F. FARMER.

PILE CUTTING DEVICE FOR CARPET LOOMS.

APPLICATION FILED JUNE 10, 1907.

921,818. **Patented May 18, 1909.**

2 SHEETS—SHEET 1.

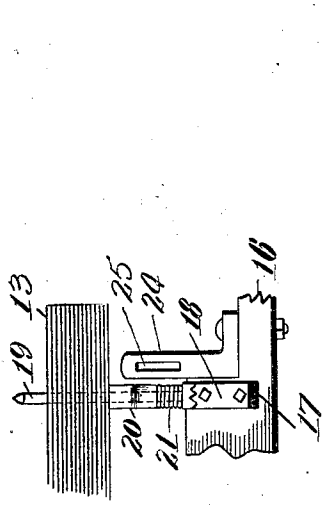


Fig. 2.

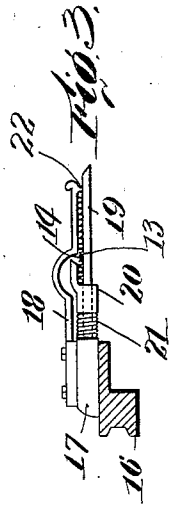


Fig. 3.

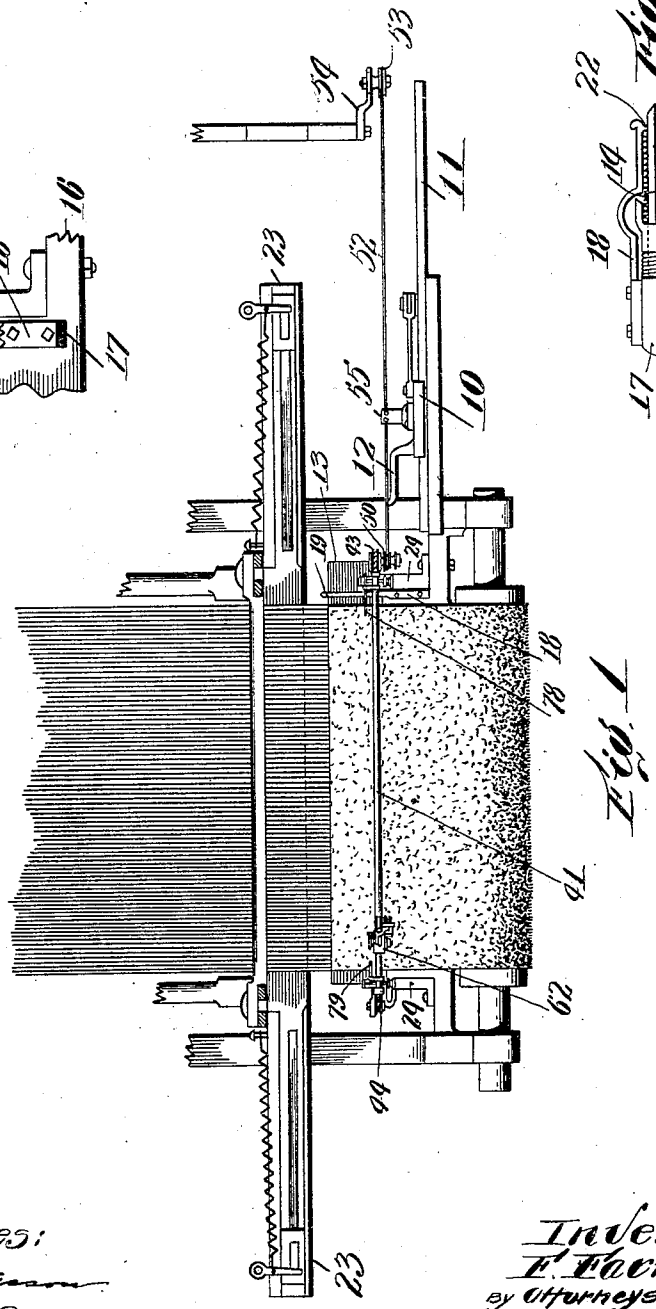


Fig. 1.

