(No Model.) 2 Sheets—Sheet 1.

S. GARRETT.

Machine for Fringing Paper.

No. 234,399. **Patented Nov. 16, 1880.**

Fig. 1

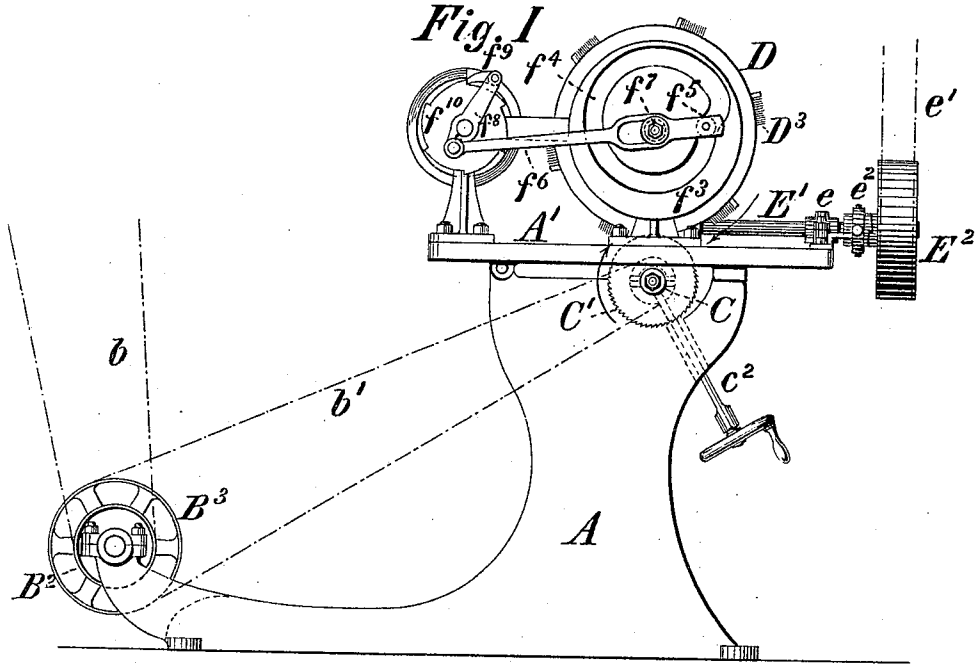
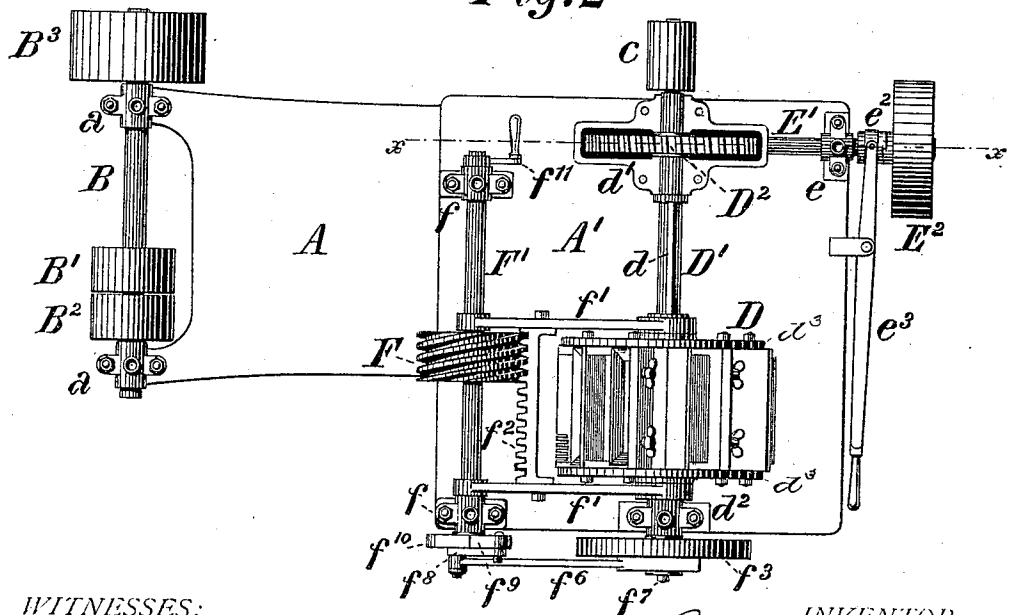


