(No Model.) 2 Sheets—Sheet 1.

H. G. OTIS.

PLAITING MACHINE.

No. 320,278. Patented June 16, 1885.

Fig. 1.

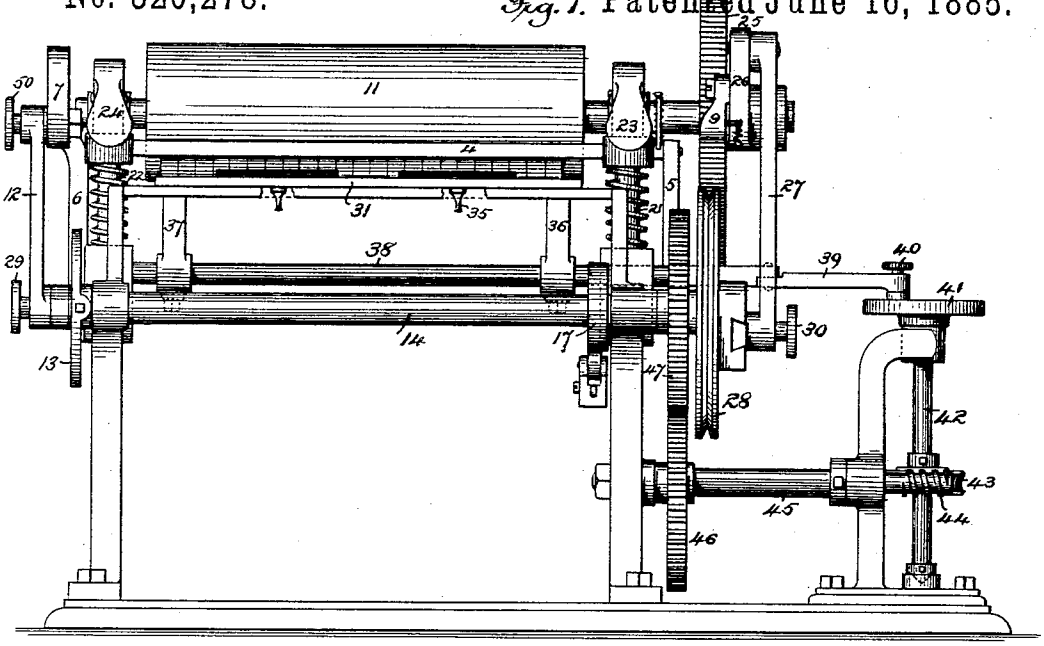
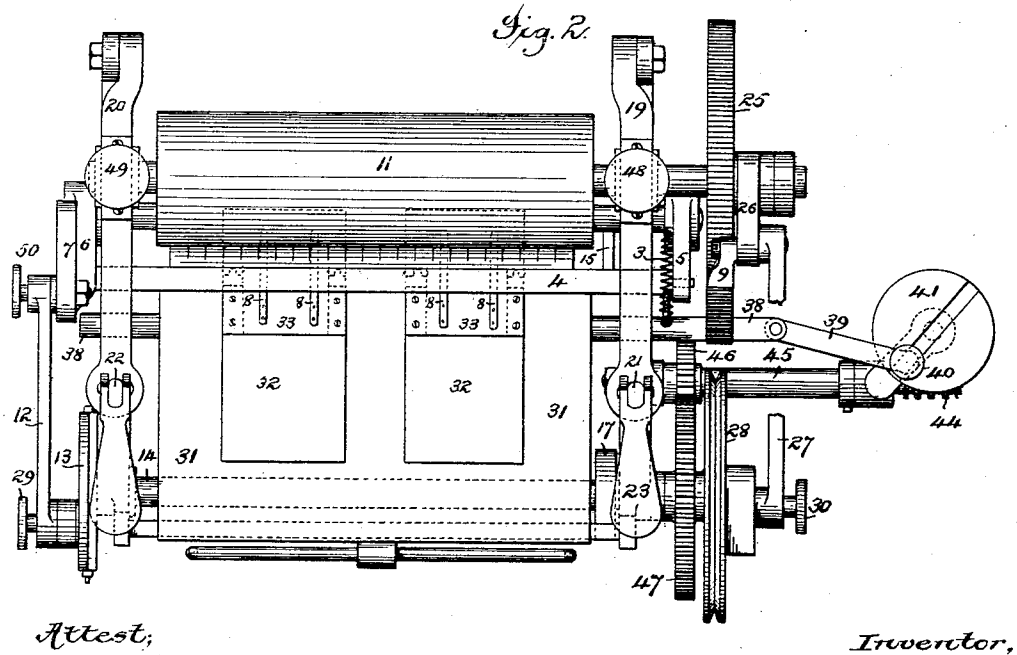


