No. 876,462. PATENTED JAN. 14, 1908.

W. G. M. KEIGHLEY & H. NETHERWOOD.

MACHINE FOR CUTTING THE PILE OF WEFT PILE FABRICS.

APPLICATION FILED MAY 21, 1906.

8 SHEETS—SHEET 1.

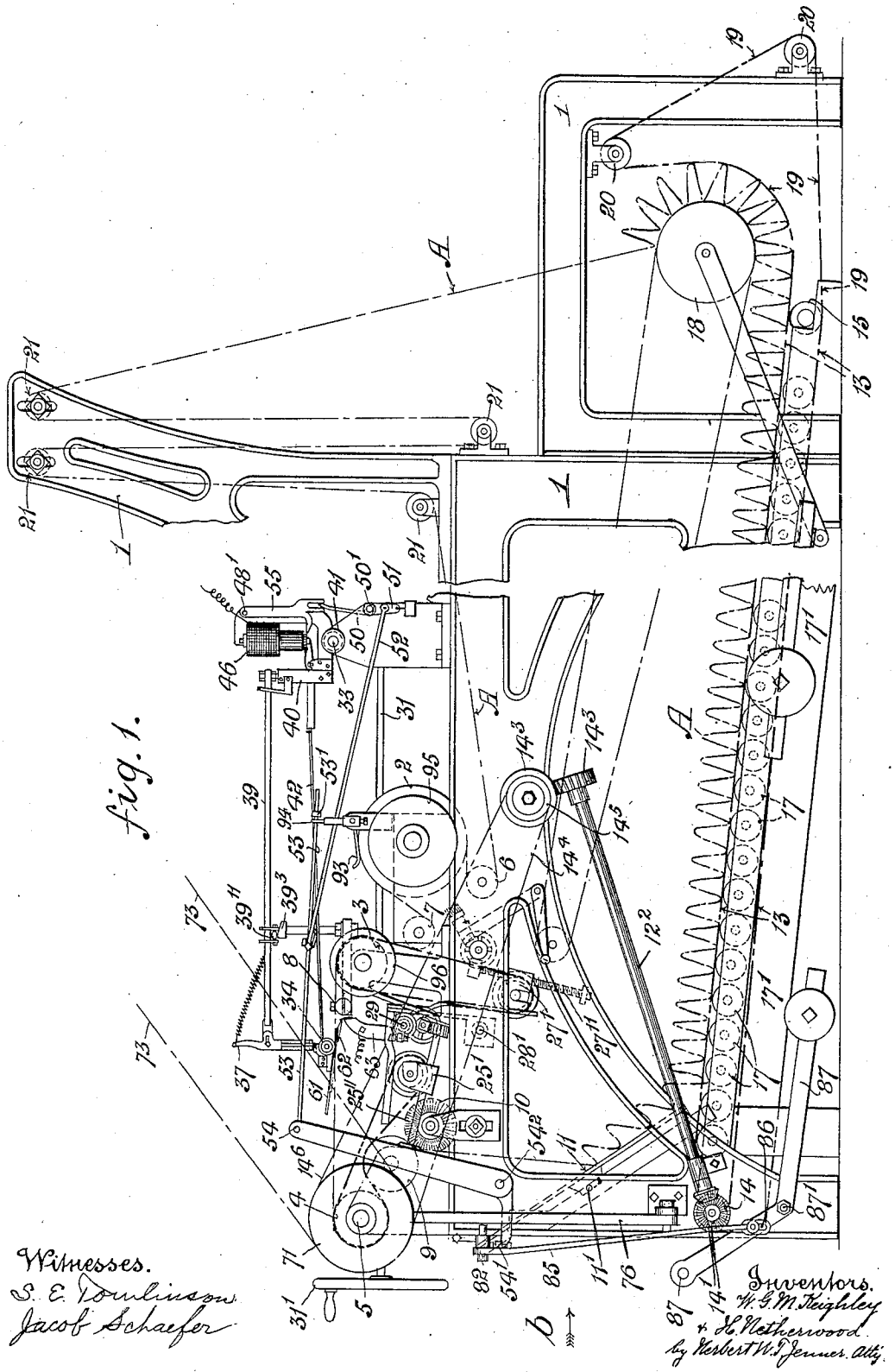


fig. 1.

Witnesses.
S. E. Doubinson
Jacob Schaefer

Inventors.
W. G. M. Keighley
& H. Netherwood
by Herbert W. Jenner. Atty.

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8 SHEETS—SHEET 2.

fig. 2.

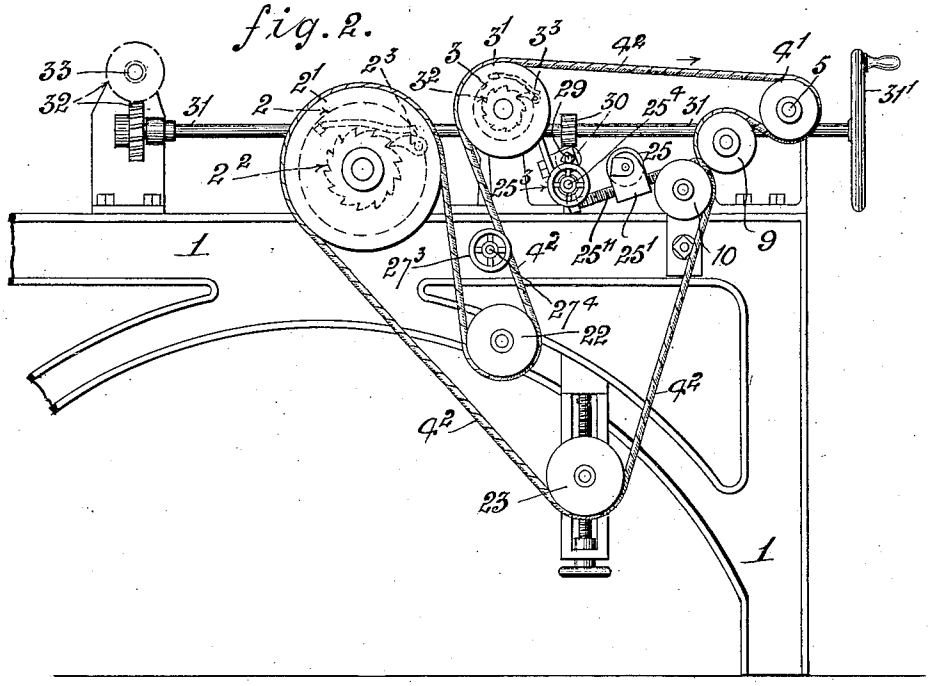


fig. 3.