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

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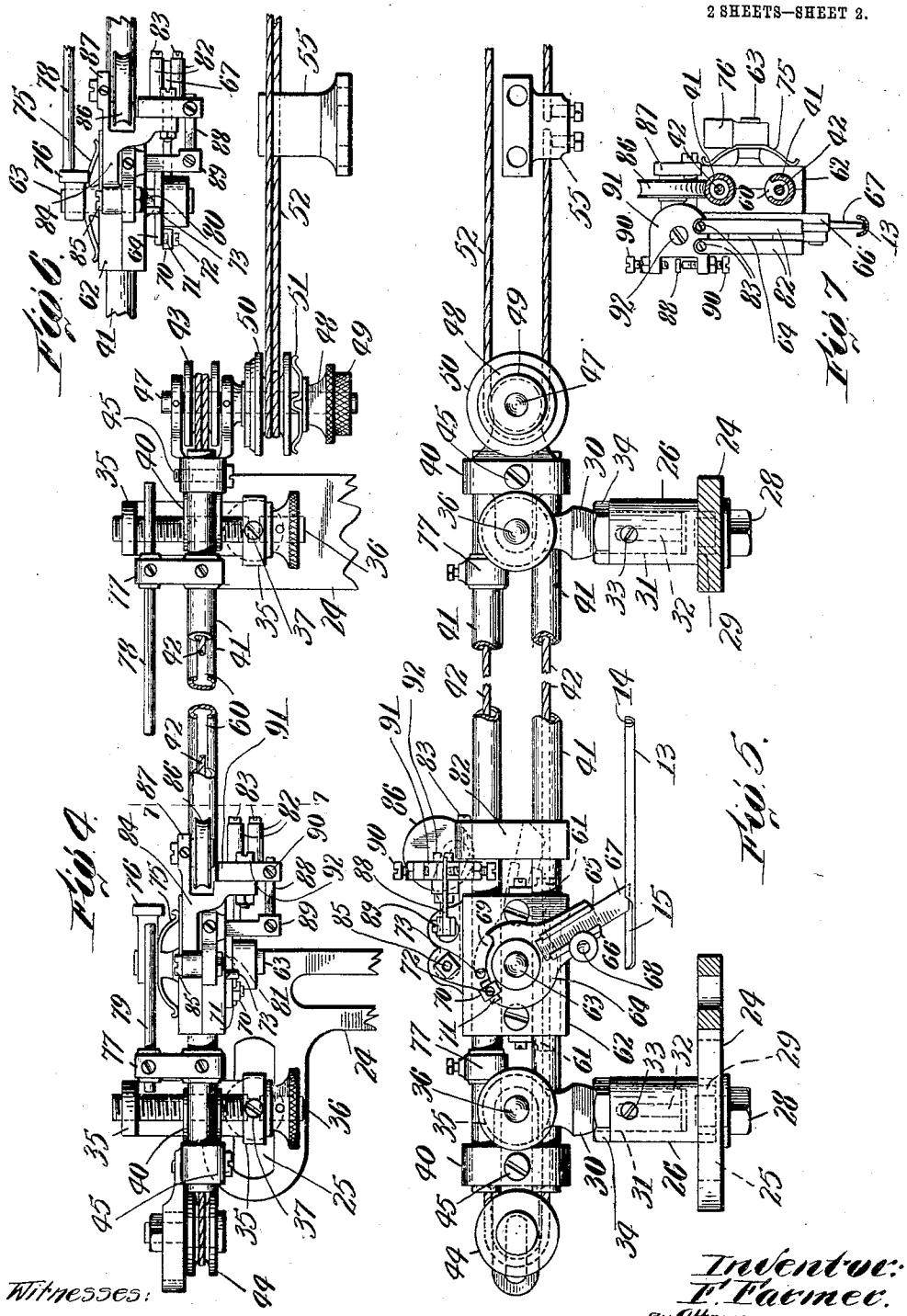


Fig. 6.

Fig. 7.

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

FREDERICK FARMER, OF WORCESTER, MASSACHUSETTS.

PILE-CUTTING DEVICE FOR CARPET-LOOMS.

No. 921,818. Specification of Letters Patent. Patented May 18, 1909.

Application filed June 10, 1907. Serial No. 378,273.

To all whom it may concern:

Be it known that I, FREDERICK FARMER, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Pile-Cutting Device for Carpet-Looms, of which the following is a specification.

This invention relates to a device for cutting piles in the manufacture of carpets and similar fabrics.

