March 25, 1969 D. S. ALTERMAN ET AL 3,434,508

APPARATUS FOR WEAVING STIFF FILAMENTARY MATERIAL

Filed Oct. 18, 1967

Sheet 1 of 5

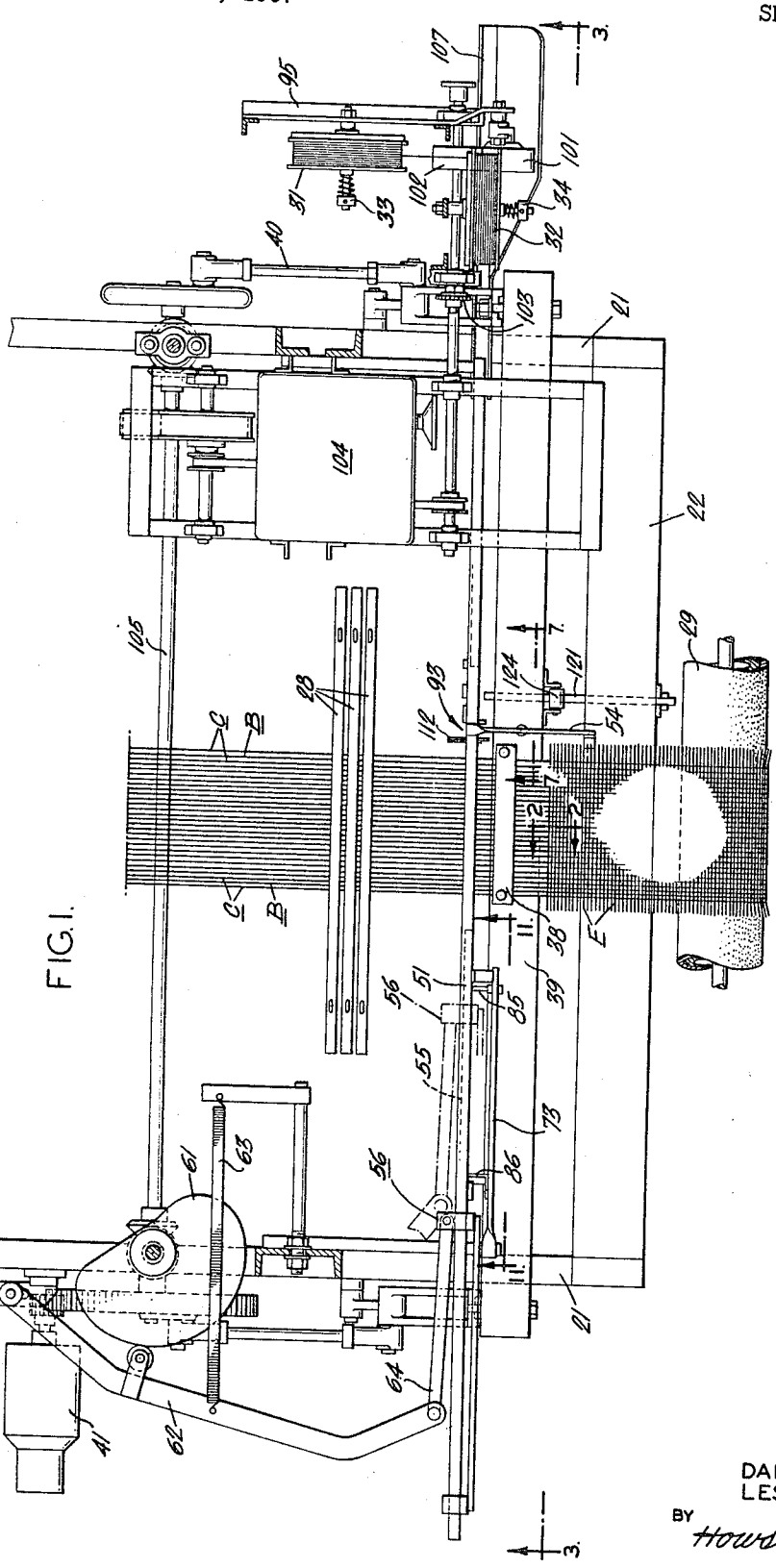


FIG. 1.

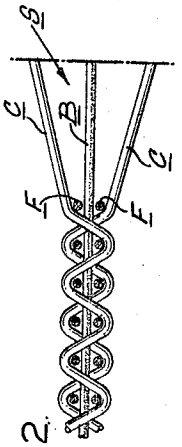


FIG. 2.