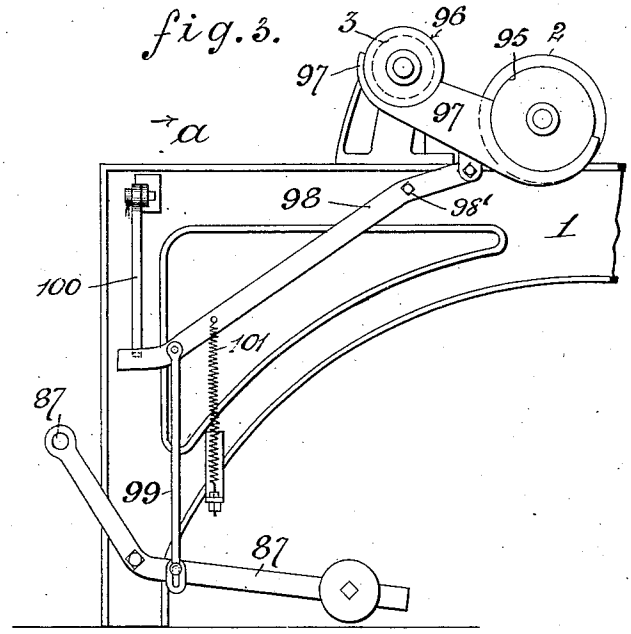
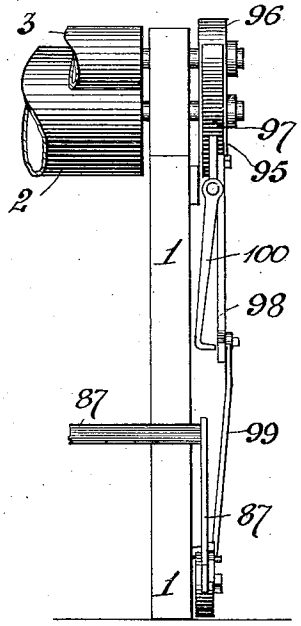


fig. 4.



Witnesses.
L. E. Tomlinson
Jacob Schaefer

Inventors.
W. G. M. Keighley
+ H. Netherwood
by Herbert W. Jenner. atty.

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

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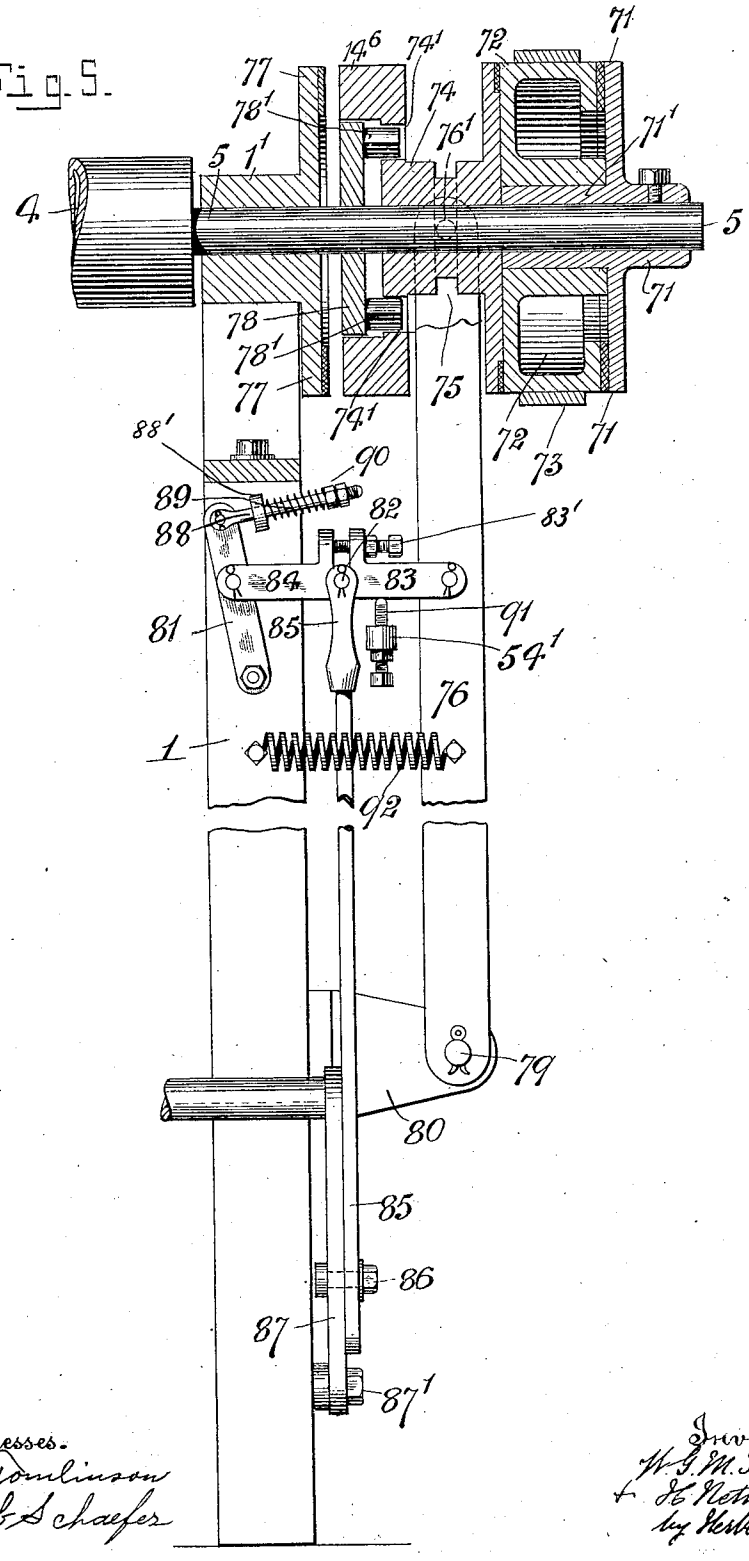
W. G. M. KEIGHLEY & H. NETHERWOOD.

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APPLICATION FILED MAY 21, 1906.

8 SHEETS—SHEET 3.

Fig. 5.



Witnesses.
C. E. Tomlinson
Jacob A. Shafer

Inventors.
W. G. M. Keighley
& H. Netherwood
by Herbert W. Jenner Atty.

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

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8 SHEETS—SHEET 4.

fig. 7.