The principal objects of the invention are to provide a construction for this purpose of such a nature that the cutting operation can be performed rapidly and with the expenditure of very little power, so as to increase the production; to provide means whereby an upward cut can be obtained before the wire is withdrawn, so as to take all strain from the wire motion cams or other mechanism; to provide means for sharpening the cutting knives before every cut, said means operating automatically during the reverse travel of the cutter; to provide a device in which the pile can be cut in either direction by a simple reversal of the position of the cutter; to provide means whereby the cutting knife can be made readily adjustable and removable; to provide means whereby the whole cutting device can be adjustably located in convenient position on the loom frame; to provide means whereby it can be operated from the pile wire motion in a convenient and simple manner in such a way that no wire lubricator is necessary; and to provide a compact, simple, and convenient arrangement of parts.

Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying two sheets of drawings which illustrate a preferred form of the invention, and in which—

Figure 1 is a plan of the front side of a carpet loom showing the invention as applied thereto. Fig. 2 is a plan on an enlarged scale of a tension mechanism to hold the pile wire after the pile is cut. Fig. 3 is a side elevation of the same partly in section. Fig. 4 is a plan of the cutting mechanism on an enlarged scale partly broken away. Fig. 5 is a side view of the same partly in section. Fig. 6 is a plan of a portion of the device with the parts in a different position from that shown in Fig. 4, and Fig. 7 is a sectional view on the line 7—7 of Fig. 4.

The invention is illustrated in connection with the loom in which the pile wire is operated in one of the several ways in which this can be done through a horse 10 which reciprocates along ways 11 and which is provided with an arm 12 for operating the pile wires 13.

By reference to Figs. 3 and 5 it will be seen that each of the pile wires is formed with a longitudinal groove 14 in its upper face, and that one side is cut away at 15 near both ends for a purpose which will be described hereinafter. These wires may conveniently be made of sheet metal.

By reference to Figs. 2 and 3 it will be seen that the frame 16 of the loom is provided with a bracket 17 on which is mounted a top spring 18 for engagement with the tops of the pile wires. This bracket is also provided with a spear 19 adapted to pass under the pile wires, and with a tension device 20 operated by a spring 21 to move against the pile wires when they are in the fabric. This constitutes a tension to hold the pile wires after the pile is cut. It will be seen that the outer end 22 of the top spring 18 engages the outer side of the pile wire which lies next to the lay 23. The pile wires are manipulated by the horse 10, or in any other desired manner, so that preferably there are several wires in the fabric at a time, and they are drawn out in regular order as is well understood in this art.

Mounted on the loom frame are a pair of brackets 24 located on opposite sides of the fabric as produced. These brackets are preferably adjustable on the frame, and are connected with it in any desired way, as for example, by means of bolts. Each bracket is provided with a slot 25 in which is mounted a sleeve 26 secured to the bracket by means of a bolt 28 passing into the bottom of the sleeve. Each sleeve has a flat portion 29 to fit the slot in the bracket. In this way the sleeve can be adjusted longitudinally along the bracket. Each sleeve is also provided with an elevating stand 30, the lower part of which 31 is screw-threaded and is provided with a longitudinal slot 32 for receiving a binding screw 33. On top of the sleeve is located an elevating nut 34 for engaging the screw-threads and regulating the height thereof according to the way in which it is turned. Each stand is provided with a couple of bearings 35 through which passes an adjusting screw 36 adapted to be clamped in adjusted positions by means of a clamp screw 37. This adjusting screw passes

through a head 40. These devices are located on both sides of the loom, so there are two heads 40 opposite each other. They support a pair of tubular rails 41 which extend from one side of the loom to the other and constitute conduits for a flexible member 42 which passes through the two rails and around a pair of pulleys 43 and 44 mounted in bearings with which said heads are provided. It will be seen that the two heads are in the form of clamps having two separable parts held together by screws or bolts 45 to clamp the two rails in position. The flexible member 42, which may be in the form of a cord, chain or cable, preferably passes once around the pulley 44 and twice around the pulley 43 from which it receives its power to reciprocate in the tubes.