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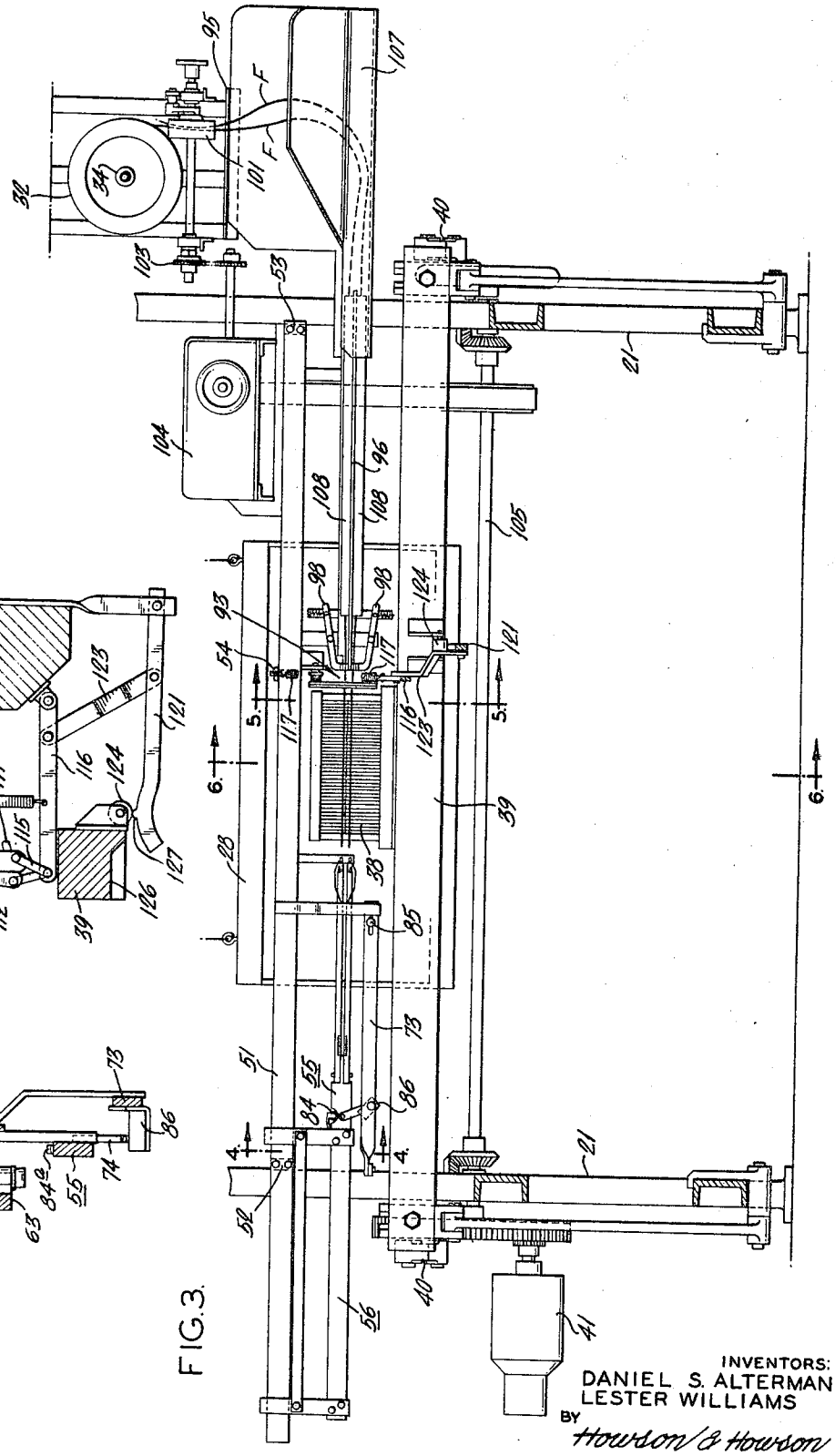


FIG. 3.

FIG. 5.

FIG. 4.

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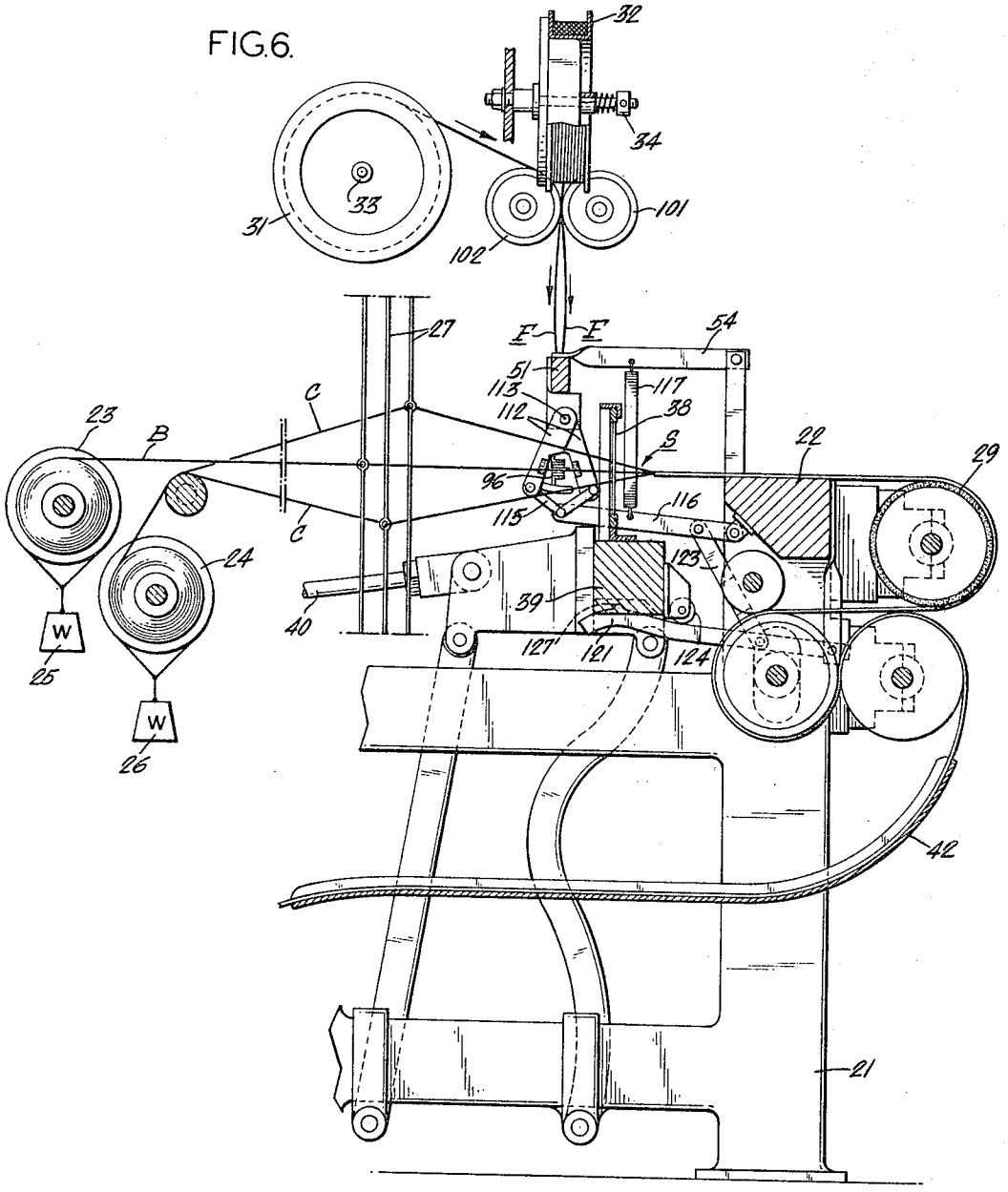
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FIG.6.