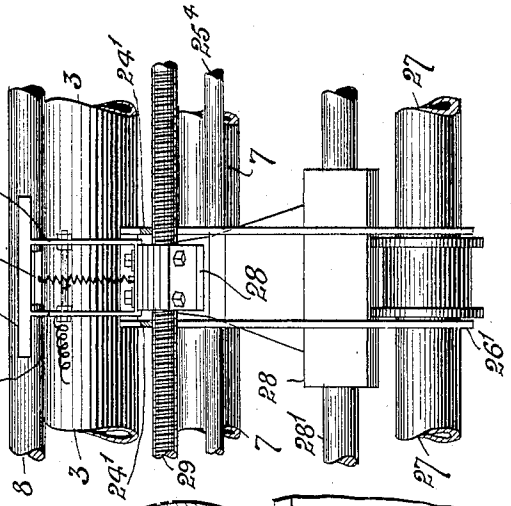
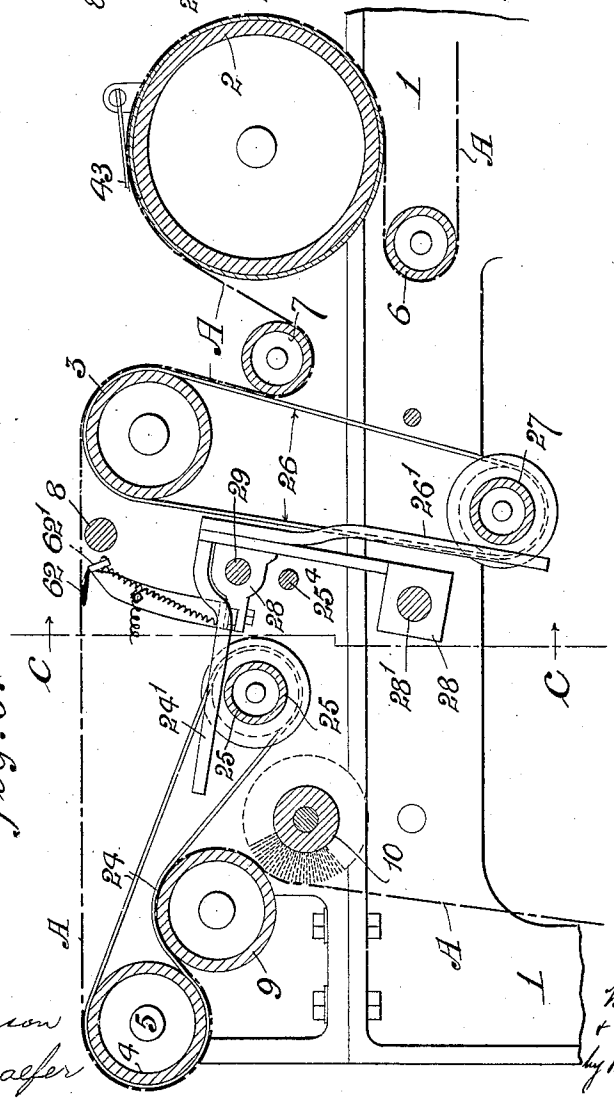


fig. 6.



Witnesses.
S. E. Dunlinson
Jacob Schaefer

Inventors.
W. G. M. Keighley
& H. Netherwood
by Herbert W. Jenner Atty

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

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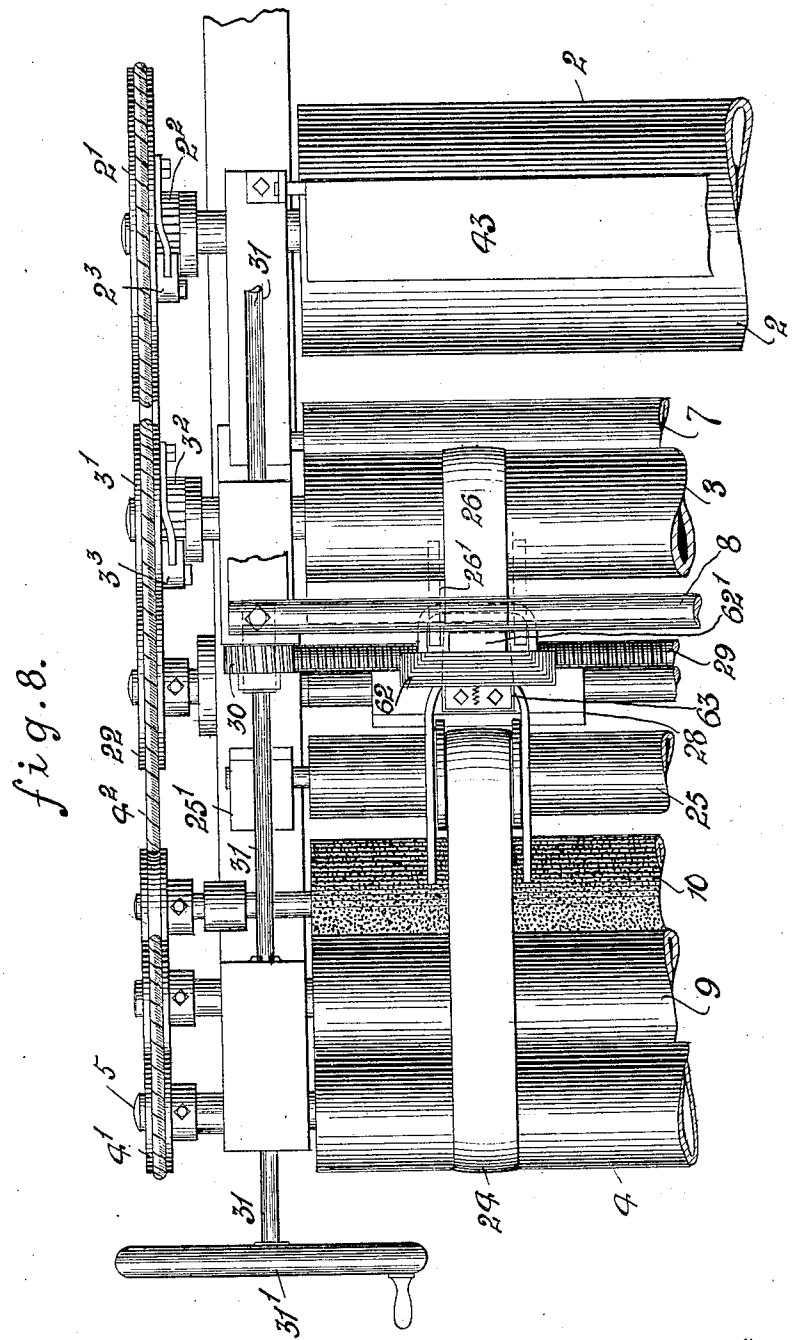


fig. 8.

Witnesses.
S. E. Dowlinson
Jacob Schaefer

Inventors.
W. G. M. Keighley
& H. Netherwood.
by Herbert W. Jenner
Atty

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8 SHEETS—SHEET 6.

fig. 20.

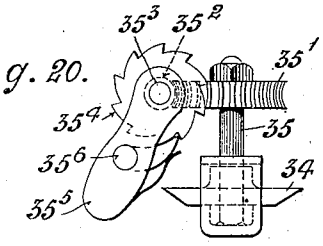


fig. 9.

fig. 11.

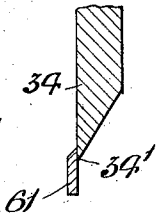


fig. 10.

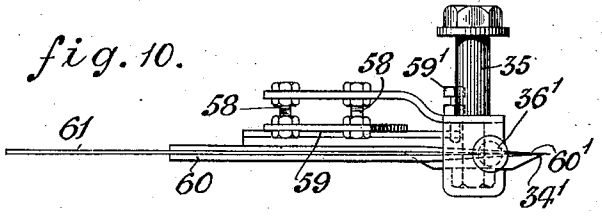
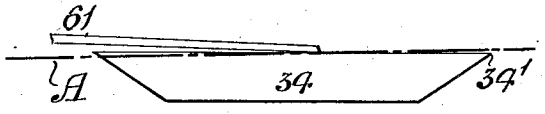


fig. 12.



Witnesses.
S. E. Dunlinson
Jacob Schaefer

Inventors.
W. G. M. Keighley
& H. Netherwood
by Herbert W. Jenner, atty.

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8 SHEETS—SHEET 7.

fig. 13.

