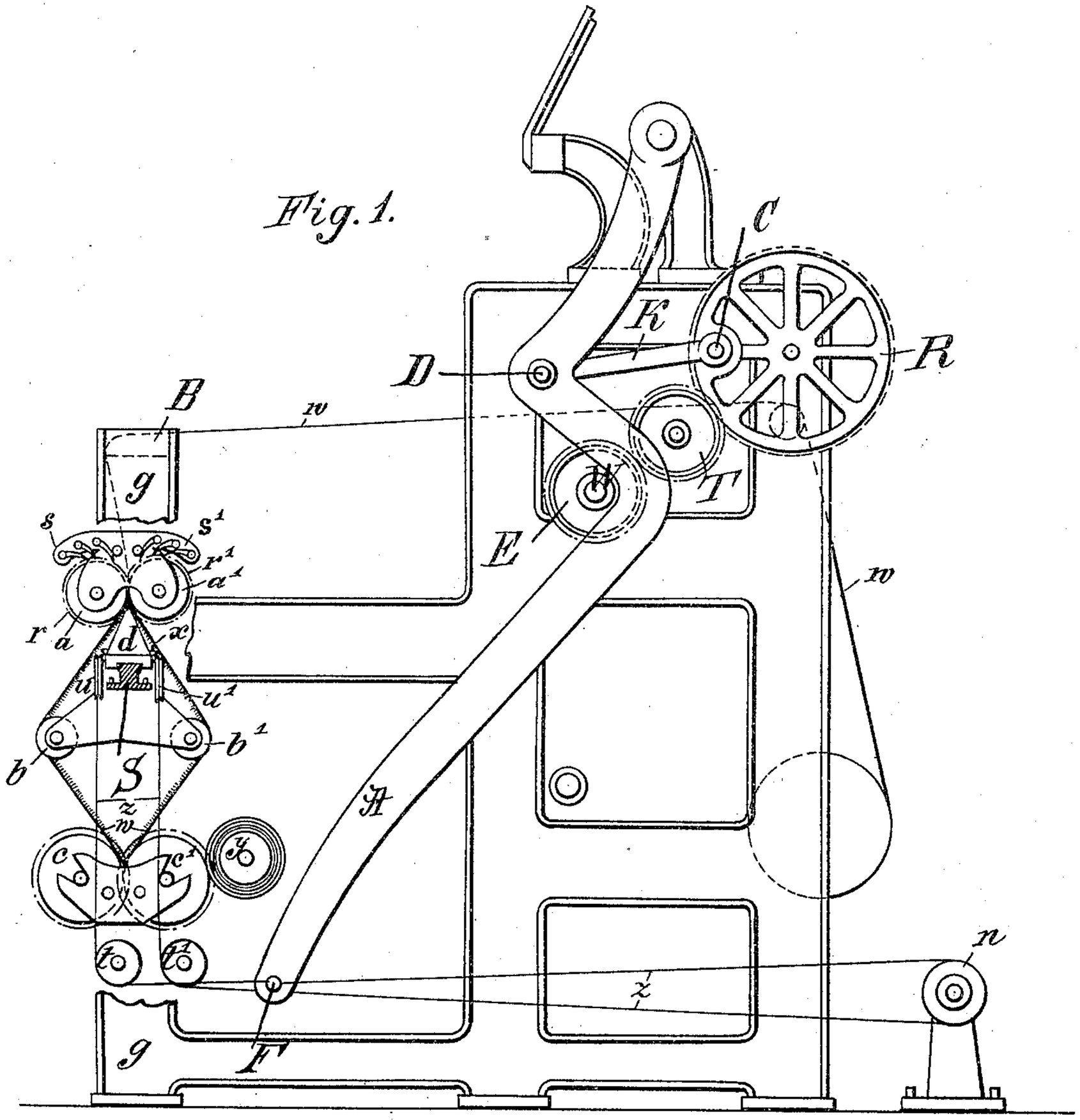
(No Model.) 4 Sheets—Sheet 1.

R. RICHTER.

APPARATUS FOR CUTTING DOUBLE PILE FABRICS.

No. 604,701. Patented May 24, 1898.

Fig. 1.



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(No Model.)

4 Sheets—Sheet 2.

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APPARATUS FOR CUTTING DOUBLE PILE FABRICS.

No. 604,701. Patented May 24, 1898.

Fig. 2.