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APPARATUS FOR WEAVING STIFF FILAMENTARY MATERIAL

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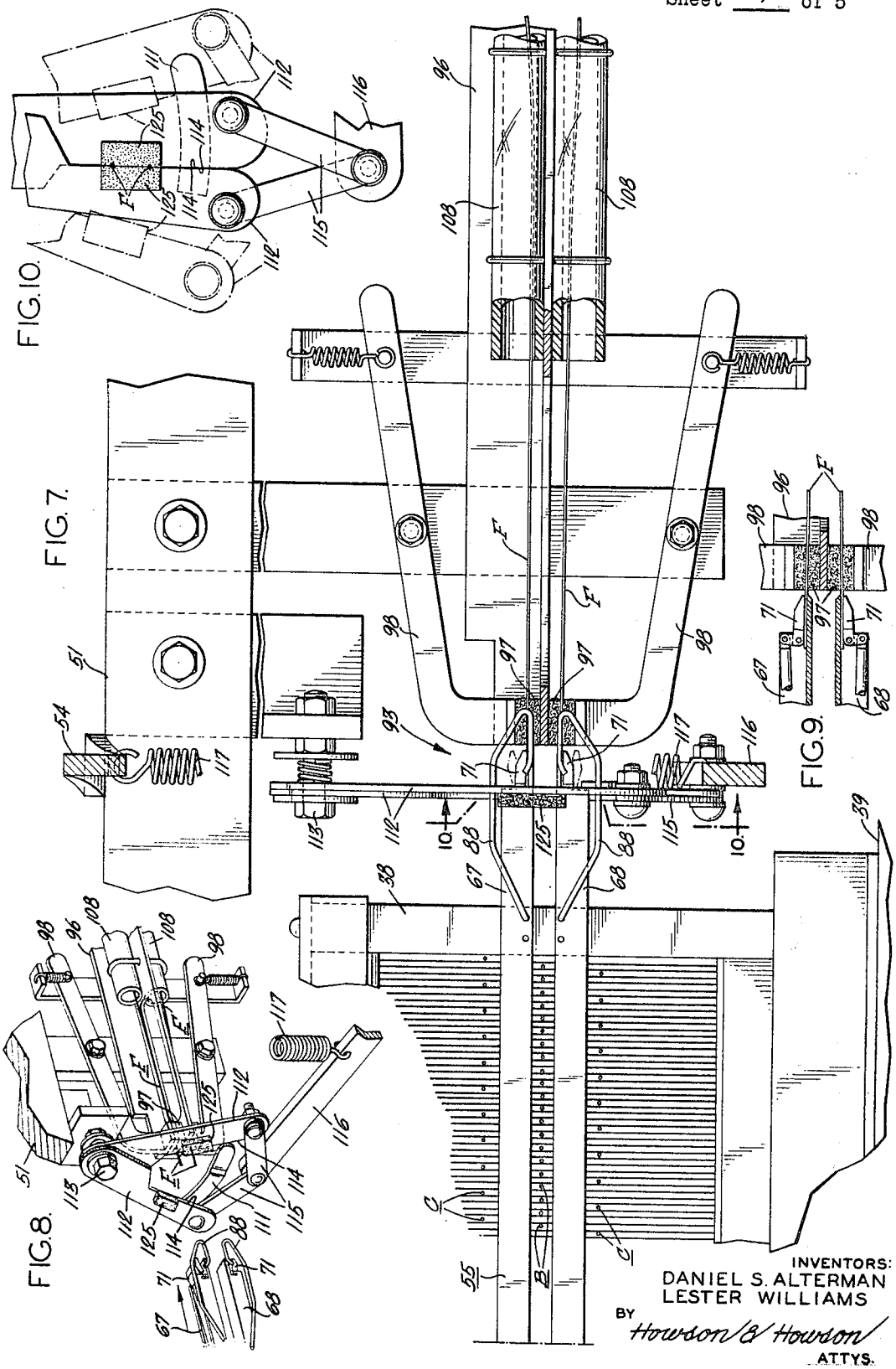


FIG. 10.

FIG. 7.

FIG. 9.

FIG. 8.

