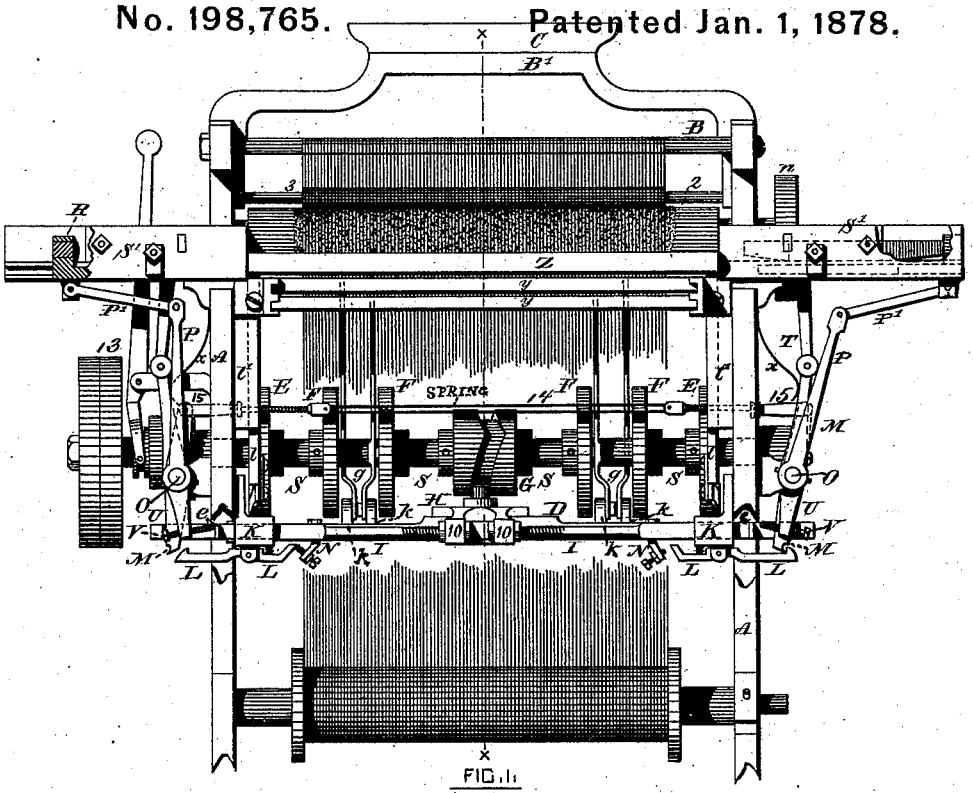


FIG. 1.

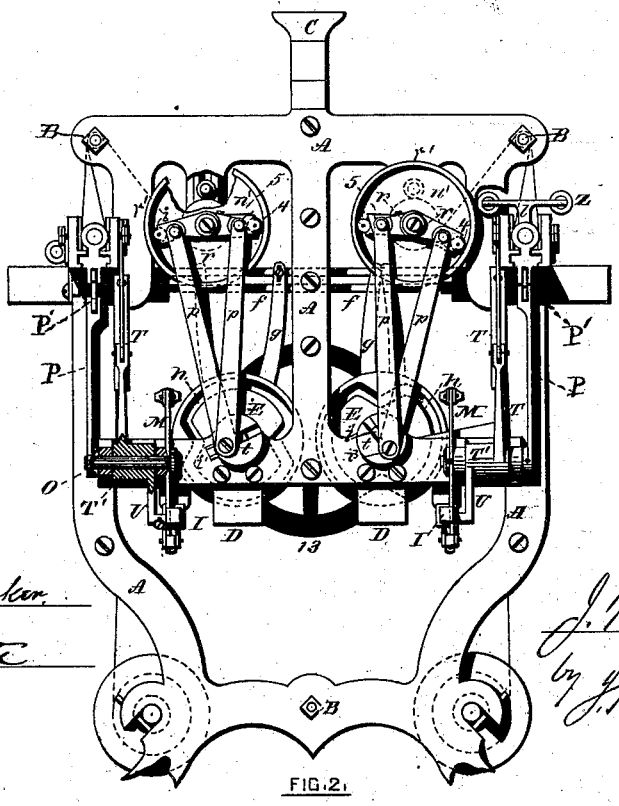
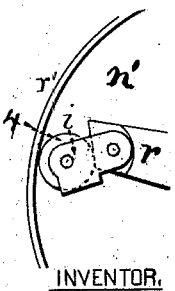


FIG. 2.

FIG. 2½



WITNESSES.