Mounted in the bearings with which one of the heads 40 is provided is a shaft 47 to which the pulley 43 is connected. This shaft extends out to one side and is provided with a nut 48 and a clamp nut 49 if desired. Loosely mounted on this shaft is a pulley 50, and between this pulley and nut 48 is a friction disk 51. Passing preferably twice around the pulley 50 is a flexible member 52 which also passes over an idler 53 mounted adjustably on a slotted adjustable bracket 54. This flexible member is connected at both ends with a bracket 55 mounted on the horse 10.

It will be seen that the reciprocation of the horse 10 results in the reciprocation of the flexible member 52. As this member is wound more times around the pulley 50 than it is around the pulley 53, it is well adapted to transmit a motion of rotation to the pulley 50. This motion is transmitted to the shaft 47 through the instrumentality of the friction disk 51, and from that it is transmitted to the pulley 43. In this way the flexible member 42 is reciprocated, but it will be observed that the connection between it and the flexible member 52 is not positive, but is capable of yielding so that if anything arrests the motion of the flexible member 42 it will not interfere with the operation of the horse 10. Each reciprocation of the flexible member 52 is intended to operate to move a knife for cutting the pile of the fabric. For this purpose one of the rails 41 is provided with a slot 60, and in this slot run a pair of grippers 61 mounted on a carriage 62. This carriage reciprocates on the rails 41, and consequently they serve to guide the carriage. This carriage is provided with a shaft 63 which extends through it, and has at one end a knife holder 64. This knife holder has a groove 65 in an arm 66 thereon in which is located a cutting knife 67 held in position by a screw 68 or in any other desired way. The knife holder 64 is provided with a curved slot or cut-away portion 69, at one end of which is a lug 70 having a movable stud 71 therein adapted to be held in adjusted positions by means of an adjusting screw 72. A stop-pin 73 is mounted on the carriage in position to engage this stud so as to limit the motion of the knife in one direction. It will be seen that these parts are so adjusted that the knife is adapted to enter the groove in the pile wire at such an angle that in passing across the fabric it will cut the pile upwardly. This is an improvement over those devices in which the pile is cut with a downward motion. The shaft 63 extends through the carriage as has been stated, and is provided on its opposite end with a friction disk 75, and also with an arm 76 which controls the position of the cutting knife.

One of the rails 41, preferably the upper one, is provided with a pair of adjustable brackets 77 on one of which is mounted a dog 78 and on the other a dog 79. Now when the carriage moves across the fabric to the right, as indicated in the drawings, the arm 76 will engage the dog 78 as indicated in Fig. 6, which will turn the shaft 63 and the knife 67 will move upwardly into the position shown in dotted lines in Fig. 5.

As has been stated the motive means for the flexible member is not positively connected therewith, but only frictionally, so that when this occurs, the motion of the flexible member 42 will be stopped without arresting the motion of the member 52. It will be understood that the member 52 moves through a longer path than the member 42 on account of the fact that the pile wires have to be withdrawn by it. Now on the reverse motion of the carriage, the arm 76 will come into contact with the poker 79 at the end of the stroke of the carriage, and this will bring the knife back into cutting position, as shown in Fig. 5, in full lines. The friction disk 75 serves to hold the shaft and cutter in whatever position they are placed in by contact with the pokers.

Means is also provided whereby when the knife is moved upwardly as indicated it is moved sidewise into a different plane. This is accomplished in the present instance by a cam or projection 80 on the carriage which in the cutting position of the blade fits into a cavity 81 in the side thereof, but when the knife holder is turned into the position shown in dotted lines in Fig. 5, it is forced out of this cavity, as indicated in Fig. 6. This brings the knife between a pair of hones 82. These hones are hung on screws 83 indirectly supported by a bracket 84 which is pivoted on a horizontal stud 85 to swing in a vertical plane. In order to reciprocate the hones while the knife is between them, this bracket 84 is provided with a wheel 86 preferably of leather or having a surface which will not slip while traveling back and forth on one of the rails 41. This wheel is connected with the bracket by means of an arm

87 thereon in a position at a little distance from its center. On this account, as the wheel passes along the rails and revolves it will cause the bracket to oscillate and the hones to move back and forth over the edge of the knife. A spring or arm 88 is mounted on an arm 89 on the carriage. The end of the spring is adjustably connected with the bracket by engaging adjusting screws 90 which preferably are supported by the bracket indirectly, being mounted on an oscillating disk 91 adapted to swing on a stud or bolt 92 on the bracket 84. The arm 88 limits the oscillating motion of the disk which oscillates the hones transversely. It will be seen that as the bracket 84 swings the disk also oscillates, thus automatically sharpening the knife between operations.