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APPARATUS FOR WEAVING STIFF FILAMENTARY MATERIAL

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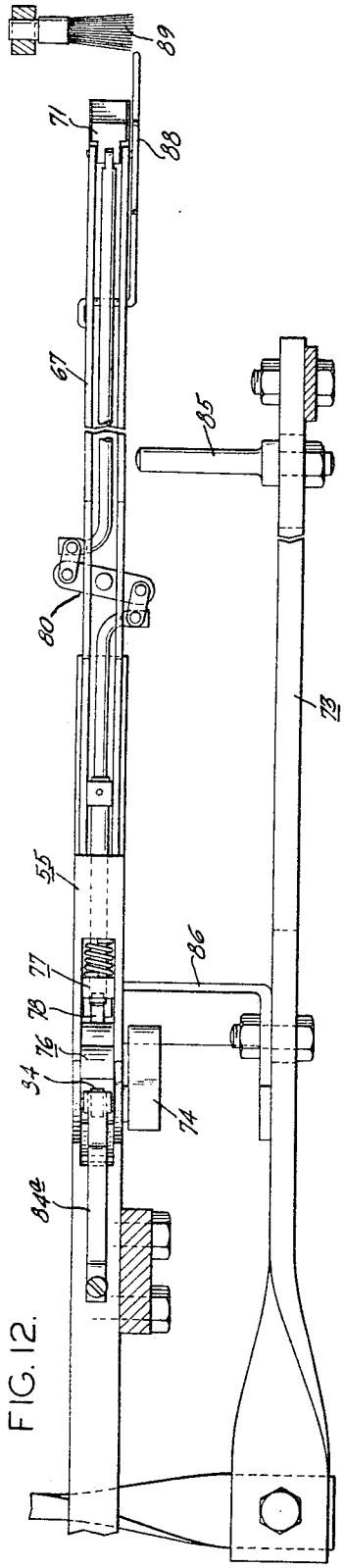


FIG. 12.

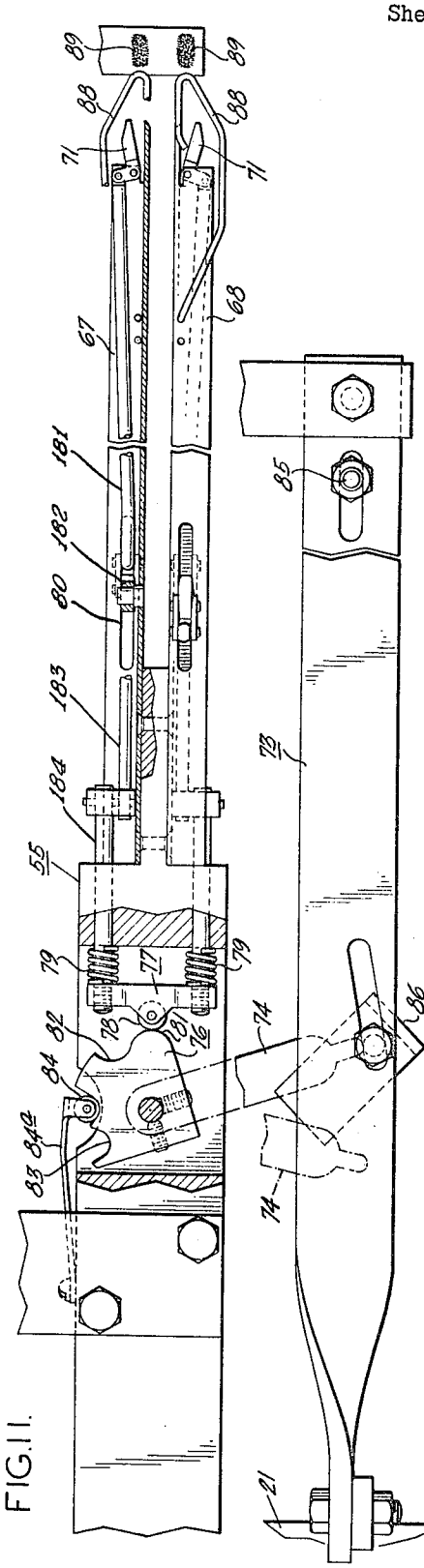


FIG. 11.

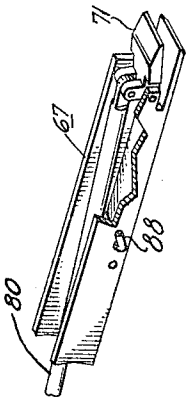


FIG. 14.

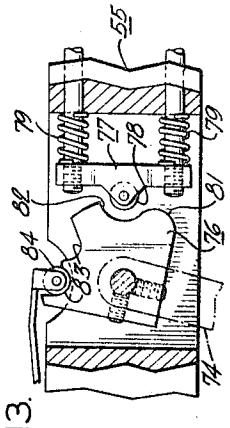


FIG. 13.

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United States Patent Office 3,434,508 Patented Mar. 25, 1969

3,434,508

APPARATUS FOR WEAVING STIFF FILAMENTARY MATERIAL

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Int. Cl. D03d 47/14
U.S. Cl. 139—130 19 Claims

ABSTRACT OF THE DISCLOSURE

A loom for weaving stiff filamentary material in the weft or filling in which the filling strands are pulled through the shed of the loom from a stationary supply mounted on one side of the loom and including a positive feed means. The puller mechanism is mounted on the other side of the loom and is projected through the shed and withdrawn after gripping the free ends of the filling material. The gripping mechanism is actuated to grip the filling at the extended limit position of the puller and is actuated to release the filling near the retracted limit position of the puller. A severing mechanism is provided to sever the inserted filling strand from the supply prior to the beat-up of the loom. The severing mechanism severs the stiff filamentary material by impact shattering.

The present invention relates to apparatus for weaving stiff filamentary material in the filling of a fabric, and has particular application to weaving a fabric having a filling composed of a tungsten filament core having boron deposited thereon known in the trade as boron filaments.

