M. O. REHFUSS, A. BURGESS & J. G. REHFUSS.

MECHANISM FOR CUTTING THE FLOATING THREADS OF LACE AND OTHER FABRICS.

APPLICATION FILED FEB. 12, 1912.

1,103,838.

Patented July 14, 1914.

2 SHEETS—SHEET 1.

Fig. 1

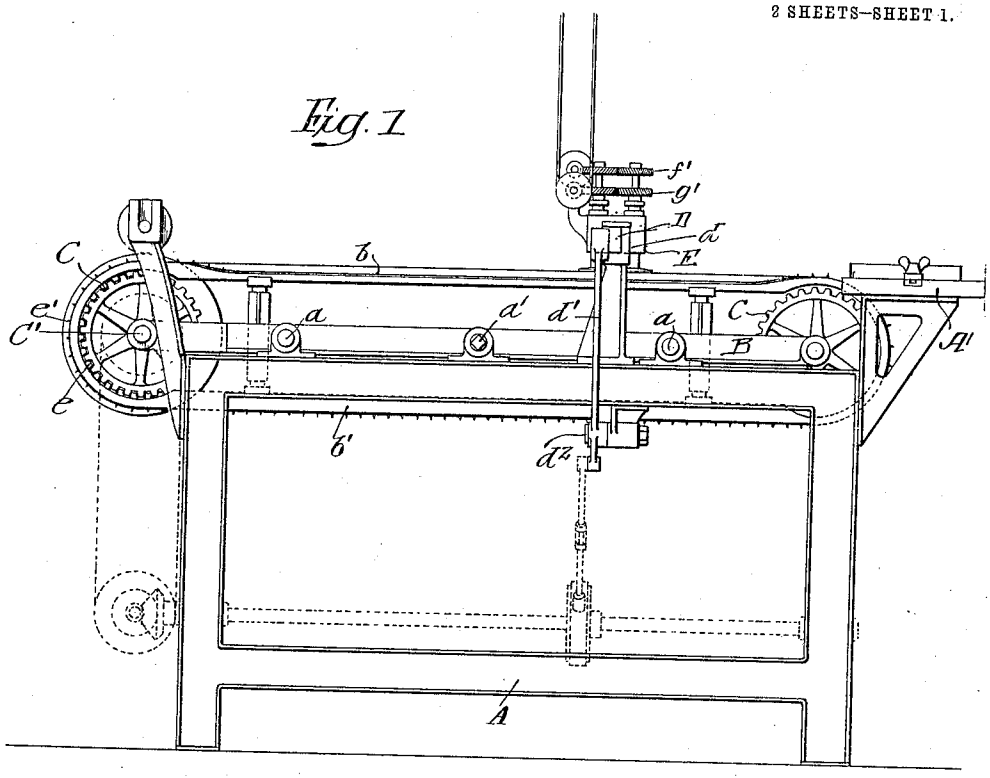
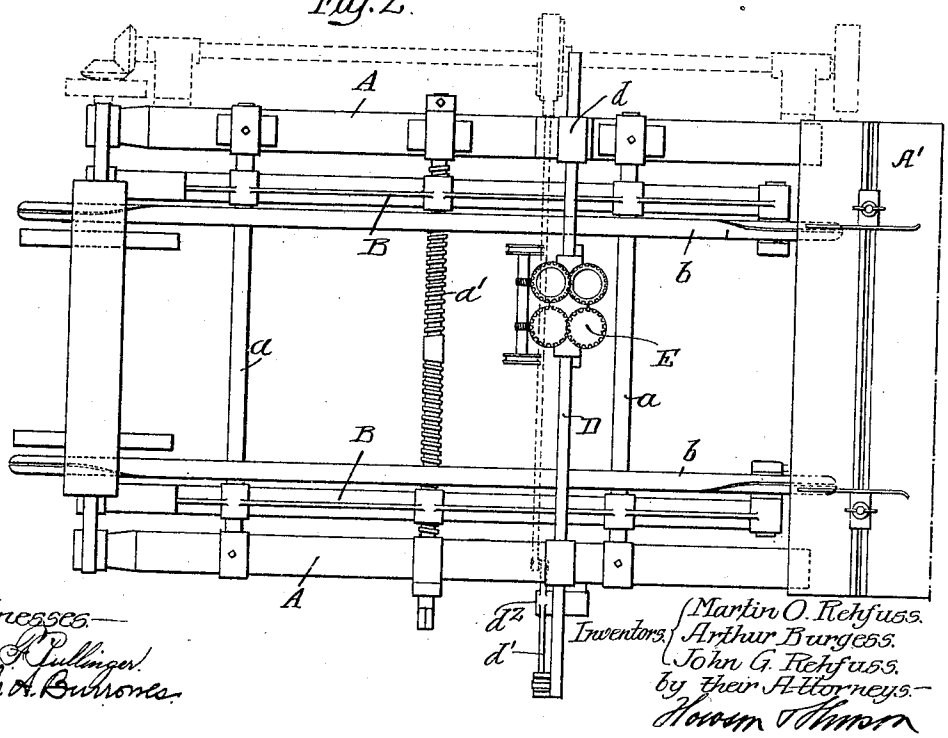