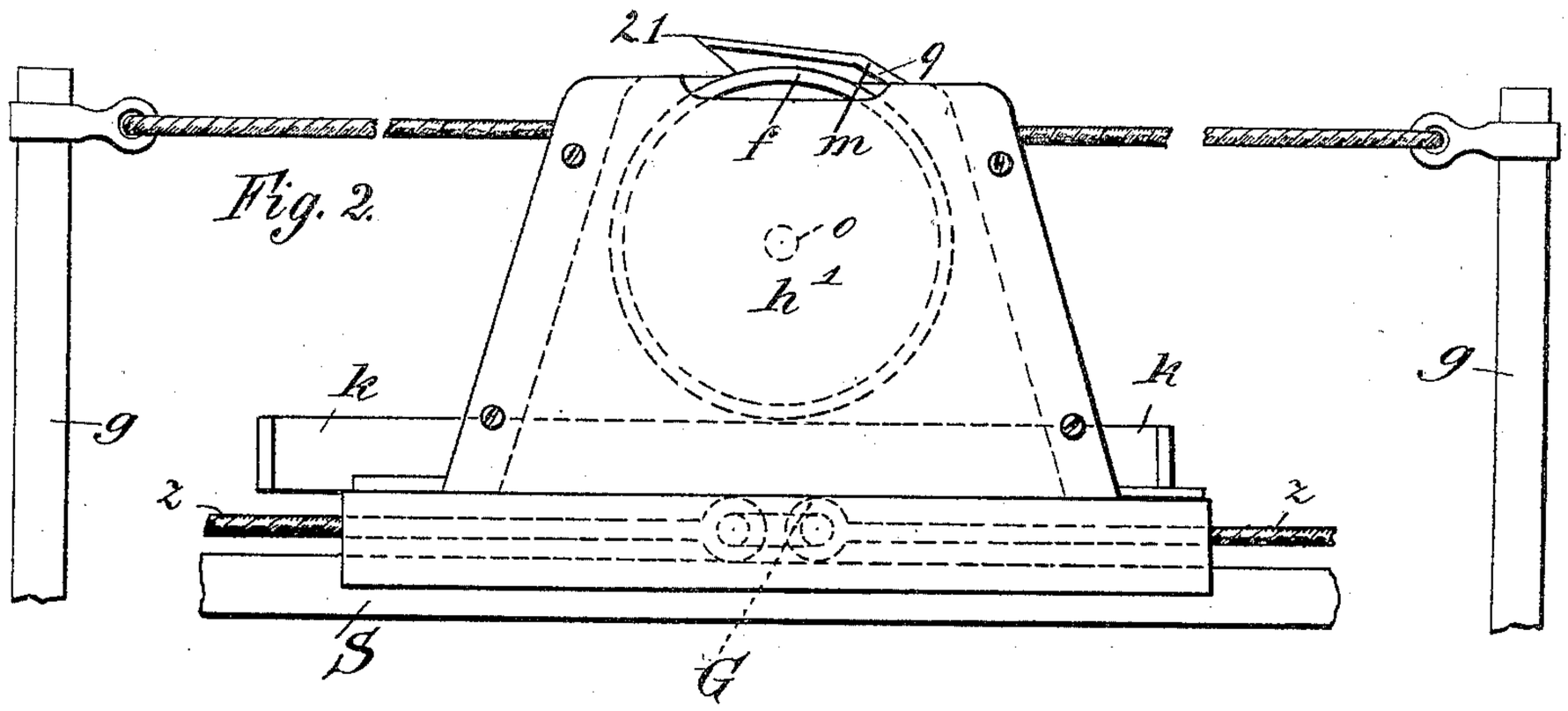


Fig. 3.

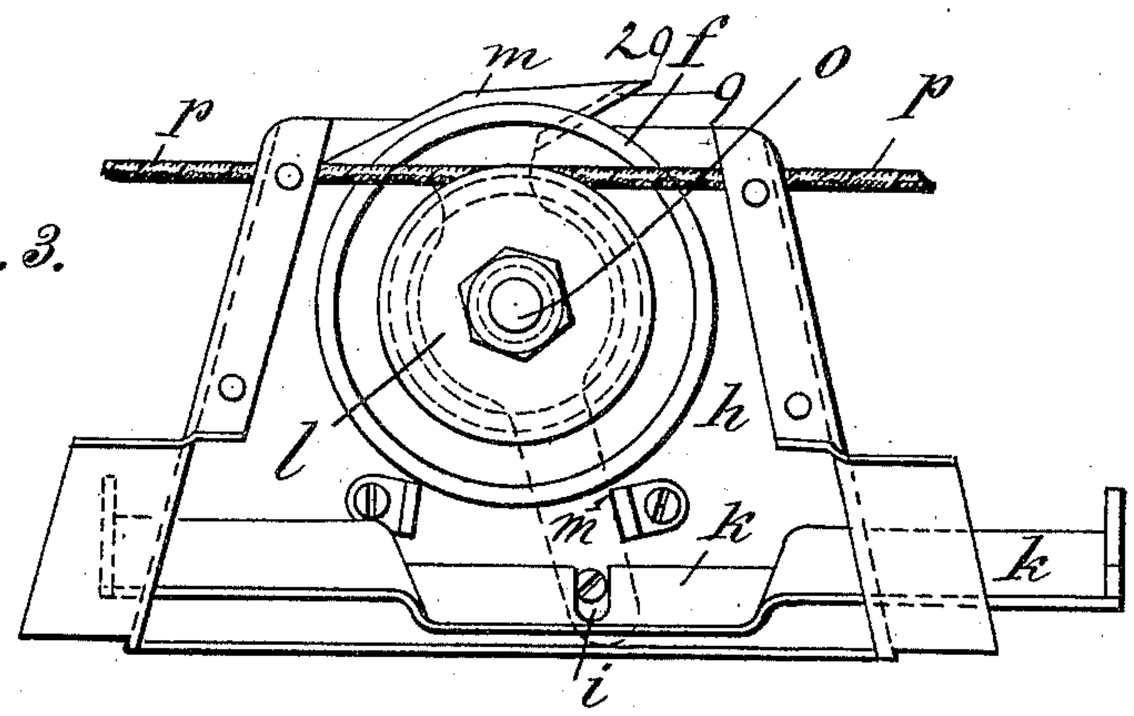
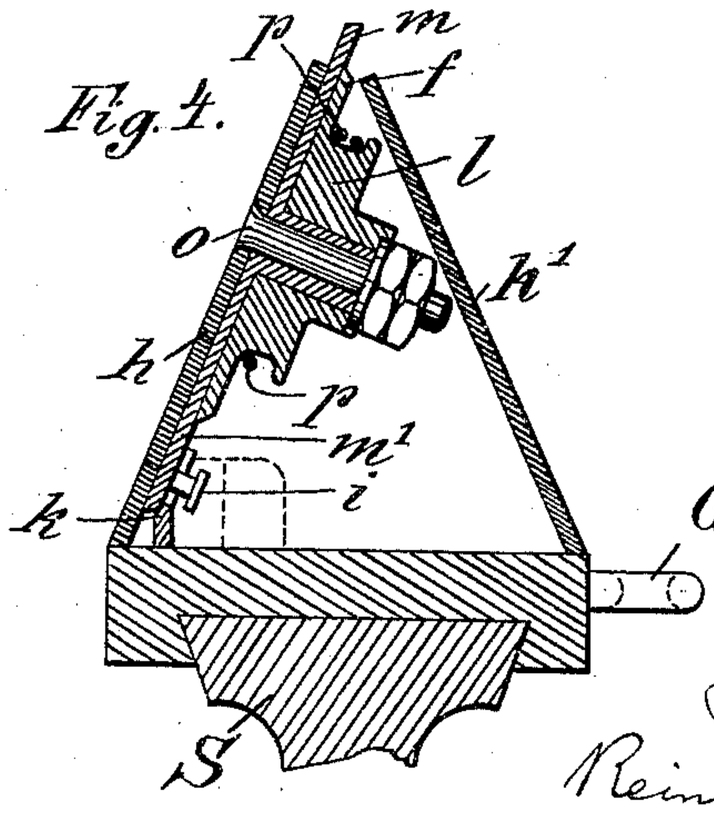