Boron filaments and similar stiff filamentary material is characterized by an extremely high tensile strength, but is also characterized by the fact that it is extremely brittle and may not be bent on a radius of less than seven or eight inches without fracture. Furthermore, if the filament is subjected to an impact, it shatters. There is little difficulty in weaving boron filaments into the warp of a fabric on conventional looms, but because of the physical characteristics of the filament and the limitations of conventional looms, it is impossible to weave boron filaments into fabric as the filling. While boron warp fabrics have many desirable end uses, the fact that the boron is confined to the warp produces limitations which detract from the utility of the fabric.

Attempts to weave boron filaments on wire cloth looms have not been successful because of the extremely fine denier of the boron filament which makes it impossible to use conventional wire-handling devices and furthermore the brittleness of the boron filament and its tendency to shatter, require special handling techniques.

Manual looms may be operated with the boron in the filling, but the cost of production of such fabric on manual looms is so high as to render it impractical.

With the foregoing in mind, the present invention provides a novel automatic loom for weaving stiff filamentary material into the filling of a fabric.

More specifically, the present invention provides an improved filling motion for a loom which is capable of handling stiff filamentary material such as boron filaments which are of small denier and subject to shattering upon impact.

More specifically, the present invention provides a filling motion of the stated type having a stationary supply of filling material in continuous length, feed means to feed the material from said supply to the filling motion, and improved severing means for severing a predetermined length of the filling from said continuous supply after said length is inserted into the shed of the loom.

The present invention also provides a filling motion wherein the deflection of the warp and the filling is minimized by the simultaneous insertion of two individual lengths of filling material into a split shed above and below the center of the shed whereby the center of the shed may be defined by a warp of similar stiff filamentary material which is maintained at the mid-shed position throughout the weaving operation.

All of the objects of the invention are more fully set forth hereinafter with reference to the accompanying drawings wherein:

FIG. 1 is a plan view of a loom embodying the present invention with the lay thereof near its forward position and the filling puller retracted;

FIG. 2 is an enlarged diagrammatic sectional view taken on the line 2—2 of FIG. 1 showing the weave produced by the loom of FIG. 1;

FIG. 3 is a front sectional view taken on the line 3—3 of FIG. 1;

FIG. 4 is an enlarged sectional view of the filling puller taken on the line 4—4 of FIG. 3;

FIG. 5 is an enlarged sectional view showing the filling severing mechanism as seen from the line 5—5 of FIG. 3, but with the lay in mid-position;

FIG. 6 is a transverse sectional view as seen from the line 6—6 of FIG. 3, but with the heddle frames in position for forming a shed;

FIG. 7 is a sectional view showing the filling severing mechanism as seen from the line 7—7 of FIG. 1 but with the lay in its rearward limit position;

FIG. 8 is a fragmentary perspective view of mechanism shown in FIG. 7 but in a position in advance of that shown in FIG. 7;

FIG. 9 is a fragmentary sectional view of mechanism shown in FIG. 7 illustrating the engagement of the puller jaws with the filling material;

FIG. 10 is a view of the severing mechanism as seen from the line 10—10 of FIG. 7 but in the position of FIG. 5 after retraction of the puller;

FIG. 11 is a sectional view taken on the line 11—11 of FIG. 1 with parts broken away showing the construction of the puller mechanism;

FIG. 12 is a plan view of the structure shown in FIG. 11;

FIG. 13 is a fragmentary view of mechanism shown in FIG. 11 but with the puller advanced; and

FIG. 14 is a fragmentary perspective view of the upper puller jaw.

Referring now to the drawing, and more particularly to FIGS. 1, 3 and 6 thereof, the loom comprises a pair of side frames 21, 21 interconnected at the front by a breast beam 22. As shown diagrammatically in FIG. 6, warp beams 23 and 24 are mounted at the rear of the loom with conventional drags 25 and 26 to feed body warps B and chain warps C to heddles 27 mounted in heddle frames 28 which form a split shed S at the front of the loom behind the breast beam 22. The filling F is inserted into the shed S from a pair of filling supply rolls 31 and 32 mounted on the right hand side frame 21 and provided with a suitable drag means 33 and 34 respectively. A filling motion pulls the filling strands F into the shed S above and below the body warp B. A reed 38 is mounted on a lay 39 to beat the filling F into the fell of the cloth at the forward end of the shed S. The lay 39 is reciprocated fore and aft by a lay operator 40 connected to the main drive motor 41 of the loom. Upon beat-up of the lay 39, the fabric is drawn off around a breast roll 29 mounted for rotation in front of the breast beam 22 and then across a fabric support pan 42 underlying the lay to the rear of the loom where it is collected by conventional means (not shown).

In the operation of the filling motion as the heddles **27** open the shed and the lay **39** is displaced rearwardly, a filling puller **55** is advanced from the left hand side of the loom through the opening split shed S. When the lay is in its rearward limit position, the puller grips the free ends of the filling F at a gripping and severing station **93** on the right hand side of the shed as the shed is opening. Thereafter, the puller **55** is retracted, pulling with it two strands of filling through the upper and lower parts of the split shed. The filling puller is outside of the shed before the shed is closed by the heddles **27** and the filling strands are released. Concurrently with the release of the filling strands, the filling severing mechanism is operated at the station **93** to sever the filling strands inserted in the shed from the supplies. The lay **39** then moves the reed **38** forwardly to displace the severed strands into the fell at the forward end of the shed, and the fabric is advanced, as described above. At this point the shed is closed and one loom cycle is complete.