The purpose of the cut away portions 15 of each of the pile wires will now be understood as it is seen that in order to bring the knife to one side in this way it is desirable that the pile wire be cut away to permit it to pass to and from it angularly.

It will be observed that by a construction made in accordance with this invention, the whole device is adapted to be applied readily to any ordinary carpet or similar loom; that the guiding rails are readily adjustable vertically and horizontally; that the knife has an upward cut; that its cutting position is adjustable; that the operation of the knife is such that it does not interfere with the operation of the pile wire motion even when the knife is arrested before the end of the stroke of the pile wire motion is reached, as is usually necessary in this class of devices; that the parts are of a simple and compact nature, and not likely to get out of order in use; that the knife is sharpened between operations and in an efficient manner by the double oscillatory motion of the hones; that the pile may be cut in either direction by the reversal of the knife holder; that the pile over the wire is cut before the wire is drawn, therefore taking all strain from the wire motion mechanism; that no wire lubricator is necessary; and that the knife can be readily removed and adjusted. Most of these advantages coöperate with each other to secure an increase in production.

While I have illustrated and described a preferred form of the invention, I am aware that many modifications may be made therein by persons skilled in the art without departing from the scope of the invention as expressed in the claims.

Having thus fully described my invention, what I claim is:—

1. A pile cutting device for looms, comprising a slotted bracket, a hollow sleeve resting on the bracket, a stand having a screw extending through said sleeve, means for securing the stand and sleeve in adjusted positions on the bracket, a rail, means on the stand for supporting the rail, and a pile cutting knife movable along the rail.

2. A pile cutting device for looms comprising a bracket adapted to be mounted on a loom, a sleeve, means for adjustably mounting the sleeve on the bracket, a stand adjustably mounted on the sleeve, means for preventing said stand from turning on the sleeve, said stand having bearings, an adjusting device mounted in said bearings, a rail supported by said screw and adapted to be adjusted across the stand thereby, and a pile cutting knife movably supported by the rail.

3. In a loom, the combination of a series of pile wires each having a groove and an opening in the side near the end of the groove, a pile cutting knife, means for moving the knife along the groove, and means for moving the knife through said opening at the end of its stroke.

4. In a loom, the combination of a pile wire having a groove and a side opening at the end of the groove, a pile cutting knife, and means for simultaneously moving said knife upwardly out of the groove and swinging it sidewise through said opening.

5. In a loom, the combination of a pile wire having a longitudinal top groove and an opening at the end thereof, a pile cutting knife, means for moving the knife along the groove, and means for simultaneously moving the knife vertically with respect to the groove and laterally through said opening.

6. In a loom the combination of pile wires each having a longitudinal groove and a side opening at the end thereof, and a pile cutting knife movable along said groove through said opening.

7. In a loom, the combination of a slidable carriage, a pile cutting knife oscillatably mounted thereon, means for oscillating said knife in a vertical plane at the end of the travel of the carriage, and a cam for throwing said knife laterally at the same time.

8. In a loom, the combination of a reciprocable carriage, a knife holder pivotally mounted thereon, said knife holder having a projection, and a pair of dogs one located at each end of the travel of the carriage and adapted to engage said projection to turn the knife-holder.

9. In a loom, the combination of a reciprocable carriage, a knife holder pivotally mounted thereon, said knife holder having a projection, a pair of dogs one located at each end of the travel of the carriage and adapted to engage said projection to turn the knife-holder, and a cam located on said carriage and engaging the knife-holder for moving it laterally with respect to the direction of motion of the carriage.

10. In a loom, the combination of a pile wire having a groove and a side opening at the end of the groove, a pile cutting knife, a support for the knife means for simultane-

ously moving said knife upwardly out of the groove and moving it sidewise through said opening, and means for reciprocating the knife comprising a flexible member connected with the support, and a pulley for receiving the flexible member.

11. In a loom, the combination of a pair of rails having passages therethrough, a carriage supported on the rails, and means passing through said passages for moving the carriage along the rails.

12. In a loom, the combination of a pair of rails located one over the other and having passages therethrough, one of said passages terminating in a slot through the wall of the rail, a carriage supported by the rails, and a flexible connection passing through said passages and connected with the carriage through said slot for moving the carriage along the rails.