Fig. 4.



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(No Model.) 4 Sheets—Sheet 3.

R. RICHTER.

APPARATUS FOR CUTTING DOUBLE PILE FABRICS.

No. 604,701. Patented May 24, 1898.

Fig. 5.

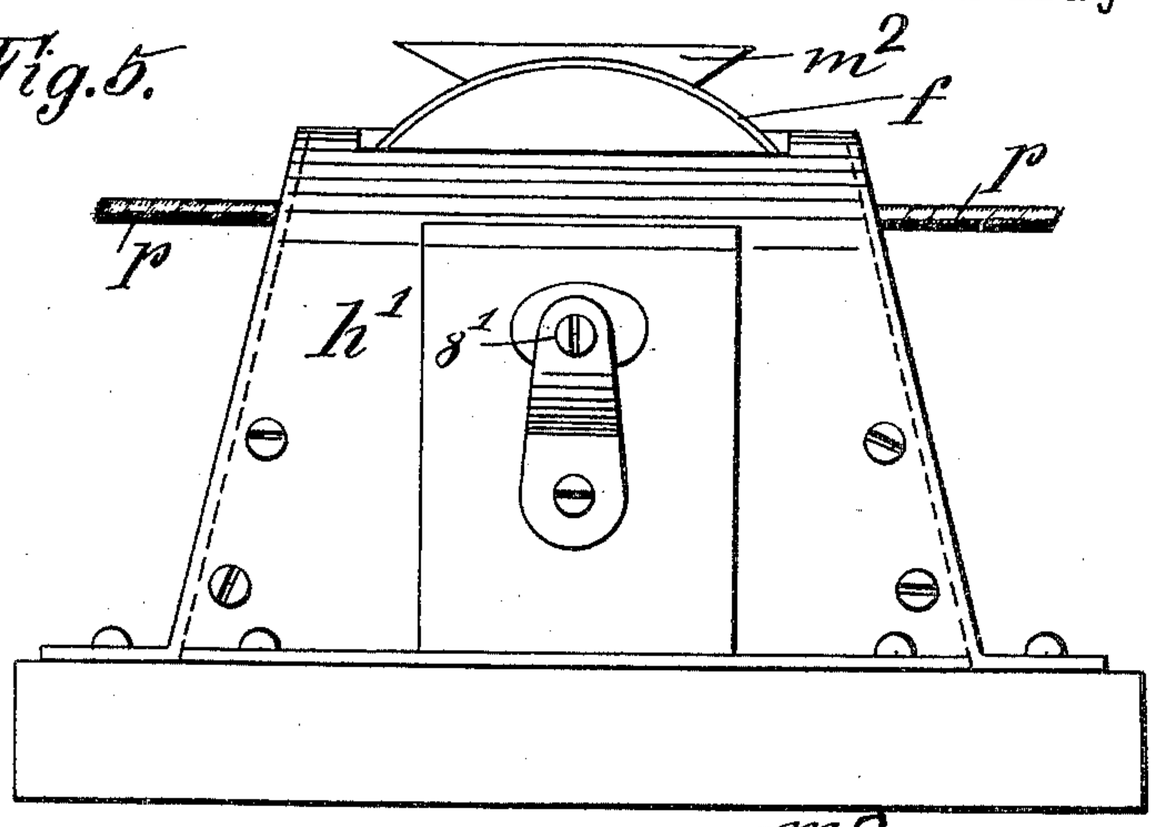


Fig. 4.