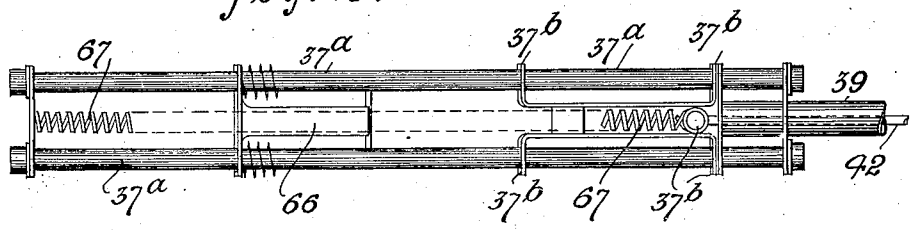


fig. 14.

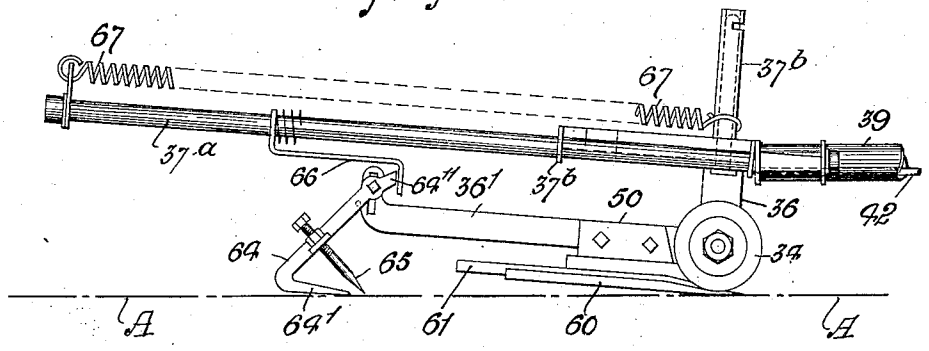
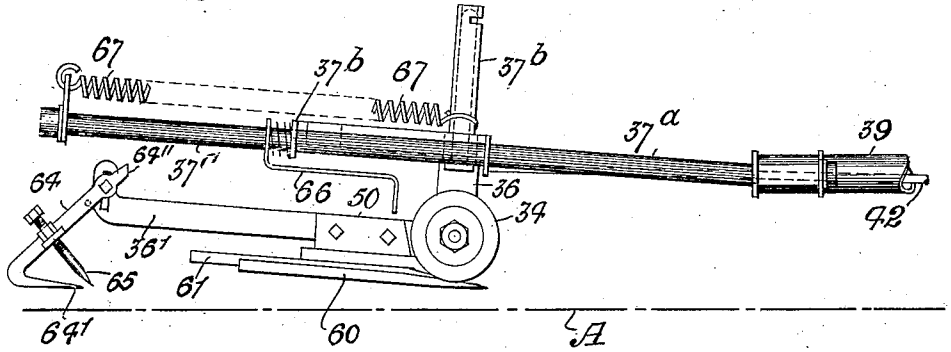


fig. 15.



Witnesses.
S. E. Tomlinson
Jacob Schaefer

Inventors.
W. G. M. Keighley
& H. Netherwood
by Herbert M. Jenner. atty.

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8 SHEETS—SHEET 8.

fig. 16.

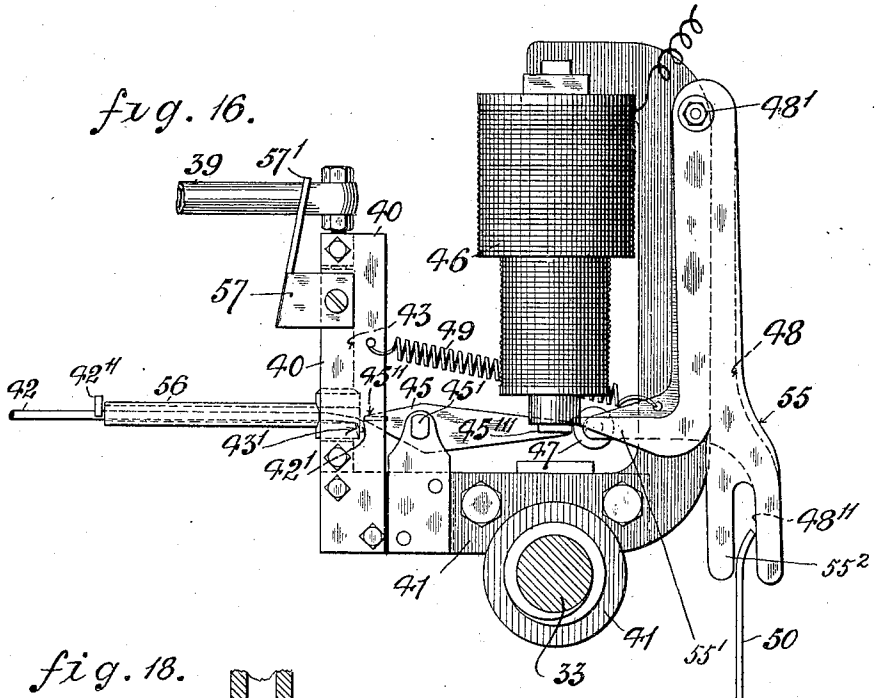


fig. 18.

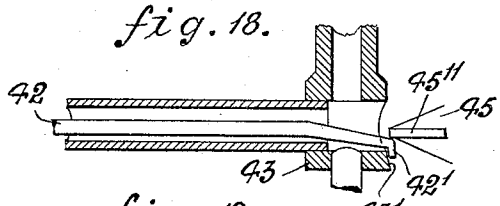


fig. 19.

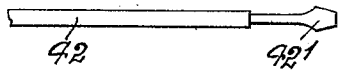


fig. 17.

Witnesses.
S. E. Tomlinson
Jacob Schaefer

Inventors.
W. G. M. Keighley
H. Netherwood
by Herbert W. Jenner atty.

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

UNITED STATES PATENT OFFICE.

WILLIAM GEORGE MACGREGOR KEIGHLEY AND HARRY NETHERWOOD, OF HUDDERSFIELD, ENGLAND.

MACHINE FOR CUTTING THE PILE OF WEFT PILE FABRICS.

No. 876,462. Specification of Letters Patent. Patented Jan. 14, 1908.

Application filed May 21, 1906. Serial No. 317,907.

To all whom it may concern:

Be it known that we, WILLIAM GEORGE MACGREGOR KEIGHLEY and HARRY NETHERWOOD, subjects of King Edward VII of Great Britain, and residents of Huddersfield, in the county of York, England, have invented certain new and useful Improvements in Machines for Cutting the Pile of Woolen, Cotton, Velvet, or Like Corded or Weft Pile Fabrics, of which the following description, in connection with the accompanying drawings, is a specification.

This invention relates to machines for cutting the pile of weft pile fabrics, such as cotton cords, velvets and the like, in which the cutting is effected longitudinally of the fabric.

The object of our invention is to provide improved cutting means so constructed and arranged that fiber cannot get between the acting surfaces, the cutter head or heads being mounted so as to be easily movable away from the fabric when the cutter guide pierces the body or foundation thereof, the downward displacement of the cutter head or guide in piercing or cutting through the foundation of the fabric bringing into operation means to effect the stoppage of the machine. Suitable means are provided for traversing the endless fabric through the machine and under the cutter; to give proper tension thereto; to adjust the positions of the parts for cutting each successive race, and to stop the machine after cutting each race.