Fig. 2.



Witnesses—
Walter A. Fullinger.
Wills A. Burrones.

Inventors, Martin O. Rehfuss.
Arthur Burgess.
John G. Rehfuss.
by their Attorneys.—
Howson & Howson

THE NORRIS PETERS CO., WASHINGTON, D. C.

M. O. REHFUSS, A. BURGESS & J. G. REHFUSS.

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2 SHEETS—SHEET 2.

Fig. 6.

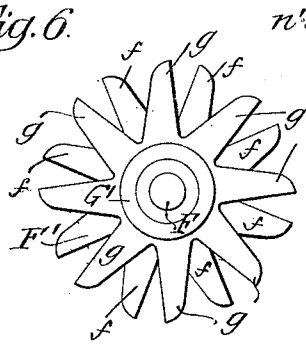


Fig. 5.

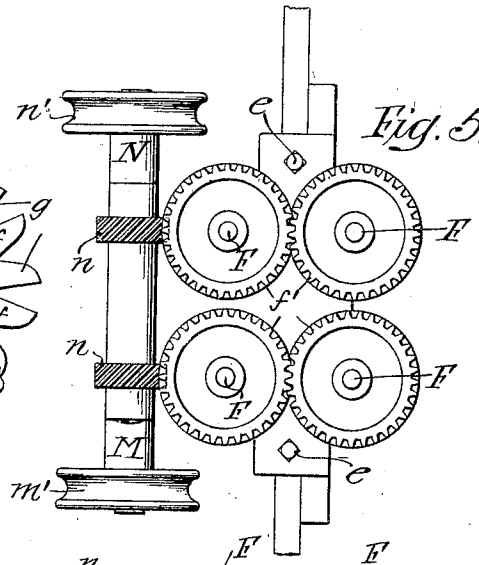


Fig. 8.

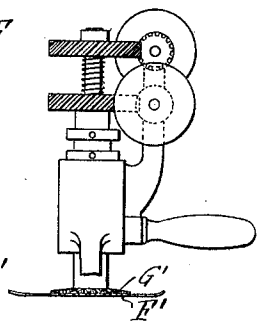


Fig. 4.

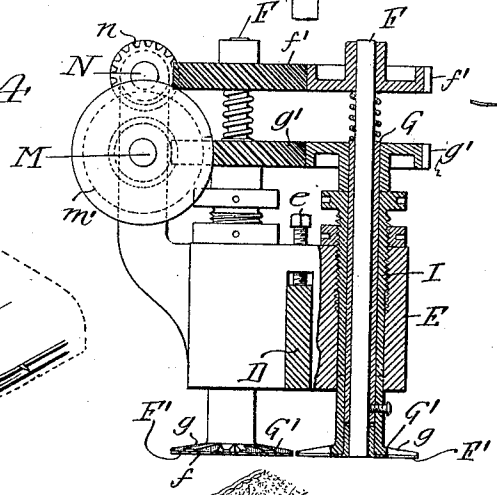


Fig. 7.

