L. H. OLMSTED.

PLAITING MACHINE.

No. 180,054. Patented July 18, 1876.

Fig. 1

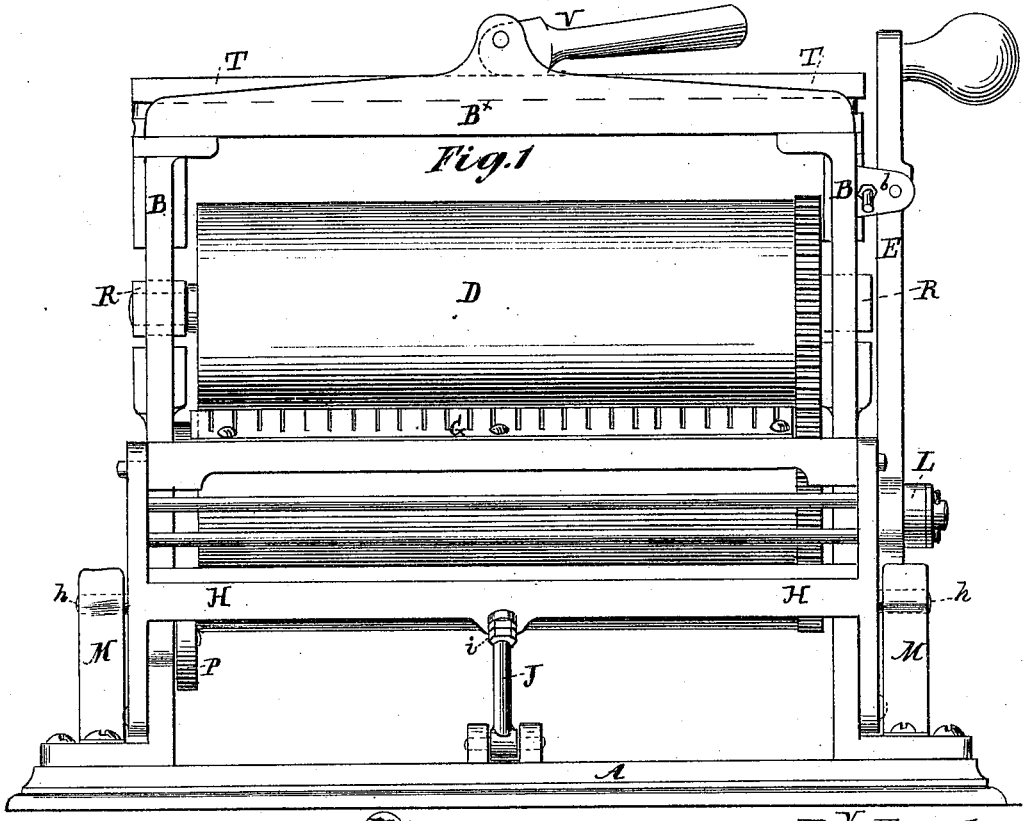

Fig. 2

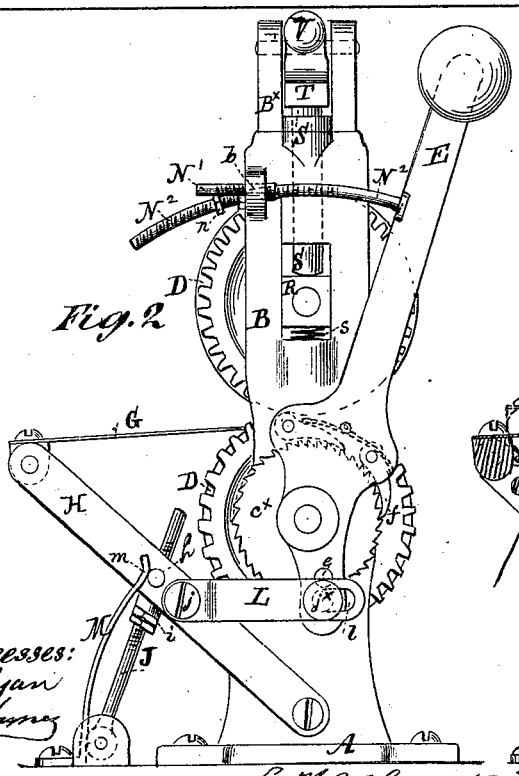

Fig. 3

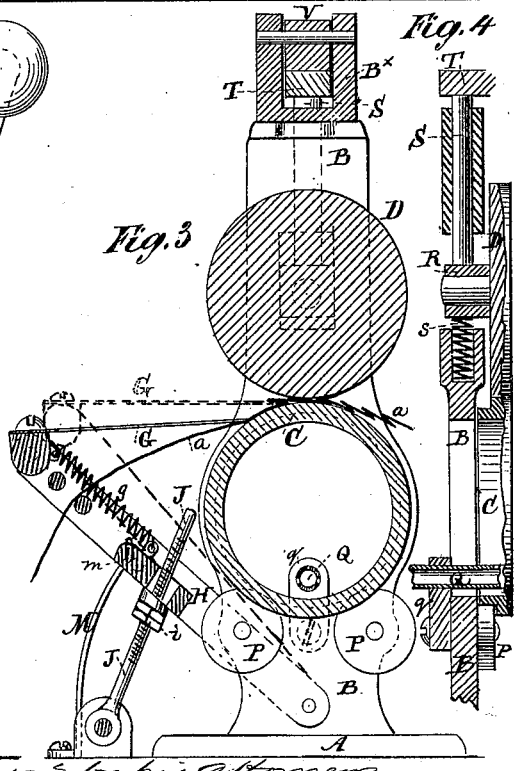

Fig. 4

Witnesses:
M. Ryan
F. Harry

L. H. Olmsted by his Attorneys
Brown & Allen

UNITED STATES PATENT OFFICE.

LEVERETT H. OLMSTED, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PLAITING-MACHINES.

Specification forming part of Letters Patent No. **180,054**, dated July 18, 1876; application filed April 7, 1876.

To all whom it may concern:

Be it known that I, LEVERETT H. OLMSTED, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Plaiting-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention consists essentially in a novel construction and arrangement of parts, whereby I am enabled to operate the rollers and plaiting-knife by means of an oscillating lever and a connecting device; also in a novel construction and arrangement of a double-acting spring or springs for co-operation with the lever and connecting-link, to impart the requisite back and forward motion to the knife-carrying frame; and, further, in certain details of construction and arrangement of parts for lessening the friction and providing for the heating of the hollow roller, and for adjusting the working parts of the machine.

The accompanying drawing illustrates the manner of carrying out my invention.