Our invention comprises an improved cord or velvet cutting machine specially arranged and constructed for the employment therein of a circular cutter or cutters suitably mounted and acting in conjunction with a blade and guide to cut the pile as the fabric is traversed under the said cutter, the cutter being stationary during the cutting action but, especially for velvets and the like, receiving intermittent rotary movement to present a fresh cutting edge to the work at the commencement of each race, or at any given time, or the cutter may receive as low continuous rotary motion. When the cutter is rotated continuously, the motion must be so slow that the cutter is substantially stationary so far as its cutting action is concerned, but the very slow motion brings new cutting surfaces into operation. When the cutter cuts by being revolved it is not suitable for velvet, although satisfactory for knitted fabrics which are made with coarse yarn. Attempts have been made in this class of machine to cut cords or velvets with a stationary or rotary circular cutter, especially the latter, but, so far, unsuccessfully, by reason more particularly of the fiber collecting between the guide and cutter and preventing the proper cutting of the pile. By our improvements we have overcome the difficulties which have hitherto prevented the practical working of a machine of this circular cutter type and are enabled to cut cords or the like with a circular cutter as effectually a swith the ordinary stationary cutting knife, an intermittently rotating or very slowly revolving circular cutter being especially suitable for cutting velvets or like pile goods, as the cutting edge in contact with the pile is being periodically or constantly changed and therefore no injury is done to the pile as is the case when cut by the knife or cutter now employed, and which, by reason of having to be frequently re-sharpened, causes the cut pile to show a difference where the dull knife edge finishes and the re-sharpened edge commences, and affects the value of the fabric.

The various novel features of our invention will be fully described in the subjoined specification and particularly pointed out in the following claims:—

Figure 1 is a side elevation of a cord or velvet cutting machine embodying our improvements, the back brake mechanism, illustrated in Figs. 3 and 4, being omitted; Fig. 2 is elevation of a portion of the opposite side of the machine, showing the rope drive, and the mechanism for operating the screws to traverse the cutter head and the tension device simultaneously transversely across the machine; Fig. 3 is a side elevation of the back brake mechanism; Fig. 4 is an end view of same, looking in the direction of arrow *a* Fig. 3; Fig. 5 is front end elevation, partly in section, looking in the direction of arrow *b*, Fig. 1, of the friction driving mechanism by which motion is imparted to the machine, and which also comprises the front tension roller brake; Fig. 6 is a longitudinal section of the front end of the machine, showing the course taken by the fabric, and also the device for moving the tension belts, and the contact device for operating the electric stop motion when the

guide penetrates through the fabric; Fig. 7 is a front view of these last mentioned parts taken in the form of a section on the line *c*, *c* Fig. 6, looking in the direction of the arrows; Fig. 8 is a plan view of the parts shown in Fig. 6, with the driving arrangements for same; Fig. 9 is a side elevation of the tilting cutter head, cutter and parts; Fig. 10 is a plan view of the cutter plate showing the cutter and parts; Fig. 11 is a part sectional elevation of the circular cutter and knife, showing the cutting edges; Fig. 12 is an enlarged plan view of the circular cutter and knife; Fig. 13 is plan view of a modified form of cutter head; Fig. 14 is a side elevation of Fig. 13 showing the cutter in its operative position; Fig. 15 is similar elevation to Fig. 14, but shows the cutter in inoperative position; Fig. 16 is a side elevation of the mechanism for stopping the machine on the cutter being removed from the operative position or the guide piercing the fabric; Fig. 17 is a plan view of Fig. 16; Figs. 18 and 19 are detached details showing the catch on the end of the stop wire attached to the tilting cutter head, and Fig. 20 is plan view of the circular cutter showing one embodiment of means for intermittently rotating the cutter; Figs. 5 to 20 are on an enlarged scale.

Referring to the drawings, 1 represents the framework of the machine, 2 the delivery roller, 3 the feed roller, and 4 the tension roller, which is positively driven by means of the main shaft 5 on which it is mounted, and to which motion is imparted by means of the friction driving mechanism to be hereinafter described. The fabric A which is made endless, is guided under a roller 6 loosely mounted in bearings in the framework to the roller 2 and after passing over the said roller it is conducted under a roller 7 similar to the roller 6 and from thence over the feed roller 3. After leaving the feed roller it passes over a bar 8, which is placed just in front of the cutter and steadies the fabric while the cutter is operating. From the bar 8 the pile fabric, a race of the pile of which has now been cut, passes over the positively driven tension roller 4, and thence over a second tension roller 9 when it is acted upon by the revolving brush 10. The brush 10 directs it on to the inclined board 11, which delivers it on to the endless belts 13 passing around rollers 14 and 15 at the front and rear of the machine respectively, the belts 13 resting between these two rollers, on revoluble rollers 17 supported at each side of the machine in a frame 17′. Motion is imparted to the roller 14, to cause the belts 13 to traverse the fabric towards the rear of the machine, by means of bevel gears 14′, shaft 12^2 and worm gears 14^3, the worm of the said gear being driven by a belt 14^4 passing around a pulley or disk 14^5 fast to the said worm, and around a pulley 14^6 forming part of the friction driving mechanism. Instead of the arrangement of endless belts and rollers just described, any suitable form of scray or traveling apron or conveyer may be employed to traverse the fabric underneath the machine. After leaving the endless belts and rollers, or the scray, the folds of fabric are caught between the self-adjusting drum or cylinder 18 and a series of ropes or belts 19 passing around the roller 15 intermediate the belts 13 and loosely mounted guide rollers 20. This causes the folds of the fabric to be carried to the top of the drum 18 and from thence it is conducted over and under guide rollers 21 and the roller 6 back to the feed roller 2. The inclined board 11 is pivoted at 11′ to enable it to be turned over to direct the fabric out of the machine instead of on to the scray.

Having thus described the course of the fabric through the machine, we will now describe the means for causing the fabric to be suitably tightened or put under tension longitudinally in order that the cutter may act. This portion of our invention is shown most clearly in Figs. 2, 5, 6 and 7. The fabric is stretched longitudinally between the delivery and feed rollers 2, 3, and the tension roller 4, by means of a brake drive comprising the grooved pulleys 3′ and 2′ respectively, loose on the shafts of the feed and delivery rollers and around which passes a rope 4^2 driven from a pulley 4′ on the tension roller shaft. The rollers 3 and 2 are provided with ratchet wheels 3^2 and 2^2 into engagement with which are pressed, by means of springs, the pawls 3^3 and 2^3 pivoted on the backs of the grooved pulleys 3′ and 3^2, to rotatively connect the rollers and pulleys in a forward direction so that said rollers cannot rotate at a quicker speed than the pulleys are driven at. So long, therefore, as there is the required amount of tension on the fabric, the feed and delivery rollers rotate with the grooved pulleys on their respective shafts, but should the tension become abnormal, as when the fabric is held or retarded in any way and fails to rotate the rollers 3, 2, at the same speed as the pulleys 3′, 2′, the latter are free to revolve independently of the rollers, the pawls 3^3, 2^3, riding harmlessly over the teeth of the ratchet wheels until the requisite tension is again reached, when the pull on the fabric increases the speed of rotation of the said rollers until locked to the pulleys by engagement of the pawls with a tooth of the respective ratchet wheels, whereupon the rollers and pulleys again rotate together at the same speed.