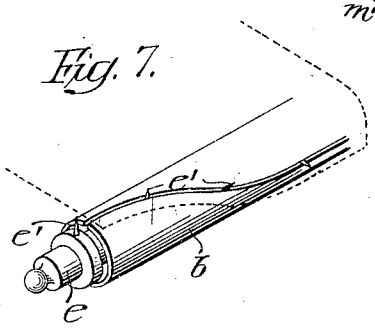
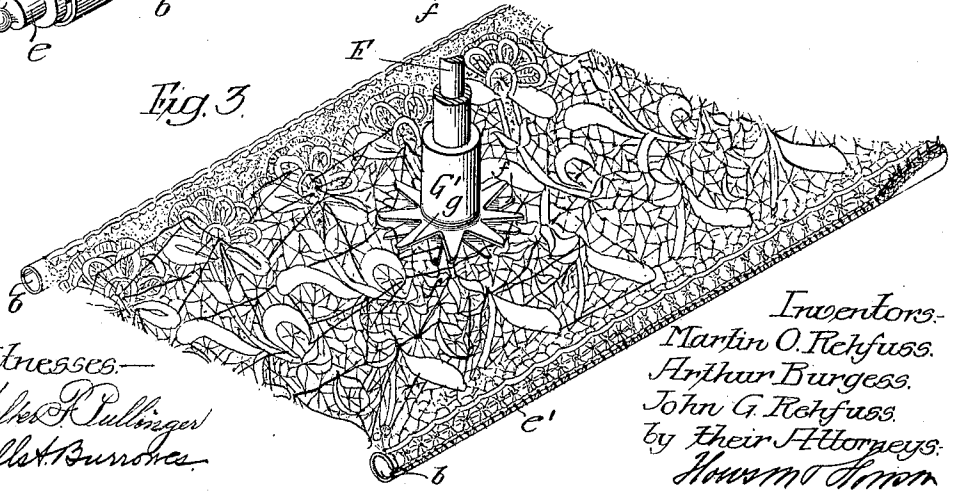


Fig. 3.



Witnesses:—
Walter F. Pellinger
Willis A. Burrows.

Inventors:—
Martin O. Rehfuss.
Arthur Burgess.
John G. Rehfuss.
by their Attorneys:
Howson & Howson

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MARTIN O. REHFUSS, ARTHUR BURGESS, AND JOHN G. REHFUSS, OF PHILADELPHIA, PENNSYLVANIA.

MECHANISM FOR CUTTING THE FLOATING THREADS OF LACE AND OTHER FABRICS.

1,103,838. Specification of Letters Patent. Patented July 14, 1914.

Application filed February 12, 1912. Serial No. 676,994.

To all whom it may concern:

Be it known that we, MARTIN O. REHFUSS, a citizen of the United States, ARTHUR BURGESS, a subject of the King of Great Britain and Ireland and the Isle of Man, and JOHN G. REHFUSS, a citizen of the United States, all residing in the city of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain Improvements in Mechanism for Cutting the Floating Threads of Lace and other Fabrics, of which the following is a specification.

The object of our invention is to provide a simple and effective mechanism for cutting and removing the floating threads from the face of lace and like material.

In the making of certain types of lace the thread, in place of being cut at each individual design, is floated over one face of the lace material during the process of manufacture and these floating threads, after the lace fabric has been completed, are removed, usually by a pair of scissors in the hands of an operator. This is a very tedious and costly operation.

By our invention the fabric is fed through a machine and stretched. This causes the floating threads to project slightly above the fabric and then, by the passage of a rotating knife over the surface of the fabric, the threads are not only severed but cut at the points where they join the fabric. Thus they are entirely removed, so that when the fabric leaves the machine it is free of floating threads.

In the accompanying drawings:—Figure 1, is a side view of a machine illustrating our invention; Fig. 2, is a plan view of the machine; Fig. 3, is a detached perspective view showing the rotating cutters in the act of severing the floating threads; Fig. 4, is a vertical sectional view of the cutters; Fig. 5, is a plan view of Fig. 4; Fig. 6, is an enlarged plan view of the cutters; Fig. 7, is a perspective view of one of the conveyer rails showing the manner of stretching the material; and Fig. 8, is a view of a hand cutter.