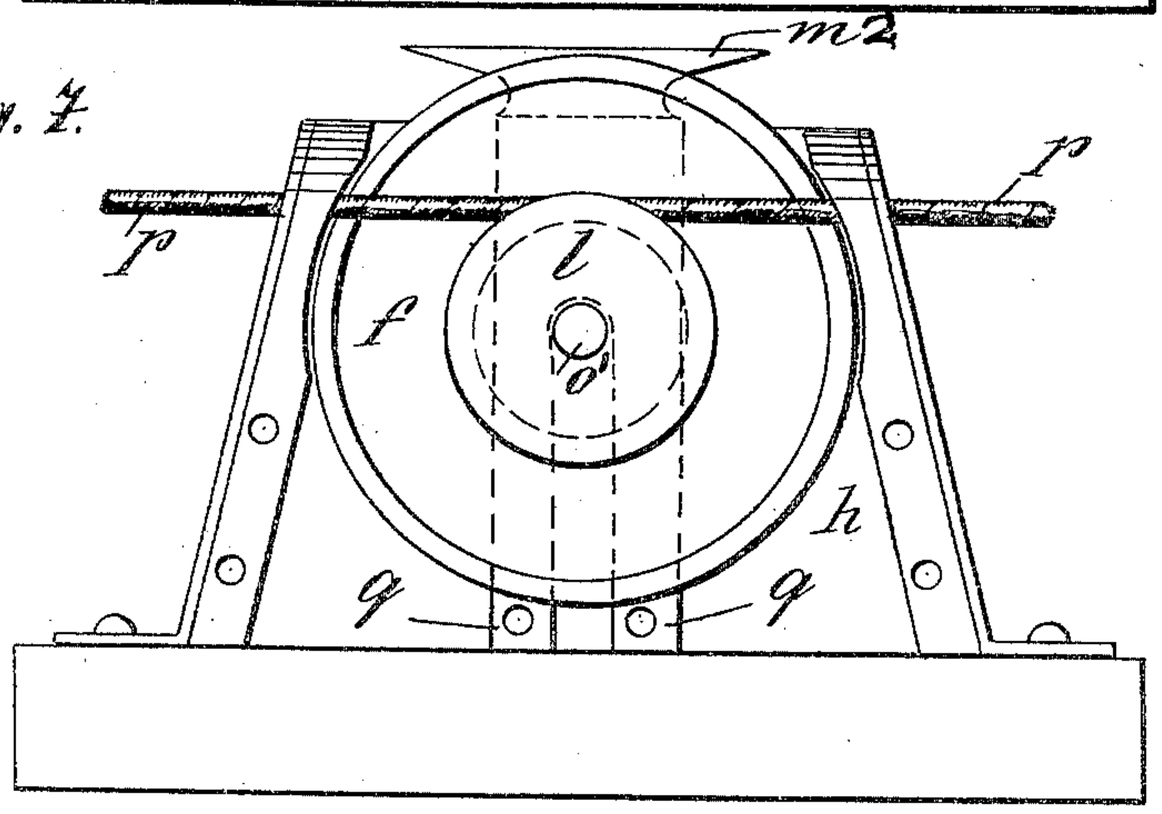
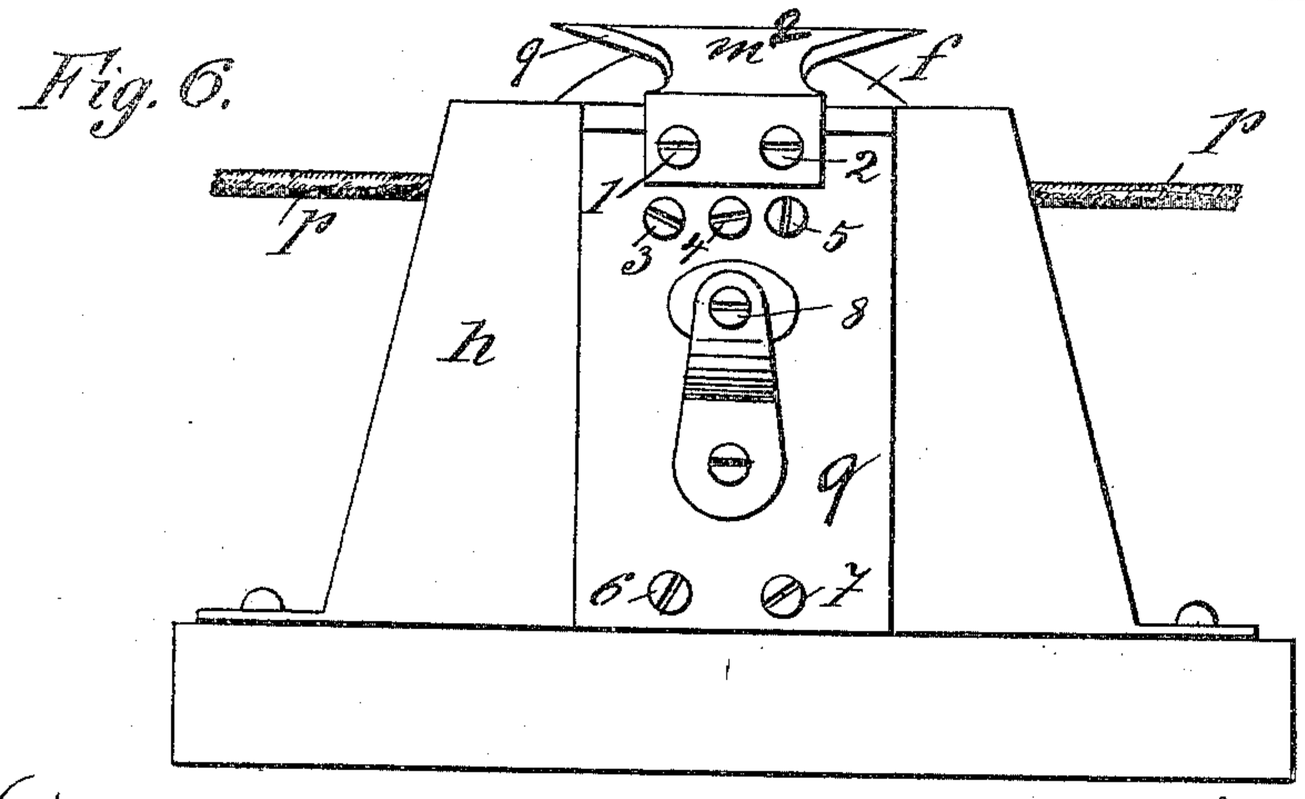


Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

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APPARATUS FOR CUTTING DOUBLE PILE FABRICS.

No. 604,701. Patented May 24, 1898.

Fig. 8.

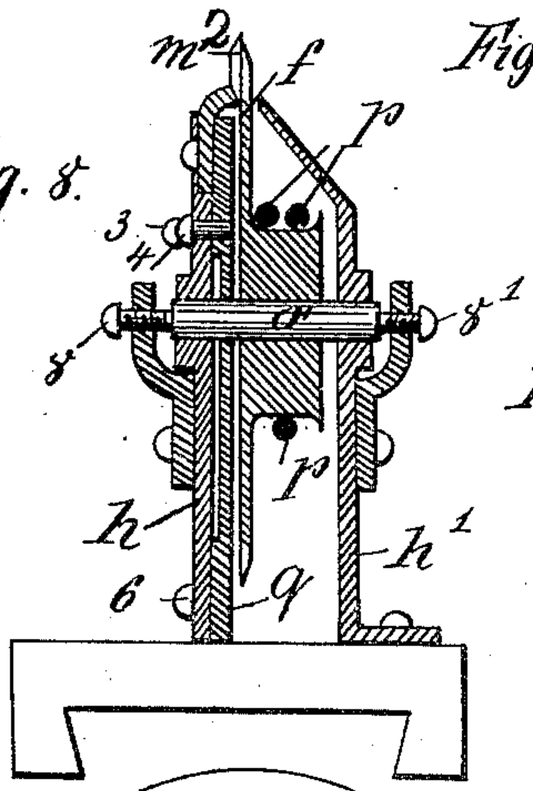


Fig. 9.

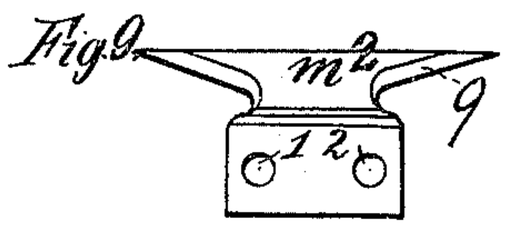


Fig. 10.

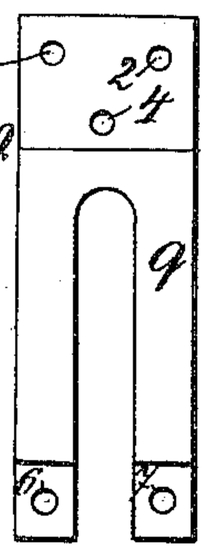


Fig. 11.

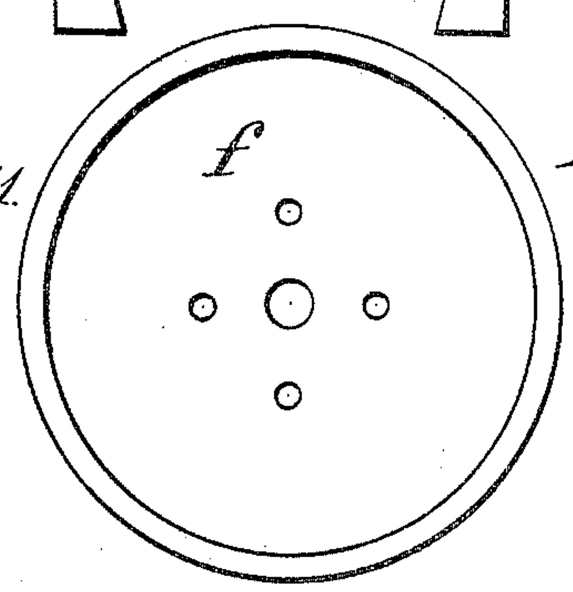


Fig. 12.