In the next cycle, a new shed is opened, reversing the positions of the chain warps C and maintaining the position of the body warp B. The operations are repeated so that a fabric such as shown in FIG. 2 is produced including the chain warps C, the body warp B and the upper and lower filling strands F. It should be noted that the body strand B remains straight and is devoid of crimps so as to avoid breakage of the body strands, which may be boron filaments as discussed above. Likewise, the upper and lower filling strands F are supported in their respective planes above and below the body strands B so as to be devoid of kinks which would tend to break the boron filament. The chain warps C, on the other hand, pass above and below the upper and lower strands respectively in a sinusoidal path to provide a firm interlocking of the boron filaments. Preferably, the chain warps are composed of fiber glass which imparts the desired characteristics to the finished fabric. It is to be understood that other filaments may be woven into a fabric on the illustrated loom, depending upon the particular end use intended for the fabric.

Referring now to FIGS. 1, 3, 4 and 11 through 14, the filling insertion mechanism includes a track **51** mounted on the side frames as indicated at **52** and **53** and supported intermediate the side frames by a support bracket **54** mounted on the breast beam **22** (see FIG. 1) at the right hand side of the shed S. The filling puller **55** comprises a pulling rapier mounted on the track **51** by means of a sliding carriage **56** which is adapted to reciprocate across a distance corresponding to the width of the shed. The carriage is reciprocated by a puller cam **61** driven from the drive motor **41** and having a cam follower lever **62** biased thereagainst, for example by means of a spring **63**. The carriage **56** is connected to the lever **62** by means of a connecting arm **64**. Thus, as the loom operates, the cam **61** makes one revolution for each cycle of loom operation and effects a reciprocation of the filling puller carriage **56** between the positions shown in full lines and broken lines respectively in FIG. 1.

The inner end of the puller rapier **55** is bifurcated to provide upper and lower channels **67** and **68** respectively which enter the upper and lower shed openings of the split shed S. A gripping jaw **71** is pivoted at the leading end of each channel member to cooperate with the web of the channel to grip the free end of the strand of filling F when the puller **55** is advanced all the way through the shed and reaches the extended limit position, at a gripping and severing station **93** (see FIGS. 1 and 7), and to release the strand when the tip of the puller is withdrawn out of the shed in its retracting motion.

The jaws **71** are operated automatically at the desired points in the travel of the puller **55** by suitable controls mounted on a control frame **73** which extends parallel to the path of movement of the puller **55**. The jaws **71** are operated by a trip arm **74** pivoted in the body of the puller **55** and carrying a trip cam **76**. A trip bar **77** carrying a follower roller **78** is biased against the cam **76** by means of suitable spring elements **79**. The bar **77** is connected to the jaws **71** by a trip lever means **80**. As shown in FIGS. 11 and 12, the trip lever means comprises an articulated lever for each jaw, each having a leading link **181** pivoted to an offset arm of the associated jaw at its forward end, and pivoted to a connecting link **182** at its other end. The link **182** is journaled in the puller **55** and is pivoted to a trailing link **183**. The link **183** terminates in a slide bolt **184** which is connected to the bar **77** and supports the associated spring **79**.

The cam is pivotable between the clockwise and counterclockwise limits of its pivotal movement. In the counterclockwise limit shown in FIG. 11, a rise **81** engages the roller **78** and displaces the bar **77** to open the jaws **71**. In the clockwise limit shown in FIG. 13, a depression **82** registers with the roller **78** to permit the springs **79** to displace the bar **77** to close the jaws **71** against the webs of the channels. Detents **83** are provided in the cam **76** to register with a spring-biased catch roller **84** mounted on the body of the puller **55** by a spring arm **84***a*. The catch roller **84** serves to center the cam in its respective clockwise and counterclockwise limits.

In operation of the puller **55**, when it is extended through the shed, and reaches the inner end of its advancing movement, the trip arm **74** engages against a trip pin **85** on the control frame **73** to displace the arm **74** from the full line position of FIG. 11 to the position shown in broken lines in FIG. 11 and in FIG. 13. The roller **78** passes into registry with a depression **82** and permits the springs **79** to displace the trip bar leftwardly to close the jaws **71**. When the puller **55** is retracted through the shed, the arm **74** in the broken line position of FIG. 11 engages a cocking plate **86** mounted on the control frame **73** as shown in FIGS. 11 and 12. The plate **86** is positioned to intercept the path of the arm **74** when it is in the broken line position of FIG. 11, but is sufficiently low to permit the arm **74** to pass-by without engaging the plate when the arm is in the full line position of FIG. 11. Thus, on retraction of the puller **55**, with the arm **74** in the clockwise limit position, the arm engages the plate **86** to pivot the cam **76** to the position shown in FIG. 11 which thereby causes the trip bar **77** to be displaced toward the right, thereby opening the jaws **71**.

Since the channels **67** and **68** of the puller **55** enter the shed S as it is opening, means is provided to prevent interference between the open jaws **71** and the warp yarn in the shed. To this end, guide wires **88** are mounted to project forwardly beyond the tip of the channels **67** and **68** alongside the jaws **71** in the direction toward the fell of the cloth in the shed. The guide wires **88** deflect any warp yarns in the shed openings so as to prevent their interference with the open jaws **71** of the puller rapier **55**.

Because of the fine denier of the boron filaments used in the filling, it is imperative to maintain the jaws clear of any particles which would impart their gripping action when the trip bar **77** is moving from the position shown in FIG. 11 to the position shown in FIG. 13. To this end, jaw-cleaning brushes **89** are mounted on the track **51** to intercept the path of movement of the jaws at the left hand side of the shed. The jaws **71** pass into engagement with the brushes **89** after releasing the filling strands at the end of the retractive movement of the puller **55** and again pass into contact with the brushes **89** at the beginning of the advancing movement of the puller **55**. In this manner, any particles sloughed from the filaments, are cleared from the jaws so as to avoid impairment of the gripping action of the jaws upon the filling strand ends at the right hand side of the shed.