Fig. 2



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(No Model.) 2 Sheets—Sheet 2

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Fig. 3

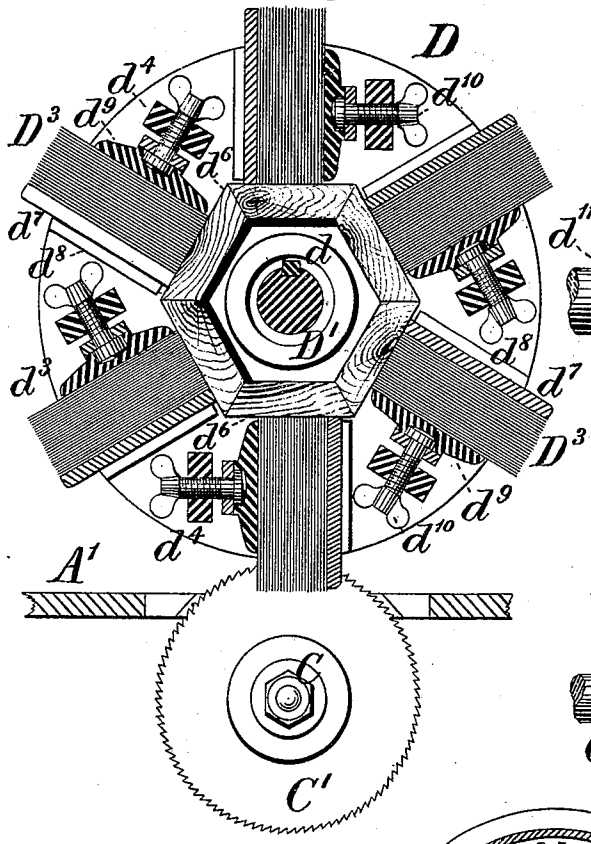


Fig. 4

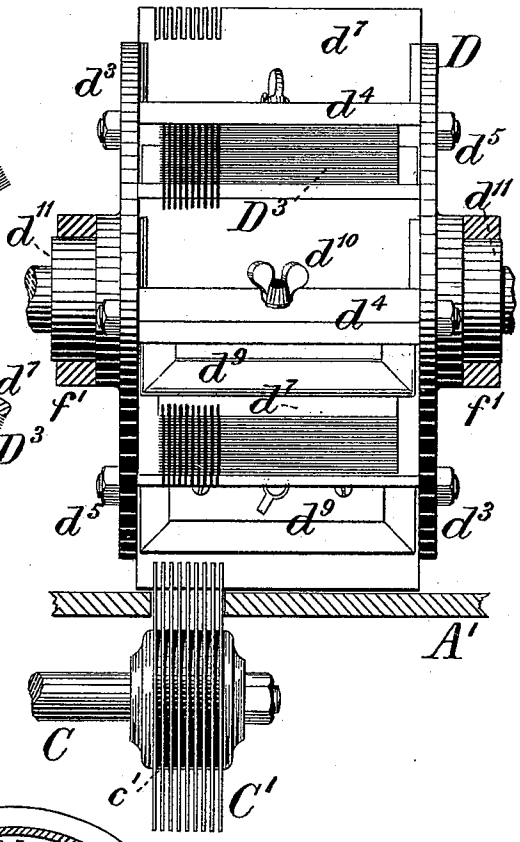
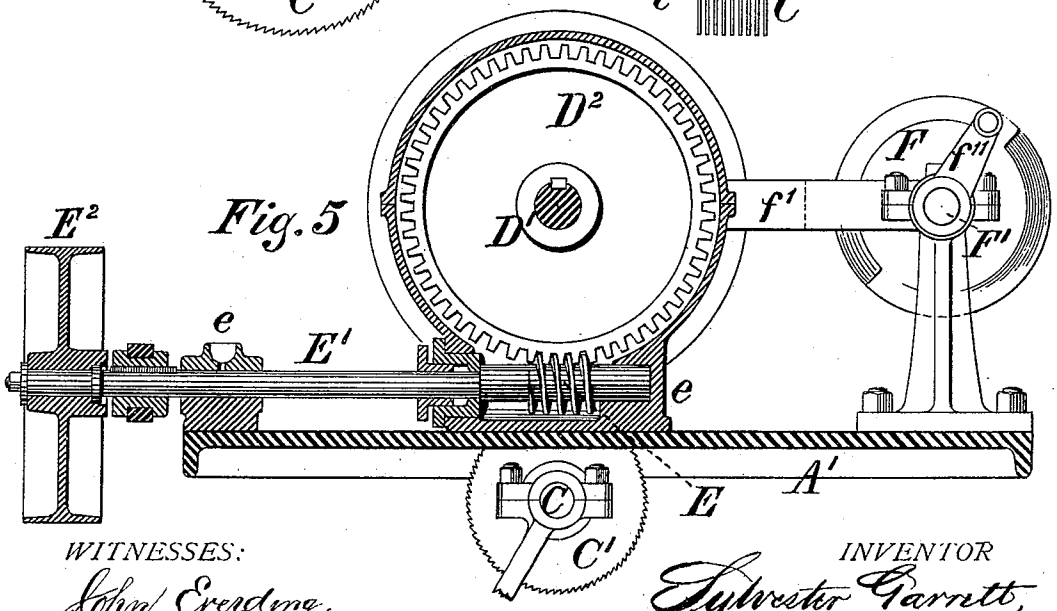


Fig. 5



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UNITED STATES PATENT OFFICE.

SYLVESTER GARRETT, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR FRINGING PAPER.

SPECIFICATION forming part of Letters Patent No. 234,399, dated November 16, 1880.

Application filed August 26, 1880. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER GARRETT, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Machines for Fringing Paper, Leather, and Textile Fabrics, of which improvements the following is a specification.

My invention relates to mechanism for fringing the edges of paper, leather, or textile fabrics by the simultaneous formation of a series of slots or notches and intervening strips or shreds thereon, and is an improvement upon that for which Letters Patent of the United States No. 228,750 were granted and issued to me under date of June 15, 1880.

The object of my present invention is to economize time and labor and correspondingly reduce the cost of manufacture by providing means for securely clamping and retaining the sections of material to be fringed in a series of compact bundles, admitting of the insertion and removal of material during the operation of the machine, and automatically feeding the several bundles of material to the cutting mechanism.

To these ends my improvements consist in the combination of a saw-arbor and a series of circular saws thereon, a carrier provided with a series of clamps for receiving the material to be fringed, gearing for rotating said carrier, so as to successively present each bundle of material to the saws and feed the material at a regulated rate of speed thereto, and mechanism whereby the carrier is moved longitudinally upon its shaft, to present a fresh surface to the action of the saws on the completion of a cut upon the entire series of bundles of material.

The improvements claimed are hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a side view, in elevation, of a machine embodying my improvements; Fig. 2, a plan or top view of the same; Fig. 3, a transverse central section, on an enlarged scale, through the carrier; Fig. 4, a front view, on a similar scale, of the same; and Fig. 5, a vertical section, on an enlarged scale, at the line *x x* of Fig. 1.

To carry out my invention I provide a substantial frame or stand, A, to the top of which is hinged a table, A′, on which table the carrier and feeding devices, to be presently described, are mounted.