In the present instance, A is the frame having a transverse bar *a* on which is mounted a carrier B. This carrier is made in two parts and the parts can be moved toward or from each other by a screw shaft *a'*. Each part of this carrier consists of two longitudinal tubular slotted rails *b*, *b'* and two wheels C, C mounted on shafts C', C'. One of these shafts may be a driven shaft and the wheels are so confined to the carrier that the sides of the carrier can be moved toward and from each other through the medium of the screw in the present instance, to accommodate laces of different width.

e are feed chains having pins *e'*. The chains pass around the wheels C and through the tubular rails *b*, *b'*. The pins extend through the slots in the rails and engage the fabric. The slot in the upper rail is curved at each end so that when the fabric is fed from the table A' and is engaged by the pins on the chain, it will be stretched as it moves over the rails, due to the curve of the slot, as clearly shown in Figs. 2 and 7, so that, when the knives are acting, the material is held taut, and as soon as the knives have completed the cutting operation then the material is slackened again as the slots have a return curve at the delivery end, so that the pins will be in the upright position and the fabric can be readily removed from the machine.

While we have shown one style of frame and mechanism for driving the endless chains which feed the material through the machine, the frames, carriers and driving mechanism may be modified without departing from the essential features of the invention.

The peculiar form of chain forms the subject of an application for patent filed April 20, 1911, under Serial Number 622,361, therefore, we do not wish to claim it broadly in this application.

D is a bar extending over the bed of the machine, and this bar is adapted to suitable bearings *d* mounted on the frame A and is arranged, in the present instance, to slide transversely. *d'* is an operating arm pivoted at d^2 and connected to any suitable means for giving the bar a reciprocating motion. Mounted on this bar are the cutter heads E and these cutter heads are vertically adjustable on the bar by means of set screws *e*, Fig. 4. In each bar there are four spindles F, in the present instance, each having a cutter F' composed of a series of blades *f* sharpened at one side, as clearly shown in Fig. 6. These spindles pass through hollow shafts G and mounted on the hollow shafts are cutters G' having blades *g*, which are sharpened on one side and located directly above the blades *f*. In the present instance,

one cutter travels in one direction and the other in the opposite direction, so that the blades pass each other and sever any threads which enter the space between the blades.

Mounted in the head E is a threaded sleeve I adapted to the threaded opening in the head E and this sleeve can be adjusted vertically to regulate the position of the cutters in respect to the material.

Secured to the upper end of the spindle F is a right angle gear f' and on the hollow spindle G is a right angle gear g'. The gears of the opposite cutters mesh with one another so that one is driven in one direction and the other in the reverse direction and, in the present instance, N and M are two driving shafts having wheels m and n geared to the right angled gears f' and g', as clearly shown in Fig. 4.

On one end of the shaft N is a driving pulley n' and on the end of the shaft M is a driving pulley m'. These pulleys are belted to any suitable driving mechanism and the shaft M is driven at a greater speed than the shaft N so that the lower cutting blades rotate at a comparatively slow speed, while the upper blades rotate rapidly. By this means the lower blades have time to pass under the loop of the floating threads and as soon as they pass under the loops of the upper blades, sever the thread. The threads are not only severed but cut off at each end close to the fabric.

There may be as many heads E on the bar as desired, according to the width of the lace.

Furthermore, while we prefer to locate the heads on a reciprocating bar forming part of an element of the machine, the heads may be arranged, as shown in Fig. 8, in which the cutter head is shown independent of the machine and in the form of a hand tool, so that the cutter can be used by hand, in examining the work, to cut off threads accidentally omitted by the machine, but this construction may not be necessary. In this case, the lace is simply stretched from one bar to another while being examined. By stretching the lace over a space and depressing it by the cutters, the floating threads have a tendency to rise above the surface of the lace, so that when the lace passes under the cutters the fabric rests close against the bottom cutter while the loops are sufficiently free for the cutting blades to pass under them and immediately sever them. We have found by experience that the body of the lace will not be cut or injured by the blades but the floating threads will be entirely removed.