In accordance with another feature of the invention, the filling strands F are fed to the gripper jaws **71** by a positive feed mechanism which operates continuously throughout each cycle of the loom to advance a sufficient length of the filling strands to permit the puller mechanism to draw the filling strands F across the entire width

of the shed S. Since the puller **55** operates during only a portion of the cycle to withdraw the filaments F from the gripping station **93** at the right hand side of the shed to the release point at the left hand side of the shed, means is provided intermediate the yarn supplies **31** and **32** and the gripping station **93** to permit an accumulation of slack in the filling filaments F during that portion of the cycle when the puller is not operating to draw the yarn across the shed, and to permit removal of the previously-formed slack during that portion of the cycle when the puller is drawing the filling across the shed.

To prevent the slack in the filling strands F from interfering with the proper operation of the puller mechanism, friction means is provided at the gripping station **93** to provide a predetermined degree of resistance to the withdrawal of the filling strands F from the station. To this end, the filling supply is mounted on a filling supply frame **95** having an extension **96** projecting in alignment with the puller **55** into close proximity to the shed S and terminating at the gripping station **93**. Friction pads **97** are mounted above and below the extension **96** at its terminus, and spring-biased friction arms **98** operate to press the upper and lower filling strands F against the pads **97** and to retard their free movement.

As shown in FIGS. 3 and 6, the upper and lower filling supply rolls **31** and **32** are mounted on the supply frame **95** to feed the filling strands to positively-driven feed rollers **101** and **102**. The rollers **101** and **102** are positively driven through connections **103** from a variable speed drive **104** mounted on the side frame **21** and, in turn, driven from a cross shaft **105** coupled to the main drive motors **41**. The variable speed drive mechanism **104** is adjusted to advance the desired lenght of filling through the feed rolls **101** and **102** during each cycle of the loom. As shown in FIGS. 1 and 3, the filling strands from the feed rolls **101** and **102** are collected in a hopper **107** in which the slack accumulates during that portion of the cycle when the puller is not functioning to draw the filling through the shed. The hopper **107** is sufficiently large to permit accumulation of the filling strands therein without bending them on a radium smaller than that permitted by the structural character of the strand.

To prevent snarling of the filling strands in their passage from the hopper **107** to the friction pads **97** at the inner end of the frame **96**, filling guides **108** are provided intermediate the hopper **107** and the pads **97**. In the present instance, the filling guides **108** comprise transparent tubular members mounted on the frame **96** and extending from the hopper **107** to the inner end of the frame **96**. By proper adjustment of the variable speed mechanism **104**, there are always sufficient slack filling strands in the hopper **107** to permit withdrawal of the desired lengths of filling by the puller **55** during that portion of the loom cycle when the puller is operating to withdraw the strands through the guide **108** and the friction pads **97**.

Means is provided at the gripping station **93** to sever the filling strands after the puller **55** has drawn the same all the way through the shed. In the present instance, the severing mechanism is designed particularly for severing boron filaments which are shattered by impact so as to separate the inserted lengths of filling strands from the supplies. More conventional severing means, such as scissors or the like, may be used for other filamentary material. The severing mechanism is operated automatically by the movement of the lay after the pulling of the filament strands through the shed. To this end, the severing mechanism comprises a pair of severing blades **112** pivoted at their upper ends at **113** to the track **51**. The blades **112** have impact edges **114** which are aligned with the pivot **113** so as to engage flush along their entire length when pivoted together. To insure engagement of the edges **114**, a deflector **111** is mounted on the rear blade **112** on its right hand face to engage behind the right hand face of the forward blade **112**. Thus, when the blades are pivoted together, the deflector **111** insures engagement of the two edges **114**.

To effect pivotal movement of the blades **112**, toggle links **115** are pivoted to the lower ends of the blades **112** and are connected to a blade operator **116** which is pivoted to the breast beam **22** and is biased upwardly by a spring **117** connected at its upper end to the support bracket **54**.

To sever the boron filament F, the blade operator **116** is pivoted downwardly against bias of the spring **117** to displace the blades **112** into impact engagement along their edges **114**. The pivotal displacement of the operator **116** is effected by a pivoted actuator **121** extending rearwardly from the breast beam **22** to underlie the lay **39**. The actuator **121** is connected to the operator **116** by a link **123** so that the biasing spring **117** of the operator **116** biases the actuator **121** upwardly against a roller **124** carried on the forward edge of the lay **39**. As shown in FIG. 5, the lay **39** is recessed as indicated at **126** in the area of the actuator **121** to permit the actuator **121** to bear against the roller **124**. A projection **127** is provided on the actuator **121** to impart a sharp closing movement to the blades **112** as the lay moves forward along the actuator arm **121**. The projection **127** is positioned on the arm **121** to effect impact shattering of the filaments F prior to the engagement of the reed **38** therewith in its forward travel. The impact severs the inserted lengths of filling from the supplies so that the inserted lengths of filling may be beat into the fell of the cloth at the forward end of the shed S.

In order to confine the severance of the filling F to the immediate area of the blades **112**, shock pads **125** are mounted on the blades **112** on the inward faces thereof which are opposite to the faces which confront the friction pads **97**. The shock pads **125** are of resilient compressible material and projects beyond the impact edges **114** a small distance as shown by the broken lines in FIG. 10, so that they grip the filaments F prior to the impact on the filaments by the edges **114**. The pads **125** thereby engage and hold the filaments F prior to their being subjected to impact by the impact edges **114**. This holding of the filaments insures severance of the filaments at their point of engagement with the edges **114**.