A counter-shaft, B, fitted in bearings *a*, cast upon the base of the stand A, carries fast and loose pulleys B′ B² to receive a belt, *b*, by which rotation is imparted from a prime mover, and a pulley, B³, from which a belt, *b*′, passes to and around a smaller pulley, *c*, upon one end of a saw-arbor, C, mounted in bearings in the stand A beneath the table A′, and carrying a series of circular saws, C′, which are separated by interposed washers *c*′, the thickness of which is equal to the width of the threads of fringe to be formed. The saws C′ project above the top of the table through an opening formed therein, and the bearings of the saw-arbor C are adjustable vertically by means of a slide and an adjusting-screw, *c*², arranged tangentially to the driving-pulley, so that the saw-arbor may be raised and lowered, to vary the depth of cut or to compensate for wear of the saws, without interfering with the maintenance of proper tension on the driving-belt.

The paper or other material to be fringed is supported in and fed to the cutting mechanism by a rotating carrier, D, loosely fitted upon a shaft, D′, by means of a key or feather, *d*, so as to be capable of moving longitudinally upon said shaft while rotating therewith. The shaft D′ is mounted in bearings *d*′ *d*² on the table A′, above and in line vertically with the center of the saw-arbor C, and is rotated in reverse direction to the saw-arbor and at a slow speed, as required to properly feed the material, by a worm, E, secured upon a shaft, E′, mounted in bearings *e* on the table at right angles to the carrier-shaft D′, and rotated by a belt, *e*′, from a driving or counter shaft passing around a pulley, E², on one of its ends. The worm E meshes with a worm-wheel, D², on the shaft D′, and the rotation of the shafts E′ and D′ may be stopped, when required, by a clutch, *e*², and shipping-lever *e*³. The carrier D is composed of two circular heads or end plates, *d*³, united at a distance apart slightly greater than the length of the material to be fringed by a series of bars, *d*⁴, having screws upon their ends to receive nuts *d*⁵, which bear against the outer sides of the heads and hold the structure firmly together. A series of plates

or boards, d^6, is arranged centrally in polygonal form between the heads d^3, and serves as a support for the inner edges of the sheets of material, the boards d^6 being made conveniently removable, to admit of the insertion of other sets of different sizes to correspond with the varying widths of sections of material to be cut. The sections of material are arranged within the carrier in separate bundles or packages D^3, (in this instance six in number,) the several sections of each bundle being tightly compressed between a light backing-board, d^7, bearing against strips or tongues d^8 on the heads d^3 and a clamping-plate, d^9, the compression being applied in each case by a clamping-screw, d^{10}, which bears against the plate d^9 and engages a female thread in one of the bars d^4. The backing-boards d^7 are of pine or other soft wood, or its equivalent, and serve to support the material operated on during the cut, being themselves subsequently subjected to the same operation in the traverse of the carrier. After having performed their function during the fringing of one side of each bundle, they are reversed with the bundle to similarly act during the fringing of the opposite side, and are replaced by new ones when both their edges have been so far cut as to be no longer useful.

By reference to the drawings it will be observed that the machine is designed for fringing sections of material which are of greater length than the distance between the outer faces of the series of saws C′, and when such is the case it becomes necessary to impart a longitudinal movement to the carrier D after a cut has been made in each of the bundles of material D^3—that is, after each revolution of the carrier—for the purpose of continuing the operation by presenting a fresh surface to the action of the saws. Such movement is effected automatically during an interval in the comparatively slow traverse of the carrier when the bundles are entirely clear of the saws, and by the following means: Each of the heads d^3 of the carrier has a central hub or boss, d^{11}, projecting from its outer side, said bosses being coupled by two parallel links, f', fitting freely around them, with a worm-shaft, F′, mounted in bearings f upon the table A, parallel with the carrier-shaft D′, the opposite ends of the links f' having eyes which similarly fit freely on the shaft F′. A rack, f^2, is secured at its ends to the links f', parallel to the shafts F′ and D′, and a worm, F, fixed upon the shaft F′, engages the teeth of the rack f^2. A disk, f^3, secured upon one end of the carrier-shaft D′, has a cam-groove, f^4, formed in its outer face, within which groove is fitted a roller, f^5, upon one end of a cam-rod, f^6.