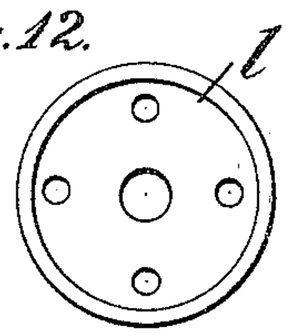
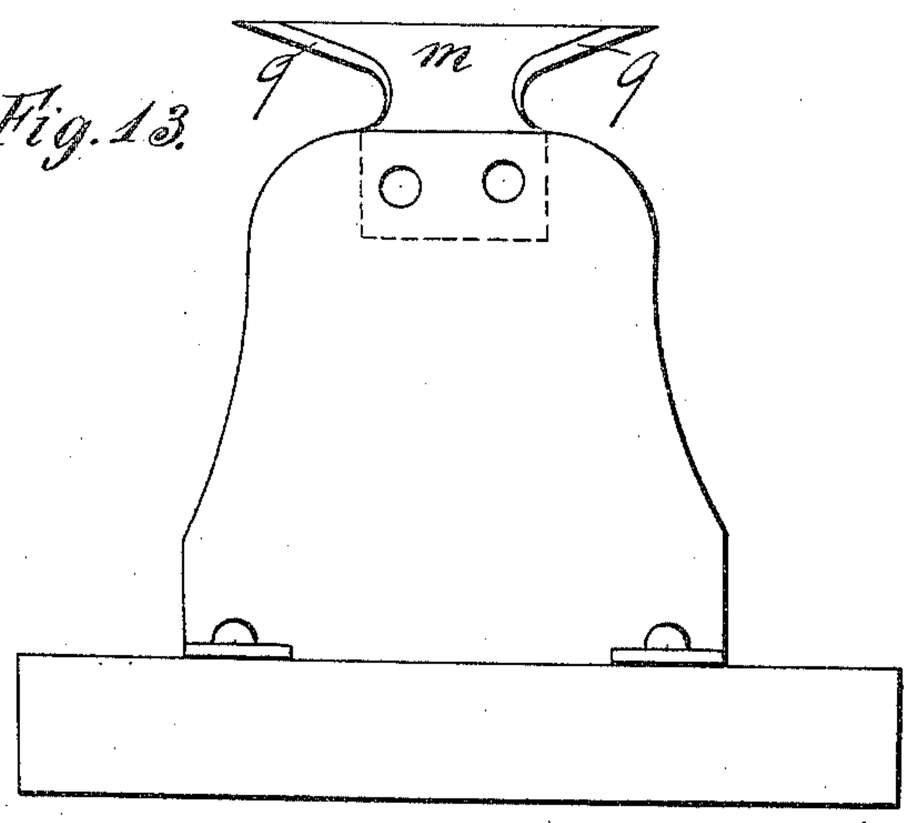


Fig. 13.



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UNITED STATES PATENT OFFICE.

REINHOLD RICHTER, OF REICHENBERG, AUSTRIA-HUNGARY.

APPARATUS FOR CUTTING DOUBLE-PILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 604,701, dated May 24, 1898.

Application filed January 18, 1897. Serial No. 619,520. (No model.) Patented in Germany June 13, 1896, No. 88,063.

To all whom it may concern:

Be it known that I, REINHOLD RICHTER, a subject of the Emperor of Austria, residing at Reichenberg, Bohemia, German Empire, have invented certain new and useful Improvements in Apparatus for Cutting Double-Pile Fabrics, (patented in Germany under No. 88,063, dated June 13, 1896,) of which the following is a full and clear specification.

The object of my invention is to provide an apparatus of a new and improved form and of a simple and cheap form of construction for cutting apart double-pile fabrics, so made that the pile will be cut evenly and smoothly without displacement of the pile-threads; and to such end my invention consists of a suitable holding device for the fabric after it has left the loom, a suitable cutting device, and a suitable device or devices for removing the cut fabric from the cutting device. It is not to be understood that my invention is limited to any particular form of such mechanism or the various portions thereof, as such invention consists in the construction of certain devices and parts and the combination of certain devices and parts, all as hereinafter more fully set forth, described, and claimed.

The machine of such invention is fully set forth and described in the following specification, of which the accompanying drawings form a part, wherein similar letters and numerals of reference designate like or equivalent parts wherever found throughout the several views, and in which—

Figure 1 is a side view, partially in central cross-section, of a velvet or double-pile-fabric loom having attached thereto my improved pile-cutting device. Figs. 2, 3, and 4 are views in various positions, upon a larger scale, of portions of my improved pile-cutting device, while Figs. 5 to 7, inclusive, show a somewhat-modified form of construction of such pile-cutting device from that shown in Figs. 1 to 4. Fig. 8 is a side view, in central vertical section, of the pile-cutting knife and connection shown in Figs. 5 and 7. Fig. 9 is a detail view of the stationary knife; Fig. 10, a like view of the stationary-knife support; Figs. 11 and 12, like views of the rotary knife and pulley rotating the same, showing the holes for bolting the same together; and Fig. 13 is a similar view of the stationary knife in position on one form of support.

One of the main advantages of my improved form of pile-cutting device consists in the fact that the cutting action is toward the comb of the loom instead of away from it, as has been hitherto the case, and that a considerable length of the completed and uncut fabric is at all times left between the cutting mechanism and the comb of the loom, whereby a great advantage is gained in that the cut is made more even and there is less danger of displacement of the pile-threads than in the devices heretofore used, wherein the cutting has been done immediately adjacent to and away from the comb of the loom.

Referring to the drawings, the completed and double-pile fabric *w* being a double-backed fabric with the pile in the center passes from the loom over the breast-beam thereof, B, and between a holding device consisting, preferably, of two rollers *a* and *a'*, revolubly supported in the standards *g*, which also support the breast-beam B, and these rolls *a* and *a'* are each provided with suitable ratchet-wheels *r* and *r'*, connected each with a plurality of pawls *s* and *s'*, by which retroactive rotation of such rolls *a* and *a'* is absolutely prevented, immediately below which rollers and extending up into the space between the same is located the cutting-apparatus carriage *d*, consisting, preferably, of an inverted-V-shaped frame or case *h* and *h'*, of steel plate, having a bottom slide plate or piece, as shown in Fig. 2, which carriage is movable transversely of the warp of the loom along a horizontal railway S of any desired form.