13. In a loom, the combination with a pile cutting knife, of means for moving the knife longitudinally, and means for moving the knife to one side at the end of its stroke.

14. The combination of a carriage, a pile cutting knife movably mounted thereon, and an adjustable sharpening device located in position on said carriage to engage said knife.

15. The combination of a carriage, a pile cutting device movably mounted thereon, and a movable sharpening device in two parts on said carriage, each of said parts being in position to engage one side of the knife.

16. The combination of a carriage, a pile cutting knife movably mounted thereon, and a sharpening device for the knife mounted on the carriage.

17. In a loom the combination of a traveling carriage, a pile cutting knife movably mounted thereon, a movable flexible member, and means for transmitting motion from said member to the carriage during a portion only of the travel of the member.

18. In a loom, the combination of a pile wire having a groove and a side opening at the end of the groove, a pile cutting knife, means for simultaneously moving said knife upwardly out of the groove and moving it sidewise through said opening, and a sharpening device located in the path of the knife when it moves upwardly out of said groove.

19. In a loom, the combination of a movable carriage, a knife movably mounted thereon, a sharpening device, and means for simultaneously swinging said knife upwardly and moving it laterally into engagement with the sharpening device.

20. In a loom, the combination of a rail, a carriage slidably mounted thereon, a frame movably mounted on the carriage, a wheel on said frame engaging the rail, a sharpening device connected with said frame, a knife on the carriage, and means for moving the knife into engagement with the sharpening device.

21. In a loom, the combination of a rail, a carriage reciprocably mounted thereon, a bracket movably mounted on the carriage, a wheel eccentrically connected with the bracket and running on the rail, a knife movable with the carriage, and a sharpening device connected with said bracket, movable thereby, and in position to engage the knife.

22. The combination of a rail, a carriage movably mounted thereon, a bracket pivoted to the carriage, a wheel adapted to run on the rail and eccentrically connected with said bracket whereby the rotation of the wheel will oscillate the bracket, and a sharpening device mounted on the bracket.

23. The combination of a rail, a carriage slidably mounted thereon, a wheel having a leather surface resting and traveling on said rail, a bracket movably connected with said carriage and eccentrically connected with said wheel, whereby the movement of the carriage and wheel will oscillate the bracket, and a sharpening device mounted on said bracket.

24. The combination of a rail, a carriage movable therealong, a bracket pivoted to the carriage, a wheel eccentrically connected with the bracket and running on the rail, whereby the bracket is oscillated as the carriage travels.

25. In a pile cutter, the combination of a pile wire motion comprising an endless flexible member, a pulley over which said endless member passes, a shaft on which said pulley is loosely mounted, a friction disk on the shaft engaging said pulley, whereby its motion may be transmitted to the shaft, a pile cutting knife, and means fixed to said shaft for operating said knife.

26. In a pile cutter, the combination of a cutting knife, an oscillatory bracket, an oscillatory disk on the bracket and a hone supported by said disk in position to engage the knife.

27. In a pile cutter, the combination of a cutting knife, an oscillatory bracket, a disk mounted on the bracket on an axis at an angle to that on which the bracket oscillates, a pair of hones depending from the disk and means for oscillating the bracket and disk about their respective axes.

28. In a pile cutter the combination of a cutting knife a bone therefor and means for giving said hone a double oscillatory motion so as to engage the knife.

29. In a loom, the combination with a series of pile wires, of a tension device adapted to move against the pile wires at one side of the series when they are in the fabric, and a spring above the pile wires for engaging the pile wire on the opposite side of the series of pile wires.

30. In a loom, the combination with a series of pile wires, of a tension device adapted to move against one end wire of the series, and a spring above the pile wires having

means for engaging the other end wire of the series as it is introduced into the fabric.

31. In a loom, the combination with the pile wires, of a spring adapted to engage said wires, a tension device also adapted to engage the wires and move them toward the spring, and a spear located below the path of the pile wires for supporting them.

32. In a loom, the combination of a tension device for engaging the pile wires, and a spear located in position to support the pile wires and constituting a guide and support for the tension device.

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

FREDERICK FARMER.

Witnesses:

CHAS. J. THOMAS,

E. BERT JOHNSON.