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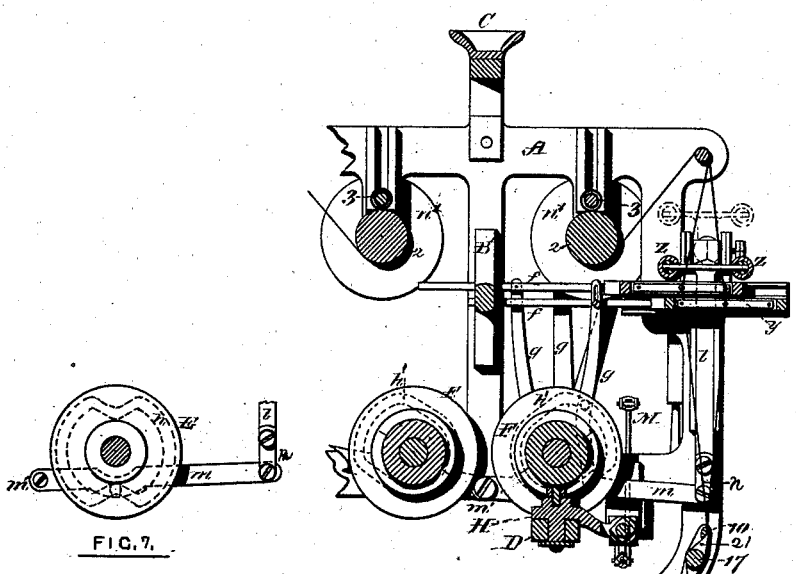

FIG. 7.

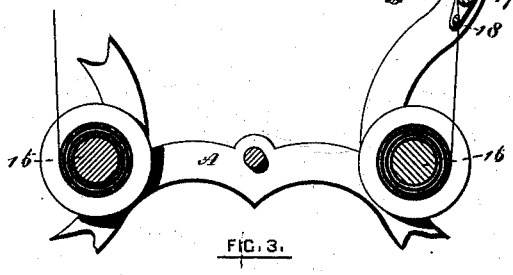

FIG. 3.

FIG. 8.

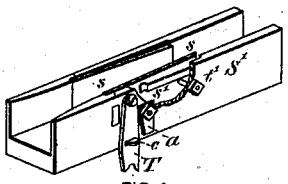

FIG. 4.

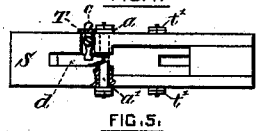

FIG. 5.

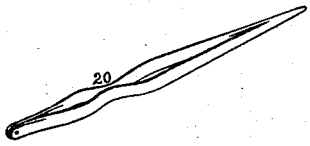

FIG. 9.

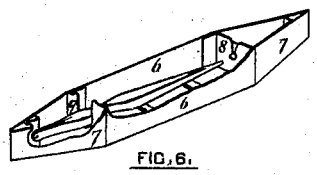

FIG. 6.

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UNITED STATES PATENT OFFICE.

J. MELLEDGE FLAGG, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN VERTICAL LOOMS.

Specification forming part of Letters Patent No. **198,765**, dated January 1, 1878; application filed December 18, 1876.

To all whom it may concern:

Be it known that I, J. MELLEDGE FLAGG, of Providence, in the county of Providence and State of Rhode Island, have invented a Loom, of which the following is a specification:

My invention relates to an improvement in looms, whereby I effect a great saving in the power required for running the same, while I gain great speed and am enabled to perform a much greater amount of work than the looms of ordinary construction in present use are capable of producing; and my invention consists in constructing and arranging the different parts of the loom and in modifying the shuttle, as fully described hereinafter, so as to effect the desired results.

Referring to the drawings, Figure 1 is a front elevation of my invention. Fig. 2 is an end elevation of the same. Fig. 2½ is a detached view of the take-up disk and friction-clutch. Fig. 3 is a section of the same on the line *x x* of Fig. 1. Figs. 4 and 5 are detail views of the shuttle-box. Fig. 6 represents the shuttle. Fig. 7 is a detail view of the cam and lever that actuate the reed. Fig. 8 is a view in detail of a portion of the shuttle, and Fig. 9 represents a peculiar form of spindle to be used in my shuttle.

Similar letters and figures in the several figures indicate like parts.

A A represent the sides or ends of the frame, each cast in one piece. B B are the cross pieces or ties that connect the two ends of the frame together. On the upper part of the upper cross-tie B′ is a receptacle, C, for holding extra shuttles.

On a cross-bar, D, which also connects the ends of the frame together, is supported a slide, H, which has a longitudinal movement on the bar D.