Mounted in the frame or case *h h'* is a suitable cutting-knife *m*, preferably an oscillating one and of the form shown in Fig. 3, pointed at the ends and having an inclined sharp edge 9 at either end upon the under side, and such knife-blade is pivotally mounted upon the pivot *o*, upon which is also mounted a rotating circular knife, disk, or wheel *f*, also having a sharpened edge and of such size and contour and so arranged in juxtaposition with the knife-blade *m* that the two together form a cutting-shears, one portion of which is rotary and the other of which

is not. The knife m is constructed with a boss o', on which boss o' the rotary cutting-wheel f and pulley l, operating the same, are mounted. The bottom extension m' of the oscillating knife-blade m is provided with a pivot pin or screw i, fitting into a suitable hole or slot in a sliding bar k, which reciprocates back and forth in the frame h and h' in such manner that when in the position shown in Fig. 3 the shears formed by the two knife-blades f and m will cut the pile while traveling toward the right and that when the bar k is pushed to the extreme leftward position the shears will cut the pile when traveling to the left, and the position of the knife-blade m when traveling to the left is as shown in Fig. 2. The tilting of the knife-blade m is brought about by the striking of the ends of the bar k against suitable stops (not shown) at either end of the railway S at the end of each reciprocation of the carriage upon such railway. The revolution of the circular knife-blade f is effected by means of a driving-cord p, fixed firmly at either end to the respective side frames of the cutting device or loom and passing around a suitable groove or grooves in the pulley l, which is securely fixed to or formed integral with the circular disk or knife-blade f, and the reciprocating movement of the entire cutting mechanism carried by the frame h and h' backward and forward along the railway S is effected by means of a cord z, the ends of which are secured to the carriage d, as shown in Fig. 2, such cord for this purpose passing over fixed guide-pulleys n, t, u, and t' and u' and around a horizontal guide-pulley x, carried by the loom-frame, the cord being attached at the proper point to the lower end of the reciprocating driving-lever A, and in order to keep this pulley or cord in a proper state of tension any one of the guide-rollers may be made adjustable.

The lever A makes, at each revolution of the loom-shaft, an alternating movement backward and forward through the means of a connecting-rod K, connected to a suitable pivot-pin D in such lever A, and such rod K is connected with a crank-pin C on the gear-wheel R, which meshes with the gear-wheel T, which in turn meshes with the wheel E upon the main shaft W of the loom, and the circumference of the wheel R is twice that of the circumference of the wheel E.

The operation of the device is as follows: The loom being in operation and the end of the warp having been passed, one portion of the back around the wheel b and the other around the wheel b', the same is passed between the rollers c and c', and on to the receiving-roller y, the loom being then put in operation, and the cutting apparatus being upon the left side of the loom when the top of the lever A is forced toward the front of the loom. This will cause the carriage d to move to the right, and the knives being in the position shown in Fig. 3 the point 20 of the oscillating knife m will be forced upward behind a certain number of the pile-threads of the fabric, and as the carriage is drawn across the loom such pile-threads will be severed by the combined action of the cutting edge 9 of such knife and the rotating shear plate or disk f. When the carriage d has reached its extreme position upon the right, the abutting of the right end of the sliding bar k against the stop (not shown) upon the railway S will force the oscillating knife m into the reverse position shown in Fig. 2. Then upon the forward movement of the top portion of the lever A the carriage d will be drawn backward again along the railway S in the same manner, the pile being then caught between the point 21 of the knife m and the rotating disk f, which disk, on account of the change of direction of the travel of the carriage d, will be rotating in the reverse direction from that in which it was rotated in the movement first described, and by this movement it will be seen that the fabric will be cut so smooth as to obviate the necessity of much, if any, further shearing of the pile.

In the modified form of the construction shown in Figs. 5 to 12, inclusive, instead of the oscillating knife m I have shown a fixed knife m^2, placed in a central position. In this method of construction there is greater simplicity and less wear. The knife m^2 is carried by a knife-holder q, which fits inside the frame and is fastened to such frame by suitable screws, as shown at 6 and 7 and 4, while the knife m^2 is secured to the holder q by like screws in holes 1 1 and 2 2. Upon the axle o', which turns in bearings in both sides of the frame or case h h', is fixed the cutting-disk f, having formed upon or attached to it the cord-pulley l. The screws 8 8′ allow an exact adjustment endwise of the cutting-disk f against the knife m^2. The screw 4, Fig. 8, attaches the knife-holder to the side of the frame, and 3 and 5, Fig. 6, are two steel screws, which allow the points of contact of the knife with the cutting-disk to be exactly adjusted. The operation of the apparatus is similar to that first described with the oscillating knife m.

Fig. 13 shows the arrangement of the fixed knife with the cutting-disk removed, and in this form of construction of the device the operation is precisely similar to that of the device shown in Figs. 5 to 10.

It is evident that many modifications in the construction, combination, and arrangement of the various parts of my improved pile-cutting device may be made without departing from the scope of my invention, and I do not intend to limit myself to the exact form of construction shown herein; but,

Having now particularly described my said invention, its construction and operation, what I claim, and desire to secure by Letters Patent, is—

1. In a device of the character described, the combination with holding-rollers a and a'

for feeding forward the uncut fabric, of spreading-rollers *b* and *b'*, a railway S, a traveling double-acting shears composed of a circular rotating and a straight-edged knife-blade mounted upon the railway S, means for reciprocating the shears along such railway and means for rotating the circular knife-blade during the reciprocation, substantially as shown and described.