While we prefer to drive the cutters in opposite directions, one at a greater speed than the other, they may be driven at the same speed, or may be driven in the same direction, one at a greater speed than the other, without departing from the main object of the invention.

We claim:

1. The combination, in mechanism for removing floating threads from fabrics, of a cutter; means for stretching the fabric; and means for rotating the cutter in a plane substantially parallel to the plane of the stretched fabric to cut the floating threads.

2. The combination, in mechanism for removing floating threads from fabrics, of a cutter; fabric supports spaced apart; means for stretching a fabric between the supports; and means for moving the cutter in a plane substantially parallel to the plane of the stretched fabric to sever the floating threads therefrom.

3. The combination, in mechanism for removing the floating threads from fabric, of a cutter; fabric supports spaced apart; means for stretching a fabric between the supports; means for conveying the fabric; means for moving the cutter in contact with the fabric between the supports to sever the floating threads projecting therefrom, said cutter being rotatable in a plane substantially parallel with the plane of the fabric.

4. The combination, in mechanism for removing floating threads from a fabric, of means for stretching the fabric to raise the floating threads; a cutter consisting of two blades rotatable in a plane substantially parallel with the plane of the stretched fabric; means for independently rotating the blades; and means for causing a relative movement between the cutter and the fabric.

5. The combination, in mechanism for removing floating threads from fabrics, of means for conveying a fabric; means for stretching the fabric transversely to the direction of and during said conveying movement; a cutter; and means for rotating said cutter in a plane substantially parallel with the plane of the stretched fabric to cut and remove the floating threads of the fabric.

6. The combination in mechanism for removing floating threads from fabrics; of means spaced apart for supporting a width of fabric therebetween; a cutter; with means for moving the cutter in a plane substantially parallel to the plane of the fabric and operable upon the latter between the supporting means to sever the said floating threads.

7. The combination, in mechanism for removing floating threads from fabrics, of a cutter having a plurality of blades; means for rotating said cutter in a plane substantially parallel to that of the fabric; and means for stretching the fabric to raise the floating threads into positions to be engaged by the blades.

8. The combination, in mechanism for removing floating threads from fabrics, of a cutter having a plurality of blades; means

for rotating the cutter in a plane substantially parallel to that of the fabric; means for stretching the fabric to raise the floating threads into position to be engaged by the blades; means for conveying the fabric in the said plane; and means for moving the cutter in a direction transverse to that of the conveying movement of the fabric.

9. The combination, in mechanism for removing floating threads from a fabric, of means for stretching the fabric to raise the floating threads; a plurality of cutters, each including two knives respectively rotatable in planes substantially parallel with the plane of the stretched fabric; means for independently rotating the knives; and means for causing relative movement between the cutter and the fabric.

10. The combination, in mechanism for removing the floating threads from fabrics, of fabric supports spaced apart; two spindles, one mounted within the other; cutters respectively mounted on said spindles and arranged one above the other; and means for rotating one cutter at a greater speed than the other, each cutter being operable upon the fabric between the supports and in a plane substantially parallel to the fabric.

11. The combination in mechanism for removing floating threads from a fabric; of means for stretching the fabric to raise the floating threads; a cutter consisting of two rotary blades; means for simultaneously driving the blades in opposite directions; and means for traversing the cutter over the fabric.

12. The combination in mechanism for cutting floating threads from fabrics; of means for holding the fabric; a bar; means for reciprocating the bar; a cutter head having bearings for two sets of spindles, each set of spindles consisting of a hollow and a solid spindle and each spindle having a cutter at its lower end; the cutters being arranged in pairs; with gearing by which the cutters of each set are independently driven; a spring for forcing the cutter of each set in contact; and means for driving the upper cutters at a greater speed than the lower cutters.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

MARTIN O. REHFUSS.
ARTHUR BURGESS.
JOHN G. REHFUSS.

Witnesses:
WM. E. SHUPE,
WM. A. BARR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."