The cam-rod f^6 is maintained in its normal vertical position by a pin, f^7, projecting from the end of the carrier-shaft D′ and passing through a slot in the same rod, and is journaled to one end of a pawl-lever, f^8, which is mounted so as to be vibratable upon the shaft F′, and carries a pivoted pawl, f^9, upon its opposite end. The pawl f^9 engages the teeth of a ratchet-wheel, f^{10}, secured upon the shaft F′, and the throw of the cam-groove f^4 is such that after each revolution of the carrier-shaft the pawl-lever f^8 is vibrated for such distance as that the partial rotation of the worm-shaft F′, produced by the engagement of the pawl and ratchet-wheel, will, through the worm F and rack f^2, move the carrier D longitudinally upon its shaft, the extent of such longitudinal traverse being equal to the distance between the outer faces of the series of saws plus the width of one thread of the fringe. This operation is repeated at the completion of each revolution of the carrier until the entire length of the bundles of material therein has been fringed, when, by raising the pawl from the ratchet-wheel and rotating the shaft F′ by hand in the opposite direction by a crank, f^{11}, on one of its ends, the carrier D is moved back to the position shown in the drawings, and the fringing operation may be continued, either upon the opposite sides of the bundles or upon another series of bundles, as the case may be.

It will be observed that the links f' both act to support the rack f^2, and by their bearing upon the shaft F′ serve to guide the carrier in its longitudinal traverse. The worm F, by which the carrier is moved along its shaft, serves, during its intervals of rest, as a lock to retain the carrier in its adjusted longitudinal position, the rack being incapable of imparting rotation to the worm with which it is engaged.

In the operation of the machine, the several bundles of paper or other material to be fringed being clamped in position in the carrier and rotation imparted to the saw-arbor and carrier-shaft, a cut is taken successively on each bundle by the series of saws during one revolution of the carrier. The carrier is then moved longitudinally upon its shaft, as described, and another cut taken at the next revolution, and so on until the entire length of one side of each of the bundles has been fringed. The carrier is then moved back to its original position by rotating the worm-shaft F′ by hand, the bundles are removed from the clamps and replaced therein with their opposite sides outward, and the operation is repeated. Both the longitudinal and circumferential movements are performed automatically, and the attention of the operator is not required except in changing the position of the carrier at the completion of a cut on one side of the entire series of bundles and in removing and replacing the bundles, the major portion of which latter operation may be performed without stopping the machine for the purpose.

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

1. The combination, substantially as set forth, of a carrier-shaft, a carrier fitted upon a

key or feather thereon, a worm-shaft mounted in bearings parallel to the carrier-shaft, two guide-links by which the carrier is coupled with the worm-shaft, a rack connected at its ends to said guide-links, and a worm secured upon the worm-shaft and engaging the teeth of said rack.

2. The combination, substantially as set forth, of a carrier-shaft, a carrier fitted upon a key or feather thereon, a rack coupled to said carrier so as to partake of its longitudinal but not of its rotary movements, a worm-shaft carrying a worm which engages the teeth of said rack, and a ratchet-wheel, and a cam-lever which is operated by a cam on the carrier-shaft and coupled to a pawl-lever carrying a pawl engaging the teeth of the ratchet-wheel on the worm-shaft.

3. The combination, substantially as set forth, of a saw-arbor carrying a series of circular saws separated by interposed washers, a carrier-shaft mounted in bearings parallel and adjacent to the saw-arbor, a worm and worm-wheel by which rotation is imparted to the carrier-shaft, a carrier fitted to rotate with and move longitudinally on the carrier-shaft, a worm-shaft carrying a ratchet-wheel and a worm which engages a rack connected to the carrier parallel to its shaft, and a lever engaging a cam-groove in a disk on the carrier-shaft and coupled to a pawl-lever, by which intermittent rotation is imparted to the ratchet-wheel and worm-shaft.

SYLVESTER GARRETT.

Witnesses:
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D. L. COLLIER.