On the top of the slide H is a projection or stud, that fits in a cam-groove in the central cam-wheel G, which is mounted on the main shaft S, and the rotation of which imparts a reciprocating motion to the slide H on the bar D.

Projecting in front of the slide H are two arms, 10 10, to which are attached, by means of adjustable nuts, screw-rods I I, which are supported in guides K K, attached to each side of the frame A A.

To the under side of the guides K K are pivoted the bars L L, the outer ends of which, on each side of the frame, are formed with catches, that are caused to engage alternately with the ends of levers M M, that actuate the lever which throws the shuttle. The inner ends of the bars L L are so constructed and arranged that, as the rods I I move forward and back, the said bars L L will be tripped by projections N N, to release the levers M M at the proper time. The projections N N are fitted with adjustable screws, as shown in Fig. 1.

The levers M M are mounted on counter-shafts O O on the outside of the frame, and to their upper ends are attached adjustable connections 15 15, each secured to the ends of a spring, 14, extending across the loom, and made of vulcanized rubber or of spiral wire, so that as the lower ends of the levers are alternately released from the catches L L, the spring will cause the double lever P P′ to be suddenly retracted, and with sufficient force to throw the shuttle from end to end.

On the opposite end of the counter-shafts O O are fastened the levers P P, to the upper ends of which are attached the arms P′ P′. The outer ends of the arms P′ P′ are attached to the under sides of the shuttle-driver or picker R, that moves in the shuttle-box S′.

Within the shuttle-box S′ are hinged, on each side, metal plates *s s*, as shown in Fig. 4, so that the free ends of each plate may be forced, by means of a spring, toward the center of the shuttle-box, for the purpose of retarding and retaining the shuttle as it nears the limit of the throw. The plates *s s* are adjusted, by means of set-screws *t′*, to project more or less, as required, as shown in Figs. 4 and 5.

For the purpose of opening or retracting the plates *s s*, to release the shuttle for the return movement, I employ a wedge, *d*, (shown in Fig. 5,) which is caused to move forward and force apart the slides *a a′*, (see Figs. 4 and 5,) which pass through the sides of the shuttle-box, turning up at right angles, and are attached by set-screws to the adjustable

friction-plates *s s*. The wedge *d* is moved forward at the proper time by means of a short arm or lever, *c*, Figs. 4 and 5, operated by the jointed lever T, Figs. 1 and 2, mounted on the counter-shaft O, the lower end of which lever T is attached to a sleeve or collar, T′, Fig. 2, on the counter-shaft O; and on the under side of the said sleeve or collar is a projecting short arm, U, Fig. 2, through the lower end of which passes an adjustable set-screw, V, Fig. 1, the inner end of which is opposite a lug, *e*, Fig. 1, on the rods I I, so that as the rods I I move to and fro, the double lever T will be actuated to throw back the friction-plates *s s* just prior to each throw of the shuttle. The double lever T is brought back to its normal position by means of a spring, *x*, Fig. 1, on the sides of the frame A.

y y represent the front edges of the harnesses, which consist of horizontal metallic frames, in which are strung the flat metallic heddles on wires extending lengthwise of the same.

Extending back from each harness-frame are rods or bars *f f*, moving in guides in the cross-tie B′, as shown in Fig. 3. To the rods *f f* are attached, in pairs, the levers *g g*, secured at their lower ends to lugs *k k* on the cross-tie D, and are provided with pins fitted with friction-rolls, that move in cam-grooves *h′ h′*, Fig. 3, in cam-wheels F F, mounted on the main-shaft S, by means of which an alternate reciprocating motion forward and back is imparted to the harnesses.

Z is the reed which beats up the woof or filling. The longitudinal sides of the reed are inclosed in metallic tubes, on which hog-frames can be placed, if desired, so as to insure the requisite stiffness. The reed Z is supported at each end upon upright bars *l l*, Figs. 2 and 3, which move in vertical grooved guides in the sides of the frame A A. The lower ends of the bars *l l* are connected, by means of short arms *n n*, Figs. 3 and 7, to levers *m m*, so as to insure a free vertical motion to the said bars. The levers *m m* are fulcrumed at *m′* on the inner sides of the frame, and are provided with pins fitted with friction-rolls, that move in the cam-grooves *h h* in the cam-wheels E E on the shaft S, as shown in Figs. 2 and 7, so as to impart the requisite vertical motion to the reed.