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

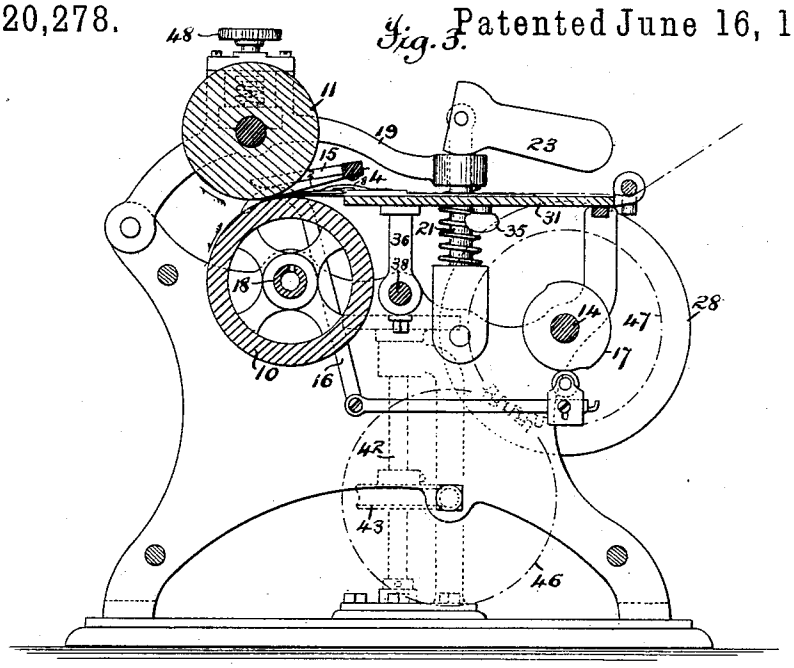


Fig. 4.

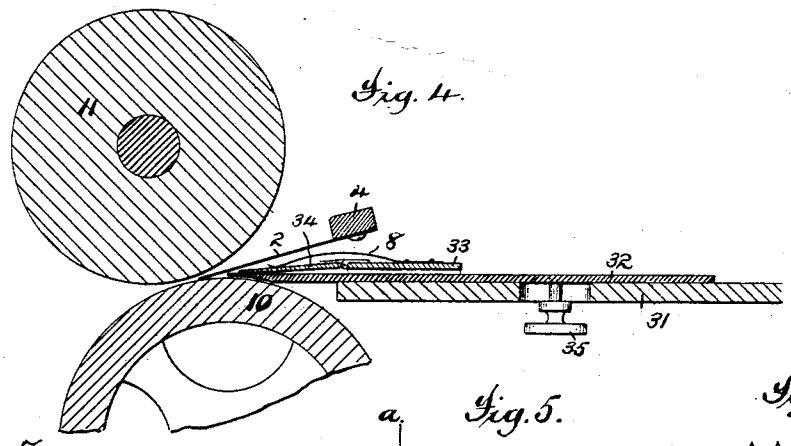


Fig. 7.

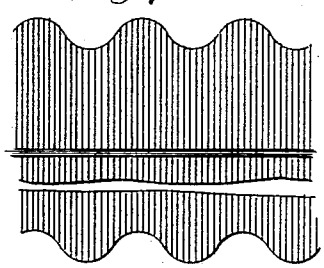


Fig. 5.