A carrier pulley 22 and tension pulley 23 are provided to keep the rope 4^2 in suitable contact with the surfaces of the respective pulleys. The rope 4^2 also drives the roller 9 and brush 10. In addition to putting ten-

sion on the fabric by means of the brake drive just described, we put extra longitudinal tension on the fabric just at the particular point in its width where the cutter is operating. For this purpose, we provide a tension belt 24 see Figs. 6 and 8 passing around the tension roller 4 and around a supplementary roller 25, and another tension belt 26 passing around the feed roller 3 and around a supplementary roller 27. The belts 24 and 26 are arranged in line with the cutter to raise the portion of fabric on which the cutter is operating slightly above the portion on either side thereof and thus put extra tension on to that particular portion. The belts 24 and 26 touch the fabric only at distant points, and do not extend for any distance in contact with it. When a single belt is used which extends longitudinally in contact with the fabric and under the pile cutting devices its action is not satisfactory. It is also found that a stationary support over which the fabric is dragged injures the back of the fabric. As the belts 24 and 26 pass over the rollers 3 and 4, which are sometimes revolved at slightly different speeds, each belt partakes of the exact speed of the roller to which it pertains, and the fabric is not dragged over any stationary support. The belts are moved transversely across the machine in unison with the cutter mechanism by means of the belt forks 24′ and 26′ (Figs. 6, 7 and 8) carried by a bracket 28 having a nut formed therein which works on a screw 29 rotated by means of worm and worm wheel 30 from the shaft 31 by means of which, and worm gear 32 at the rear end of the machine (see Fig. 2), the screw 33 for traversing the cutter mechanism is operated. The lower end of the bracket 28 is supported and slides on a transverse rod 28′. The supplementary rollers 25 and 27 are journaled respectively at either side of the machine in blocks 25′ and 27′ mounted on screws 25″ and 27″ (Fig. 1). The position of the blocks 25′ and 27′ can be adjusted to tighten or slacken the respective belts by means of hand wheels 25^3 and 27^3 (see Fig. 2) operating through transverse shafts 25^4 and 27^4 and worm gears at either side of the machine to rotate the screws 25″ or 27″ in one direction or the other.

The cutter comprises a circular disk 34 having a cutting edge 34′ mounted on a shaft or spindle 35 carried by a plate 36 having a projecting stud or spindle 36′ which is secured in the jaws 37′ formed on the tilting head 37 by means of the spring fingers 38, which permit of the cutter being removed from the machine for sharpening or other purposes and also admit of the cutter and parts swiveling about said stud or spindle 36′, whereby they will follow the race accurately and give or turn to any slight deviation in the race.

The tilting head 37 is pivoted at 37″ to a projection 39′ from the end of the radial arm 39 whose opposite end is pivoted on the vertical projection 40 carried by the bracket or pedestal 41 mounted on the screw 33 before mentioned. A bowl 39″ carried by the arm 39 rides on the bar 39^3 which is supported by brackets at either side of the machine and acts to steady the said arm 39. Rotation of the hand wheel 31′ on the shaft 31 through the worm gears 32 and 33 thus causes the bracket or pedestal 41 carrying the cutter arm to be moved transversely across the machine, to move the cutter from one race to the next succeeding race, and through the worm and wheel 30 and screw 29, causes the tension belts 24 and 26 to be moved in a corresponding manner. The hand wheel 31 is operated after each race has been cut to move the cutter and tension belts a short distance transversely to enable a fresh race to be cut. To the lower end of the tilting head 37 is secured one end of a wire or rod 42 whose opposite end is provided with a catch 42′ (see Figs. 16, 18 and 19) adapted to engage a shoulder 43′ on the support 43 fixed to the projection 40. The engagement of the catch 42′ on the wire or rod 42, with the shoulder 43′, holds the cutter in position for cutting, that is to say, in the position shown in full line Fig. 9, and the release of such catch causes the cutter head by means of the spring 44 to be tilted to lift the cutter clear of the fabric, that is to say, into the position shown in dotted line in Fig. 9.

The catch 42′ is held in engagement with the shoulder 43′ by means of a lever 45 pivoted at 45′ in bearings carried by the bracket 41, one end of the said lever being provided with a plate 45″ adapted to rest upon the upper side of the catch 42′, and the other end of the said lever being provided with a cross piece 45^3 forming the armature of an electro magnet 46.

47 is a bowl carried by a lever 48 pivoted at 48′ to the vertical arm of the bracket 41, the bowl engaging the rear end of lever 45 and being held against same under the tension of the spring 49. 50 is a plate extending transversely of the machine and secured to a rock bar 50′ to one outer end which is also secured an arm 51 (Fig. 1) having connected thereto a link 52 which is pivotally connected to a link 53 pivotally attached to the stop lever 54 having an extension 54′ and mounted at 54^2 on a stud on the side frame of the machine. A lever 55 pivoted on the boss 48^3 of the lever 48 is forked at its lower end 55^2 to loosely straddle the plate 50 and has a forwardly projecting toe 55′ which normally rests on the edge of the armature 45^3. This said lever 55 is used solely to operate the stop motion by hand, the inclined projection 55′, when the lever 55 or plate 50 is drawn forward, separating the armature from the magnet and actuating the stop lever

through the intermediate connections. The forked end 55^2 enables the lever 55 to oscillate the plate 50 in each direction, whereas the lever 48 arranged behind the lever 55 can only operate the plate 50 in one direction as it has only a single end portion to the right of the plate 50 in Fig. 16. When the plate 50 is operated to move the lever 55 to the left to separate the armature from the magnet, the lever 48 is not operated by the plate 50, but is moved to the left by its spring 49 when the armature has been moved downward sufficiently to make room for the roller 47.

A stop piece 42″ on the rod or wire 42 is provided to engage with the end of a short tube 56 for preventing the rod or wire from being pushed too far rearwardly to carry the catch beyond the shoulder 43′. A bracket 57 having a forked end 57′ embracing the radial arm 39, prevents the said arm from swinging too far to either side.

Attached by adjusting screws 58 to the plate 36 carrying the circular cutter 34, is another plate 59 to which is attached a guide 60, the point 60′ of which is shaped and adapted to enter the race slightly in front of the cutter 34. The point 60′ is formed by beveling the top and sides of the loop-guide 60 at one end portion thereof. Resting in a slot in the guide 60 is a fixed knife 61 having its upper and forward edges ground away at an angle, as shown plainly at Figs. 11 and 12. The plate 59 carrying the guide and the fixed knife is adjusted to bring the said knife close up to the flat side of the circular cutter in about the positions shown by Figs. 11 and 12, so rhat the meeting edges of the fixed knife and cicular cutter form an angle into which the pile passes as the fabric is carried along. The coöperation of the cutting edges of the circular cutter and the fixed knife, causes the pile to be cut very cleanly, and there is no liability of the cutter becoming choked whit fiber and failing to act. A set screw 59′ keeps the knife 61 in contact with the cutter 34. Should the cutter guide 60 penetrate through the above, it contacts with one or other of a series of wires 62 secured to a plate 62′ pivoted on a frame 63 carried by the bracket 28. These wires are in circuit with the electro magnet 46 around the cores of which two separate wires are coiled, one over the other in opposite directions, a weak current normally passing through one of the wires to energize the magnet to attract and hold the armature 45^3.