2. In a device of the class described, the combination with the holding-rollers *a* and *a'*, of the spreading-rollers *b* and *b'*, the drawing-rollers *c* and *c'*, the taking-off roller *y*, a railway S, a traveling double-acting shears composed of a circular rotating and a straight-edged shear-blade mounted upon the railway S, means for reciprocating the shears, and means for rotating the circular knife-blade during reciprocation, the shears being located below the rollers *a* and *a'*, substantially as shown and described.

3. In a device of the class described, the combination with a cutting device or shears for cutting the pile of the fabric, of a reciprocating carriage therefor, a railway S upon which the same is mounted, and means for reciprocating the carriage; the said cutting device or shears consisting of a straight-edged knife-blade, a rotary circular knife-blade adjacent thereto so that the two together form a shears, a wheel *l* secured to the rotary circular knife-blade of the shears, and a belt or cord *p* encircling the wheel *l* and permanently secured at the ends in such manner that as the carriage carrying the stationary and rotary knife-blades is reciprocated, rotary motion will be given to the rotary knife-blade *f*, first in one direction and then in the other, according to the direction of the movement of the carriage, substantially as shown and described.

4. In a device of the class described, the combination with a cutting device or shears for cutting the pile of the fabric, of a reciprocating carriage therefor, a railway S upon which the same is mounted, and means for reciprocating the carriage; the said cutting device or shears consisting of a knife-blade having the points 20 and 21 and the undercutting straight edges 9, a rotary circular knife-blade adjacent thereto so that the two together form a shears, a wheel *l* secured to the disk or rotary circular knife-blade of the shears, and a belt or cord *p* encircling the wheel *l* and permanently secured at the ends in such manner that as the carriage carrying the knife-blades is reciprocated rotary motion will be given to the rotary circular knife-blade *f*, first in one direction and then in the other according to the direction of the movement of the carriage, substantially as shown and described.

5. In a device of the class described, the combination with a reciprocating carriage, of means for reciprocating such carriage, a cutting device or shears carried thereby consisting of a rotating disk knife or circular shear-blade *f*, means for rotating the blade *f*, a knife *m* having the cutting edges 9 and the points 20 and 21, and means for vibrating such knife *m* at the end of each reciprocation of the carriage, substantially as shown and described.

6. In an apparatus for cutting double-pile fabrics on the loom, the combination with the loom and the shaft W, of a toothed wheel E upon the said shaft W, a loose intermediate wheel T gearing with the wheel E, the wheel R gearing with the wheel T, the connecting-rod K pivoted upon the crank-pin C of the wheel R, the driving-lever A to be moved alternately backward and forward, upon which the connecting-rod K is pivoted at D, the cord *z* attached to the lower end of the driving-lever A, guide-pulleys *n*, *t*, *u*, *x*, *u'*, *t'* over which the cord *z* passes, a carriage to which the cord *z* is secured so as to move such carriage alternately backward and forward owing to the alternative movement of the driving-lever A, the carriage having a frame *h h'*, carrying upon a pivot-bolt *o*, a vibrating knife *m* having a boss *o'*, and pointed at either end and having an inclined sharp edge on its under or inner side, a cutting disk knife or wheel *f* which together with the knife *m* forms a shears, and a pulley *l* secured to the disk knife, both the disk knife *f* and a pulley *l* being mounted on said boss *o'*, and said disk-knife blade *f* being rotated by means of a driving-cord *p* fixed to both side frames of the loom and passing around the pulley *l*, substantially as shown and described.

7. In an apparatus for cutting double-pile fabrics on the loom, the combination with a railway S fixed transversely between the two side frames of the loom parallel to the breast-beam B, of a carriage adapted to be moved alternately backward and forward along the railway, a shears or pile-cutting device carried by the carriage, consisting of a vibrating knife-blade *m* pointed at either end and having an inclined sharp edge on its under or inner side and being provided with a boss *o'*, and being pivoted upon a bolt *o* fixed to the side of the carriage-frame *h*, and being provided with an arm *m'* projecting downward from the knife-blade below the center upon which it turns, a pin *i* upon the arm *m'*, said pin *i* working in a notch or recess in a sliding plate or bar *k* which projects at each end of the carriage-frame, a circular cutting disk-knife blade or wheel *f* which together with the knife-blade *m* forms a shears, and a pulley *l* secured to the circular disk-knife blade *f*, said circular disk-knife blade being mounted upon the boss *o'*, and being rotated by means of a driving-cord *p* fixed to both side frames of the loom and passing around the pulley *l*, substantially as shown and described and for the purposes set forth.

8. In an apparatus for cutting double-pile fabrics on the loom, the combination with a reciprocating carriage, of means for reciprocating such carriage, a shears or cutting device carried by the carriage, and consisting

of a knife-blade *m*, provided with a boss *o'*, and pointed at either end and having an inclined sharp edge on its under or inner side adjacent to each point, a cutting circular disk-knife blade or wheel *f* mounted upon the boss *o'*, a pulley *l* secured to the circular disk-knife blade or wheel *f*, the two knives together forming a shears, and the circular disk-knife blade being rotated by means of a driving-cord *p* secured at the ends and passing around the pulley *l*, substantially as described and for the purposes set forth.

Signed at Reichenberg, Austria-Hungary, this 18th day of November, 1896.

REINHOLD RICHTER.

Witnesses:

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HEINRICH MEYER.