Figure 1 is a front view of a machine embodying my improvements. Fig. 2 is a side or end view of the same. Fig. 3 is a transverse vertical section, taken in the line *x x'* of Fig. 1. Fig. 4 is a vertical section at right angles to Fig. 3.

The rollers of the machine have their bearings in two standards, B B, rising from the supporting base or platform A. The lower roller C has one of its journals or gudgeons extending beyond its bearing in the standard, and serving as a fulcrum, *c*, for an oscillating lever, E. This lever is provided with one or more pawls, *f*, for engagement with a ratchet, $c^{\times}$, attached to the roller C, by which means an intermittent rotary motion is imparted to said roller, when said lever is oscillated back and forth. The upper roller D is journaled in elastic bearings, hereinafter described, and is arranged with its surface in contact with that of the lower roller, and may be rotated by friction or may be provided with gears, as shown. The upper end or long arm of the lever E may be formed into or provided with a handle to facilitate its manipulation. The lower end or short arm is connected by a link with the swinging knife-carrying frame. By this means the machine is operated entirely by the oscillating motion of the lever, instead of by a continuous rotary motion of a crank-shaft, as in machines heretofore constructed. By employing an oscillating motion for operating the machine, I am enabled to dispense with many parts heretofore employed for giving motion to the machine, and to cheapen and simplify its construction.