When the cutter guide 60 contacts with one of the wires of the series of wires 62, a circuit is thus completed and a stronger current then passes through the second wire which momentarily demagnetizes the cores of the magnet, whereupon the lever 45 is released and the heavier rear end thereof rocks it upon its fulcrum and swings the front end thereof upward away from and clear of the catch 42′, and the rear end clear of the bowl 47 on the lever 48. Immediately this takes place, the lever 48 is pulled forwards by the spring 49, the bowl 47 on said lever riding up the inclined edge of the lever 45 and holding the opposite end of the lever clear of the catch 42′. The forward movement of the lever 48, through the projecting finger 48″ thereon, causes the plate 50 to rock the bar 50′ carrying the same, in its bearings, and through the connections 51, 52, 53 (Fig. 1), to actuate the stop lever 54 to stop the machine. A bell (not shown) in circuit with the wires 62 and electro magnet 46, is rung when the guide pierces through the fabric.

To replace the catch 42′ into engagement with the shoulder 43′, the wire 42 is pushed rearwardly by hand until the catch is over the said shoulder, when the stop lever 54 is pulled forwards to cause the plate 50 to rock the lever 48 in the opposite direction to return it to its normal position. This frees the lever 45 which is thereupon attracted by the magnet and rocks the said lever 45 so as to cause the plate 45″ to bear upon the upper side of the catch 42′ and hold it in engagement with the shoulder 43′ to keep the cutter in operative position.

In the modified form of cutter head shown in Figs. 13, 14 and 15, a sliding motion is employed instead of a tilting motion to carry the cutter clear of the fabric in the event of the guide piercing the backing of the fabric, or it being necessary to withdraw the knife for any purpose. In the arrangement shown, the cutter head comprises two rods or bars 37^a on which a bearer 37^b carrying the cutter plate is adapted to slide. The rods or bars are set at an angle to the plane of the fabric as shown in Figs. 14 and 15, so as to raise the cutter clear of the fabric when the bearer is in its rear or inoperative position. The cutter plate 36 is provided with a forwardly projecting extension 36′ to which is pivoted a lever 64 whose lower end is fashioned to form a guide 64′ adapted to travel in the cut race of the fabric and rest on the backing of the same. When the cutter guide misses a portion of the pile or makes a "slip", the adjustable pin 65 carried by the lever 64 will catch against the uncut pile of the race of the fabric and rock the said lever 64 on its pivot. This movement of the lever 64 causes the upper end 64″ thereof to abut against the plate 66 fast to the rods or bars 37^a, and the pressure of the traveling fabric causes the wire 42 fast to the bearer 37^b to be operated to release a catch similar to that described in connection with the tilting cutter head. As soon as the catch is released, the spring 67 draws the bearer, and with it the cutter, rapidly into the position shown in Fig. 15,

that is to say, clear of the fabric. The wire 42 in this case is carried inside the radial arm 39.

In order to give intermittent rotary motion to the circular cutter 34, we secure on the axis 35 thereof a worm wheel 35′ (see Fig. 20), with which meshes a worm 35^2 fast on a vertical shaft 35^3 supported in bearings on a convenient part of the tilting head and carrying at its upper end a ratchet wheel 35^4. On the shaft 35^3 is pivoted a lever 35^5 carrying a pawl 35^6 adapted to engage the ratchet wheel. The attendant on moving the tilting head and parts into operative position, presses with the finger or thumb against the free end of lever 35^5 and moves it partially around, the pawl 35^6 engaging a tooth of the ratchet wheel and turning it partially round, whereby motion is transmitted through shaft 35^3, worm 35^2, worm wheel 35′ and the shaft or spindle 35 to partly rotate the circular cutter 34 and present a fresh cutting edge to the work, the intermittent rotary movement of the cutter avoiding stoppage for re-sharpening and preventing any marking or difference of cut of the pile.

Referring more particularly to Fig. 5, the friction drive mechanism by which motion is conveyed to the shaft 5, comprises a friction disk 71 fast on the shaft 5 and having a sleeve 71′ on which is loosely mounted a pulley 72 driven by belt 73 from any convenient source of power. Slidable longitudinally of the shaft 5 is a sleeve 74 having an annular groove 75 therein to receive studs 76′ projecting from the upper forked end of a vertical actuating lever 76. Fast on the grooved sleeve 74 is a pulley 14^6 from which the endless belts or scray for traversing the fabric underneath the machine, are or is driven, as previously described. 77 represents a friction disk fast to or forming part of the pedestal 1′ in which the shaft 5 is journaled. 78 represents a disk or clutch member fast to the shaft 5 to rotate therewith, but slidable longitudinally on a spline, and provided with projections or studs 78′ extending into openings 74′ in the web of the pulley 74 to clutch the said pulley and the sleeve 74 to the shaft 5. The lever 76 is pivoted at 79 to a bracket 80 fast to the machine frame. Pivoted to one another at 82, and at their other ends to the lever 76 and to the lever 81 respectively, are a pair of toggle levers 83, 84. On the pivot stud 82 of the levers 83, 84, is pivoted the upper end of a vertical rod or bar 85 having a slot at its lower end through which passes a stud 86 secured to a counter-balanced treadle lever 87 pivoted to the frame at 87′. The toggle levers 83 and 84 have stop lugs at their meeting ends, and 83′ is an adjusting screw which engages with the said lugs. This screw prevents the toggle levers from folding downward, but permits them to be folded upward when the rod 85 is pushed up. The toggle levers are pivoted together and to the said rod at their meeting ends in any approved manner. The lever 81 has pivotally connected to its upper end a rod 88, having a spring 89 confined thereon by adjusting nuts 90, which permit of the pressure of the spring 89 being adjusted to compensate for wear of the friction disks 71 and 77. 88′ is a guide lug which projects from the frame 1. The rod 88 slides in this lug, and the spring 89 is arranged between this lug and the nuts 90. In the position of the parts shown in Fig. 5, the sleeve 74 is pressing the face of the loose pulley 72 against the friction disk 71, and thus causing the motion of the said pulley to be transmitted to the shaft 5 to drive the same. When the stop lever 54 is actuated, to stop the machine, the screw 91, passing through the end 54′ of the said stop lever, comes into contact with the underside of the lever 83 and causes the vertical rod 85 to be raised and the levers 83, 84, to swing upward on their pivots and thus enable the spring 92 to move the lever 76 to the left. This withdraws the sleeve 74 from pressing the loose pulley 72 into engagement with the friction disk 71 and causes the face of the pulley 14^6, forming part of said sleeve to be pressed against the fixed friction disk 77 and act as a brake for the tension roller 4. On the stop lever 54 being returned to normal position and the treadle lever 87 depressed, the vertical rod 85 is drawn downwards and the action of the toggle levers 83, 84, causes the lever 76 to move to the right or into the position shown in Fig. 5, to restart the machine. In order to stop the machine at the end of each race, a pivoted frame or plate 93 is located over the delivery roller 2. The passage of the thickened portion of the fabric caused by the joining of the ends of the same, under this plate 93, causes it to be oscillated. By means of the finger or lever 94 on the end of the shaft supporting the said plate, and a collar 53′ fast on the connecting rod 53, this movement is transmitted to the stop lever 54 to stop the machine.