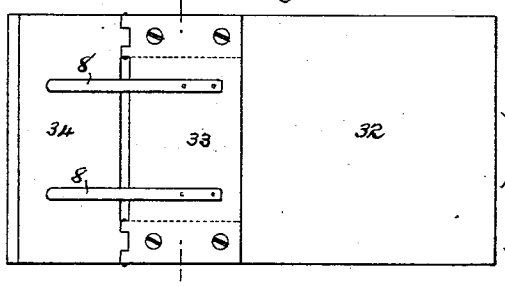


Fig. 6.

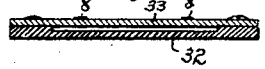
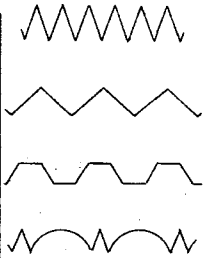


Fig. 8.



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UNITED STATES PATENT OFFICE.

HARRISON G. OTIS, OF NEW YORK, N. Y.

PLAITING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 320,278, dated June 16, 1885.

Application filed December 29, 1881. (No model.)

To all whom it may concern:

Be it known that I, HARRISON G. OTIS, a citizen of the United States, residing in the city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Plaiting-Machines, fully described and represented in the following specification and accompanying drawings, forming a part of the same.

This invention relates to a mechanism for producing a plaited trimming having one or both edges irregular in form, as curvilinear or other shaped patterns, the same being accomplished by a peculiar feeding operation, which consists in moving the material laterally, first in one direction and then in the other, as the plaiting progresses, whereby the edges of the material are caused to assume an irregular contour or outline, the exact form of which is determined by the amount and abruptness of the lateral movement of the material. One example of such product is shown in Fig. 7 of the drawings, and will be more specifically referred to in the course of this specification.

The invention consists in peculiar feeding devices and their combinations with the plaiting mechanisms, together with constructions of parts hereinafter specifically set forth.

A machine embodying the invention is illustrated in Figure 1 by a rear elevation, in Fig. 2 by a plan view, and in Fig. 3 by a longitudinal sectional elevation. Fig. 4 is a sectional elevation illustrating upon an enlarged scale the plaiting and feed-controlling devices. Fig. 5 is a plan view of the feed-plate, of which Fig. 6 is a cross-sectional elevation on the line *a* of Fig. 5. Fig. 7 illustrates a plan view of the product of the machine, the same being a plaited trimming. Fig. 8 is a series of diagrams illustrating several patterns that may be produced by the use of properly-shaped cams for operating the fabric-guide.

In its principal mechanisms the machine shown herein is a common form of plaiting-machine; but in order that the improvements constituting the present invention may be readily understood, a description of the machine will be given at length.

As is common in this class of machines, the plaiting operation is performed by a reciprocating tucking-blade, 2, that folds the fabric between two rotating surfaces. This blade, however, in addition to its horizontal reciprocation, is vibrated vertically. It is attached to a bar, 4, that is pivoted at opposite ends to arms 5 6, that are hung to swing upon the shaft of the cylinder 10. The arm 6 has a projecting curved rock-arm, 7, which is connected by a rod, 12, through a crank-pin, 29, with a crank-disk, 13, that is mounted upon one end of the main shaft 14. One end of this rod 12 is adjustably secured to the rock-arm 7 in a suitable slot by a pivot, 50, and the other end is arranged to be adjustable in a slot in the crank-disk, which arrangements are made for the purpose of varying the horizontal reciprocations of the tucking-blade, and thereby regulating the extent of each plate. At the other end of this bar it is provided with a forwardly-projecting arm, 15, that rests upon the curved end of a bell-crank, 16, which crank is suitably rocked by a cam, 17, on the main shaft 14. During each rearward movement of the tucking-blade it is raised by this bell-crank, so as to clear it from the fabric, and prevent its dragging over the same to distort the newly-laid plait. As the tucking-blade moves forward, it is drawn down to engage the fabric by means of a spring, 3, the low part of the cam 17 permitting its action to produce that effect. The fabric, whether of tarlatan, lisse, or other material, is led over a table, 31, passed beneath the tucking-blade, and entered into the nip of the pressing-roller 11 and cylinder 10. As here constructed, the cylinder 10, provided with the usual heating devices, as a gas-pipe, 18, is arranged to turn loosely in its bearings, and thus be revolved with a step-like movement frictionally imparted by the pressing-roller 11. The pressing-roller 11 has its shaft mounted in levers 19 20, which are pivoted so as to permit said roller to be raised away from the cylinder 10 when it is required to introduce or remove the goods, as in the plaiting of the middle of a long piece of goods. The moving ends of these levers 19 20 embrace vertical shafts 21 22, and are seated upon springs encircling said shaft, the resulting action of which is to throw said levers upward. These shafts are provided with pivoted cam-levers 23 24, which bear upon the upper surfaces of the levers 19 20, and thus confine them in their downward position, in which they maintain the roller 11 in frictional contact with the cyl-