The knife G is of the usual or any suitable construction, and is carried by a swinging inclined frame, H, composed of two end pieces and a connecting cross-bar. The lower ends of the end pieces are pivoted to the standards B B, so as to allow the frame to swing upward and downward toward and from the rollers. The knife is attached to the frame by means of hinges or pivots at the upper ends of the end pieces, so that it may rise when necessary, and it is provided with a spring, *g*, which has a tendency to hold it down in a nearly horizontal position, or at an acute angle with relation to the frame H, and with its front edge in contact with the surface of the lower roller. The backward motion of the frame is limited and regulated by means of a stop, consisting of a screw-rod, J, having its lower end pivoted to the base A, and its upper portion passing through a hole in the connecting cross-bar of the frame H. The rod J is provided with one of more nuts, *i*, against which the cross-bar strikes and thus arrests the backward motion of the frame. The rod may also be provided with a cushion of rubber or other elastic or soft material resting on the nut, for lessening the shock and noise of the concussion. The nut or nuts may be screwed up or down on the rod, in order to diminish or increase the amount of travel allowed to the frame H, and thereby to correspondingly diminish or increase the width of the plait.

The motion of the swinging knife-carrying frame is governed partly by the oscillating lever and connecting-link, and partly by a spring or springs. The connecting-link here represented consists of a straight rod or bar, L, connected to one of the end pieces of the frame H by a pivot, *j*, at one end, and to the lower end or short arm of the lever E at the other

end by means of a screw, $j^{\times}$, passing through a slot, *l*, in the link, and into one of two holes, *c*, in the lever. By means of the slot *l* a certain amount of play is allowed to the lever without moving the frame H, in consequence of which, when the lever is moved forward, the rollers begin to rotate before the knife begins to recede.

Instead of a slotted link, as shown, the connection may be made by means of a toggle-joint or other suitable device which will accomplish a similar result; and instead of the connection of the lever being made at one end of the frame, it may be made near the mid-length, or at any other suitable point, by means of a link attached to an arm extending from the lever in a direction parallel with its axis.

The spring or springs for actuating the knife may be of any suitable description, and arranged to operate either by contraction or expansion.

As shown herein, two springs are employed, each of which consists of a flat strip of steel, M, having its lower end rigidly attached to the base A, and its upper portion free to vibrate. The spring is slightly curved forward to a point, *m*, near its upper end, and then bent at an obtuse angle. The portion of the springs near the angles *m* bears against the frame H, or against arms or studs *h h* projecting therefrom, with a tendency to push the frame in a direction toward the rollers. The point of rigid attachment of the spring, and the point of its engagement with the frame, are not in the same vertical line; and the angle *m* of the spring, and the points of connection of the link L, are not in the same horizontal line, so that when the arms or studs *h h* are above the angles *m* the springs have a tendency to push the frame upward, and force the knife between the rollers; and, when said studs are below said angles, the springs have a tendency to push the frame downward until it is arrested by the stop J.

The parts above described operate as follows: When the lever E is moved backward toward the observer in Fig. 2, or toward the left-hand side in Figs. 2 and 3, the pawl *f* slips over the ratchet $c^{\times}$ until the lever reaches the end of its backward movement. As soon as the screw $j^{\times}$ reaches the outer end of the slot *l* it pushes the link L so as to raise the frame H. As soon as the studs *h* pass the angles *m* the springs M push the frame forward with a sudden motion, so as to force the edge of the knife between the rollers, as shown in dotted lines in Fig. 3, carrying with it the cloth, which is represented by the line *a* in said figure. When the lever is moved in the opposite direction the pawl engages with the ratchet, and starts the rollers in the direction of the arrow, so as to press the plait between the surfaces of the two rollers, and take it from the knife before allowing the knife itself to recede. As soon as the screw $j^{\times}$ reaches the inner end of the slot *l* it pushes on the link L so as to force the frame backward, and withdraws the knife from the plait, and from between the two rollers. As soon as the studs *h* pass the angles *m* the springs M push the frame downward and backward until it is arrested by the stop J, as shown in full lines. As the knife is held down by the spring *g* its edge slides over the surface of the cloth during the backward motion, and, when arrested, it is in position for the formation of another plait when again moved forward. By thus adjusting the motions of the knife and rollers with relation to each other I insure the plait being caught and pressed between the rollers before the knife is withdrawn therefrom, and thus form a perfect plait.