The mechanism for braking the delivery and feed rollers (see Figs. 3 and 4) comprises brake drums 95 and 96, respectively, fast on the axes of the said rollers, onto which a brake block 97 is adapted to be pressed by means of a brake lever 98 pivoted to the frame 1 by a pin 98′. The brake block is shown as being in contact with the brake drums. The free end of the brake lever 98 is raised to remove the brake block from engagement with the drums 95 and 96 by means of a vertical rod 99 actuated from the treadle lever 87 and the brake lever is maintained in its raised position by means of a pivoted latch 100 adapted to swing under the free end thereof. On the lever 76 being operated to stop the machine, the latch 100 is removed from under the end of the brake

lever and the spring 101 pulls down the free end of the said lever 98 and applies the brake block 97.

For cords, velvets, or the like, woven in two or more widths, a cutter and parts can be employed for operating on each width, or, for cutting cords alone, two or more cutters may be employed for each width of fabric.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. In a pile cutting machine, the combination, with mechanism for traversing the pile fabric, of a cutter provided with a curved cutting-edge and supported over the said fabric, a pointed loop-guide provided with a longitudinal groove, a knife arranged in the said groove and provided with a straight cutting-edge which bears against the said curved cutting-edge, and means for holding the said cutter and the said knife stationary while the said fabric is in motion and in contact with their said cutting-edges.

2. In a pile cutting machine, the combination, with mechanism for traversing the pile fabric, of a circular cutter supported over the fabric, a loop-guide having a beveled top portion terminating in a point and provided with a longitudinal groove and arranged at an angle to the plane of the fabric, means for adjusting the position of the said guide in a vertical plane, and a knife-blade resting in the said groove with its cutting-edge bearing against the cutting-edge of the said cutter.

3. In a pile cutting machine, the combination, with mechanism for traversing the pile fabric, of a cutter provided with a curved cutting-edge and supported over the said fabric, means for holding the said cutter stationary while the said fabric is in contact with it, adjusting devices for moving the said cutter circumferentially at will, a loop-guide, and a stationary knife-blade carried by the said loop-guide and co-acting with the said cutter to cut the loops of the said fabric.

4. In a pile cutting machine, the combination, with mechanism for traversing the pile fabric, of a support for the cutter mechanism, a head pivoted to the said support, means for turning the said head automatically to the rear on its pivot, a circular cutter carried by the said head, a loop-guide having a beveled top portion terminating in a point and provided with a longitudinal groove, a knife-blade resting in the said groove with its cutting-edge bearing against the cutting-edge of the said blade, and catch mechanism which normally holds the said loop-guide at an angle to the plane of the fabric with its point in a position to enter its loops.

5. In a pile cutting machine, the combination, with mechanism for traversing the pile fabric, of a support for the cutter mechanism, a head pivoted to the said support, means for turning the said head automatically to the rear on its pivot, a circular cutter carried by the said head, a loop-guide having a beveled top portion terminating in a point and provided with a longitudinal groove, a knife-blade resting in the said groove with its cutting-edge bearing against the cutting-edge of the said blade, catch mechanism which normally holds the said loop-guide at an angle to the plane of the fabric with its point in a position to enter its loops, and trip mechanism for automatically releasing the said catch mechanism when the said guide penetrates the fabric.

6. In a pile cutting machine, the combination, with a tension roller provided with means for revolving it, and a feed roller journaled parallel to the said tension roller, said rollers supporting the pile fabric between them, of two separate belts passing over the said rollers respectively and increasing the tension of a portion of the said fabric, separate supports for holding the said belts extended, and traversing mechanism for moving the two said belts simultaneously under the fabric crosswise of its direction of travel.

7. In a pile cutting machine, the combination, with mechanism for traversing the pile fabric, and cutting mechanism for severing the loops of the fabric, of a catch which normally holds the said cutting mechanism in its operative position, a pivoted lever provided with an armature and controlling the said catch, an electromagnet co-acting with the said armature, automatic contact mechanism which causes the release of the said armature and catch when a part of the said cutting mechanism penetrates the fabric, and lever mechanism also controlled by the said lever and armature and operating to stop the machine when the said catch is released.

8. In a machine of the class described, the combination, with a circular cutter, a fixed knife coöperating therewith, and a cutter guide, of the means for intermittently rotating the circular cutter, comprising a worm wheel fast on the axis of the cutter, a worm mounted on a vertical shaft and meshing with said worm wheel, a ratchet fast on said vertical shaft, and a lever or arm carrying a pawl held by spring in gear with the ratchet wheel to impart thereto at each movement of the arm, a step by step rotary movement, substantially as shown and described.

9. In a machine of the class described, the combination, with a transversely movable radial arm pivoted on a bracket movably mounted on a transverse screw, a cutter head pivoted on the radial arm, and a circular cutter with coöperating fixed knife and cutter guide carried by the cutter head, of a two armed pivoted catch lever having on one arm a cross piece forming an armature and provided on the other arm with a plate normally held in engagement with the catch

on the rod or connection pivotally attached to the cutter head, an electromagnet for operating the said armature, a series of wires in circuit with the electro magnet and supported by a pivoted frame beneath the fabric, the cutter guide being adapted to contact with one of said wires if it penetrates through the fabric and complete a circuit to demagnetize the cores of the magnet and release the two armed lever, a lever pivoted to the bracket carrying the radial arm, a spring to swing the lever forwardly on release of the two armed lever, a bowl on said lever to engage and ride over an inclined edge on the two armed lever when released, a transverse plate fast on a rock bar and adapted to be engaged and rocked by the lever when actuated by the spring, and connections between the said transverse plate or rock bar and the stop lever of the machine to actuate the lever to stop the machine, substantially as shown and described.

10. In a machine of the class described, the combination with the circular cutter and coöperating parts, a radial arm carrying a movable cutter head, a cutter plate detachably connected to the cutter head and carrying the cutter guide and fixed knife, a catch rod or connection pivotally attached to the cutter head, a two armed lever normally attracted by an electro magnet and held in position to hold the catch on the catch rod in engagement with the shoulder on the radial arm to maintain the cutter in operative position, and connections intermediate the two armed lever and a stop rod, of a series of wires supported beneath the fabric, the cutter guide, if it penetrates through the fabric, being adapted to contact with one of the said wires and complete an electric circuit and release the two armed lever, a pivoted lever, a rock bar or shaft, a plate secured thereto and engaged by the said pivoted lever, and intermediate connections between the rock bar and the stop lever to actuate the stop lever to stop the machine on the cutter guide penetrating through the fabric.

In testimony whereof we affix our signatures in the presence of two witnesses.

WILLIAM GEORGE MACGREGOR KEIGHLEY.
HARRY NETHERWOOD.

Witnesses:
THOMAS H. HIRST,
JOHN R. SUALAM.