inder 10. A proper elastic seating of this roller 11, to permit its yielding so as to properly press the plaited fabric, and its nice adjustment for that purpose, is accomplished by means of spring-seated boxes carried by said levers 19 20, that bear upon the upper surface of the shaft of said roller, the pressure of which springs is regulated by set-screws 48 49.

A proper step-like rotative movement is imparted to the roller 11, to cause it to appropriately feed forward the plaited fabric by means of a ratchet-wheel, 25, mounted upon its shaft, with which ratchet-wheel engages a dog, 9, that is pivoted to a crank, 26, that swings freely on the shaft of the roller, and which is properly rocked by a connecting-rod, 27, to which motion is imparted from the driving-wheel 28 through a crank-pin, 30, attached to a block which is adjustable in a dovetail groove in the face of said wheel. It is also to be remarked that the pin 29, before referred to, is provided with the same means for adjusting its position upon the disk 13. This driving-wheel 28, which is a band-wheel, is mounted upon the main shaft 14, which it rotates.

By suitably adjusting the crank-pins 29 30, the throw of the tucking-blade 2 and the feed of the roller 11 will be made to suit the dimensions of the plaiting desired to be accomplished, and the material fed between the roller 11 and the cylinder 10 will be plaited with a succession of folds that will produce the well-known plaited goods, said plaits being retained in position by the ironing action due to the pressure between the roller and cylinder and the heating of the latter, or by means of a cemented cord or other fastening applied at the time of the formation, or both.

It is manifest that the goods drawn regularly onward over the table 31 will be laid in plaits and produce a trimming with even or parallel edges, and this is the common mode of procedure.

In order that the shape of the edges of the finished trimming may be rendered fanciful or highly ornamental as the same is produced, I have provided the machine with a laterally-reciprocating guide which is automatically operated to shift the position of the fabric as the plaiting progresses, and thereby accomplish the laying of the succeeding plaits in such manner as to produce curved or other shaped borders or edges, which, by the proper movement of said guide, may have curved forms, as scallops, or angular forms, as points, or approximately right-angular outlines, as the Grecian pattern.