The take-up will now be described: 2 is a roll covered with sand-paper, or other suitable frictional surface, as in common use, for taking up the cloth as fast as woven, and which is wound on the bar 3, placed above roll 2, and fitted at the ends to move in grooves in the frame, so as to rise as it receives the cloth.

On the end of the shaft which carries roll 2, and outside the frame, is a disk, *n′*, (see Fig. 2,) having an outwardly-projecting rim, *r′*, and upon the portion of the shaft which projects through the disk *n′* are pivoted two arms, *r r*, extending in opposite directions upon the face of the disk *n′*. The outer end of each arm is beveled, as shown in Figs. 2 and 2½, and between each end and the projecting rim *r′* is placed a roll, 4, which is held in position by means of a spring, 5, as shown in Fig. 2. The rolls are further confined by means of a guard, *i*, attached to the arms *r r;* and the inclined or beveled ends of the said arms, bearing against the rolls 4 4, cause the latter to bear against the inner sides of the rim *r′* and turn the disk *n′*, with its shaft that carries the cloth, and release from the disk the friction when moved in the opposite direction, the two arms acting alternately to move the disk. Connected to the arms *r r* are the long arms or bars *p p*, which are attached at their lower ends to a screw-pin, i^3, passing through a slide, i^1, fitted in a grooved cylindrical block, *t*, secured to the outer end of the main shaft S. The lower ends of the arms *p p* are capable of being very nicely adjusted to the requirements of the take-up by means of the screw-pin i^3 and the movable slide in the grooved block *t*.

The frame in which my loom is supported is made double, as shown in Fig. 2, so as to accommodate two looms, each facing in opposite directions and acting entirely independently of each other, both being put in motion and operated by one and the same pulley, 13, connecting by means of gears, two to one, so that either may be set in motion or stopped at the will of the operator.

Fig. 6 represents a shuttle adapted for the loom above described. It is composed of thin sheet-steel or other metal, with two parallel sides, 6 6, said sides being flat; or they may be slightly curved or corrugated lengthwise to increase their stiffness, with converging ends 7 7, which are riveted to triangular pieces in the ends or points, so as to give it the requisite solidity and finish. At the point where the sides commence to converge are fixed the cross-pieces 8 9.

Fig. 8 represents the cross-piece at the front end of the shuttle, which is provided with the spring 19, for holding the thread as it comes from the spindle. The thread is passed around the end of the spring to bring it to its place. The spindle is held in its closed position by means of a notch acting as a catch in the cross-piece 9, Fig. 6.

Fig. 9 represents a peculiar form of spindle to be used in my improved shuttle. The elastic sides are curved inwardly at a point, 20, about one-third, more or less, of the length of the slot from the hinged or pivoted end. The spindle is pivoted in one of the solid ends of the shuttle, and from its peculiar shape forms a spring of itself, whereby it is held in place when pressed home.

The threads, as they leave the warp-beam, pass up in front of a rod, 18, Fig. 3, to the rear of a central bar, 17; thence up in front of the rod 10, through the heddles in the harnesses.

The rods 10 and 18 are attached to a bar, 21, which is fitted at each end on the inside of the frame, and is allowed to turn on the central bar 17. The latter is held in place by means of screws at the ends, and passing through

the frame, so that the plate 21 may be turned to increase or lessen the tension of the warp, as desired.

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

1. The combination of the rock-shaft O, having arms M P, the shuttle-picker R, connected to the arm P, the spring attached to the upper end of the arm M, with the sliding rod I, carrying a spring, and a spring-catch pivoted on a bracket, and arranged to engage with the lower end of the arm M, as set forth.

2. The combination, with the levers M M, of the catches L L and the sliding rods I I, operated by the slide H, the releasing devices N, and cam G, as and for the purpose set forth.

3. The combination, with the shuttle-boxes, of the adjustable spring-plates *s s* and mechanism, substantially as described, for vibrating said plates just prior to the throwing of the shuttle, as set forth.

4. In combination with the adjustable plates *s s*, the wedge *d*, the slides *a a'*, and the lever *c*, operated by the jointed lever T, substantially as and for the purpose specified.

5. The take-up-actuating mechanism, consisting of the disk *n'*, provided with the projecting rim *r'*, the pivoted arms *r r*, provided with beveled ends, unyielding rolls 44, mounted in swinging holders, operating-arms *p p*, and crank-disk *t*, substantially as specified.

6. The combination of the shuttle-body, its notched cross-plate *g*, and the spindle, having a portion of the elastic sides curved inwardly, as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

J. MELLEDGE FLAGG.

Witnesses:

J. H. ADAMS,

THOMAS F. MCALOON.