The width of the plait is determined by the adjustment of the back-stop formed by the rod J and nut or nuts *i*. The distance between the plaits is determined by the adjustment of the travel of the oscillating lever E, which may be accomplished in various ways, as, for example, by means of standards or arms rising from the base A for the lever to abut against, or by means of two lugs on the standard provided with adjustable screw-rods or studs. As shown herein, however, the travel of the lever is regulated by means of two screw-rods, N^1 N^2. The rod N^1 works in a screw-threaded hole in a lug, *b*, projecting from one of the standards B, and is adjusted farther in or out in order to limit the backward motion of the lever. The rod N^2 has one end attached to the lever, and the remaining portion works freely in a hole in the lug *b*, and is provided with one or more nuts, *n*. By screwing the nut *n* nearer to or farther from the lug *b* the amount of travel allowed the lever is diminished or increased, and the motion imparted to the rollers is regulated thereby.

If desired, the rod N^2 may be provided with a nut between the lever and the lug for arresting the backward motion; but the arrangement shown is deemed the most convenient.

As the slot *l* in the link L admits of some play to the lever E without moving the knife, the distance between the plaits may be increased by oscillating the lever so as to rotate the roller without moving the knife.

The lower roller, C, is hollow in order to provide for heating it by means of gas or a heated core. In order to prevent too great friction of the bearing at the open end of the roller, in consequence of the expansion resulting from the heating, I employ two or more friction-rollers, P, attached to the standard B, which rollers form a bearing for the open-ended portion of the hollow roller, and said roller is held in place on said bearings by the contact of the upper roller therewith. The standard B is provided with an opening corresponding in size with the open end of the roller, in order to admit a gas-burner or a heated core.

When gas is used for heating I employ a burner consisting of a perforated pipe, Q, passing inside the roller, and held in place by a lug, *q*, which may be removed in order to allow a heated core to be used when desired.

The upper roller D is journaled in boxes R working in vertical slots in the standards B B. Under each box is a spring, *s*, resting on the solid portion of the standard, and bearing upward against the box. Over each box is a vertically-sliding rod, S, the upper end of which extends upward into a notch in the standard. An elastic pressure-bar T rests in these notches in the standard, and bears upon the rods S. A cam-lever, V, is pivoted in lugs on the upper edges of the cross-bar $B^{\times}$ connecting the standards. When the cam-lever is depressed the upper roller is pressed downward against the lower one, and when said lever is elevated the springs *s* separate the two rollers sufficiently to allow of the insertion or removal of the work.

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

1. The combination of the oscillating hand-lever E, the ratchet $c^{\times}$, and pawl *f*, for operating the rollers, the knife-carrying frame H, and the bar L, connecting the said frame with the said lever by a slotted connection, and the spring or springs M, substantially as herein described.

2. A plaiting-machine, having the operation of its knife assisted, in both its forward and backward motion, by means of a double-acting spring or springs, substantially as herein described.

3. In a plaiting-machine, the combination, with the hollow roller, of the friction-roller bearings, arranged as shown and described, for the purpose specified.

4. The combination, with the upper roller D and its journal-boxes, of the lifting-springs *s s*, the sliding rods S S, the elastic presser-bar T, and the cam-lever V, all substantially as herein decribed.

5. In a plaiting-machine, the combination, with the oscillating lever E for operating the rollers and plaiting-knife, of stops for regulating the amount of travel of said lever, substantially as herein described.

L. H. OLMSTED.

Witnesses:
E. R. BROWN,
FRED. HAYNES.