The machine is shown as wide enough to manipulate two separate pieces of fabric, two sets of guides being shown. One of these guides will now be particularly described. It consists of a base-plate, 32, to the upper side of which is secured a bridge-plate, 33, which together form a slotted guide, as in Fig. 6. The forward portion, 34, of the bridge-plate 33 is hinged to the latter, so as to drag upon the upper surface of the fabric and keep the same smooth as it is fed onward, springs 8 affording the desirable elastic pressure. This guide-plate is adjustable with respect to the cylinder 10 by means of a set-screw, 35. In this improvement the table 31, instead of being stationary, is rendered capable of lateral movement, carrying with it the fabric-guide, consisting of the plates 32 33 34, the table being for this purpose attached by arms 36 37 to a shaft, 38, that slides in bearings in the frame-work, and which is extended at one side, where it is connected by a rod, 39, with a pivot, 40, that is adjustably secured in a crank-disk, 41, at the upper end of the shaft 42, which is slowly turned by means of a wheel, 43, and worm 44, the latter being at the end of a shaft, 45, that receives motion through wheels 46 47 from the main shaft 14. This crank-disk 41 imparts to the fabric-guide a lateral movement, first in one direction and then in the other, which gives such a feed to the fabric as will produce a plaited trimming the edges of which are scalloped or regularly curved, as shown in Fig. 7, the degree of curvature being regulated by the extent of throw imparted to said guide by the adjustment of the pivot 40 (more or less) from the center of the disk 41. It is apparent, however, that this disk 41 performs, broadly, the function of a cam properly reciprocating the fabric-guide in a lateral direction, and therefore that a properly-shaped cam might be substituted for said disk, said cam being of a pattern to produce a zigzag pattern in right lines, said right lines uniting at more or less acute or obtuse angles, or at approximately right angles, thus producing angular points at the edge of the plaited fabric, or alternate quadrangular projections and depressions. This variation of pattern at the edge of the fabric may be made up of right lines and curved lines, according to the pattern of the cam, as will be readily apparent, all as indicated in Fig. 8. A pattern-cam, therefore, is to be taken as the equivalent of the crank-disk 41, whether said cam be mounted upon the shaft 42, or be attached to the shaft of the ratchet-wheel 25 or to the main shaft. In the latter instance the form of its face would be appropriate to that of the pattern desired, and said cam would operate to appropriately throw the feed-guide in one direction, the opposite or retracting movement being accomplished by a spring which is the equivalent of the outside wall of a pattern or slotted cam.

The pattern produced by the use of the crank-disk 41 is shown in Fig. 7, wherein successive plaits are laid so as to produce a pattern curved in its outline.

As thus far described, the plaits are supposed to be laid at right angles to the length of the article; but by setting the guide at any other angle with respect to the axis of the tucking-blade the plaits will be laid at other angles with respect to the longitudinal center of the material, thus multiplying the varieties that may be produced by this invention.

In Fig. 7 the fabric is shown as having its opposite edges alike in form. This of course will result from the production of the pattern at one edge.

It is contemplated in practice, whether the fabric have its edges doubled or not, to form a hem, either to fold the fabric in its longitudinal center to form a doubled patterned edge, or to divide the same longitudinally and form two narrow fabrics, each having a patterned edge. None of the products, however, are claimed in this application.

By the use of this invention the most elaborate articles of ladies' dress-trimming are capable of production without enhancing the cost of their production beyond that of the most common trimmings made from lisse and tarlatan and similar light fabrics.

The improved trimming herein described is not herein claimed, but forms the subject-matter of another application for Letters Patent filed by me on December 30, 1881, No. 49,036.

What is claimed is—

1. The combination, with the pressing and feeding rolls 10 11, of the laterally-reciprocating fabric-guide and the tucking-blade 2, provided with means for giving the same a horizontal reciprocating movement, whereby the material is folded into the bite of the rolls, and a vertically-vibrating movement, whereby it is raised out of contact with the material as it is withdrawn from the rolls, substantially as described.

2. The combination, with a plaiting mechanism, of a laterally-reciprocating fabric-guide having a hinged top plate, substantially as described.

3. The combination, with the pressing and feeding rolls 10 11 and the reciprocating tucking-blade 2, of the fabric-guide consisting of a rigid main portion and the hinged top plate, substantially as described.

4. The combination, with the pressing and feeding rolls 10 11, of the laterally-reciprocating fabric-guide, means for adjusting the extent of its reciprocations to vary the pattern of the edge of the product, the tucking-blade 2, provided with means for giving the same a horizontal reciprocating movement, whereby the material is folded into the bite of the rolls, and a vertically-vibrating movement, whereby it is raised out of contact with the material as it is withdrawn from the rolls, and means for adjusting the stroke of said blade to vary the width of the plait, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HARRISON G. OTIS.

Witnesses:
T. H. PALMER,
H. T. MUNSON.