It is apparent from the foregoing description that the present invention provides a loom which is capable of weaving stiff brittle filamentary material into the weft of a woven fabric. As shown, the filaments are drawn through the conventional split shed of a loom and are beat into the fell of the cloth at the forward end of the shed. Because of the stiff nature of the filamentary material composing the filling of the fabric, the loom has no provision for weaving the projecting ends of the filling strands into the selvage of the cloth, and in most end uses of a cloth of this nature, it is not desirable to interweave the projecting ends of the weft filament into the selvage. If a reinforced selvage is desired, selected warps at the selvage edge of the fabric may be threaded through individual harnesses which are manipulated to provide the desired selvage motion. The warps in the selvage may be of any suitable material selected for the purpose.

While a particular embodiment of the present invention has been herein illustrated and described, it is not intended to limit the invention to such disclosure, but changes and modifications may be made therein and thereto within the scope of the following claims.

We claim:

1. In a loom for weaving having means forming a series of sheds from warp strands, a stationary supply of filling strand material at one side of the loom, a filling puller having an elongated portion adapted to be reciprocated longitudinally into and through the sheds, at least one gripping jaw at the free end of said portion, and means to actuate said jaw when said puller is inserted through said shed to grip the filling strand material from said stationary supply; and when said puller is with-

drawn from the shed to release the gripped filling strand material, the improvement wherein said actuating means comprises:

a trip bar carried by said puller adjacent the other end of said elongated portion,

trip lever means interconnecting said jaw with said trip bar whereby said trip bar in one position is effective to open said jaw and in a second position is effective to close said jaw,

spring means biasing said trip bar toward said second position,

a trip cam mounted on said puller for pivotal movement operable at one limit of its pivotal movement to engage said trip bar and displace it toward said one position and having a depression operable at the other limit of the pivotal movement of said cam to register with said trip bar to afford displacement thereof by said spring to said second position,

a trip arm carried by said trip cam and projecting beyond said puller,

a control frame mounted alongside the path of movement of said puller at said other side of the loom,

a trip pin carried by said frame in the path of movement of said trip arm and, upon passage of said puller through said shed, operable to pivot said trip arm and said trip cam to said other limit and thereby effect closing of said jaws, and

a cocking plate mounted on said control frame in the path of movement of said trip arm when in said other limit position and, upon retraction of said puller to a position beyond the shed of said loom, operable to pivot said trip arm and said cam to said one limit and thereby open the jaw.

2. A loom according to claim **1** wherein said shed-forming means forms a split shed and said filling puller has two elongated portions with a gripping jaw at the free end of each portion, said stationary supply supplying two strands of filling strand material to said puller, said trip lever means comprising a trip lever for each jaw connected to said trip bar whereby said trip pin and said cocking plate respectively close and open both of said jaws simultaneously.

3. A loom according to claim **1** wherein said actuating means includes a spring-biased catch means bearing against the trip cam, said trip cam having detents operable to receive said catch means when in its respective limits of pivotal movement.

4. A loom according to claim **1** wherein said elongated portion comprises a channel member and said trip lever means is mounted within said channel member.

5. A loom according to claim **1** including guide wires mounted on said elongated portion and projecting therebeyond to deflect the warp strands in said sheds out of the path of movement of said elongated portion and the jaw during their reciprocation into and through said sheds.

6. A loom according to claim **1** including brush means mounted on said loom in the path of movement of said jaw when in the open position to clear any particles therefrom after release of the gripped strand material.

7. In a loom for weaving having means forming a series of sheds from warp strands, a stationary supply of filling strand material at one side of the loom, a filling puller having an elongated portion adapted to be reciprocated longitudinally into and through the sheds, at least one gripping jaw at the free end of said portion, and means to actuate said jaw when said puller is inserted through said shed to grip the filling strand material from said stationary supply, and when said puller is withdrawn from the shed to release the gripped filling strand material, the improvement wherein said loom includes:

feed mechanism for positively feeding a length of filling strand material to said jaw corresponding to the width of the shed, said feed mechanism including positively-driven feed rolls operated in timed relation to said loom, and

a hopper positioned intermediate said feed rolls and said jaw operable to collect slack in said strand material from said feed rolls during the period when said puller is ineffective to draw the filling strand material through the shed and to afford discharge of said slack toward said jaw during the period when said puller is operated to draw the strand material through said sheds.

8. A loom according to claim **7** including tubular guide means intermediate said hopper and said jaw, said tubular guide means receiving said strand material and preventing kinks therein as it is discharged toward said jaw.

9. A loom according to claim **7** including friction means intermediate said hopper and said jaws to engage said strand material and impart a predetermined drag thereon as it is withdrawn by said puller.

10. A loom according to claim **9** wherein said friction means comprises a pad on one side of the path of said filling strand material and a second pad on the other side of said path and biased toward said one pad and said strand material to impart said predetermined drag thereon.

11. A loom according to claim **10** including a severing station intermediate said friction pads and said jaw, said severing station including shock pads disposed on opposite sides of said strand material, means mounting said pads for closing movement on said strand material whereby said material is firmly supported by said shock pads and said friction pads, and means operable upon closing of said shock pads to sever said strand material intermediate said shock pads in said friction pads.

12. A loom according to claim **11** wherein said severing means comprises impact edges on said shock-pad mounting means operable after closing of said shock pads to sharply engage flush against one another to thereby sever said fiilling strand material by impact.

13. A loom according to claim **12** wherein said shock-pad mounting means comprises a pair of blades mounted for pivotal movement about a common pivot, said impact edges being aligned with the pivotal center of said common pivot to thereby insure flush engagement of said blade edges.

14. A loom according to claim **13** wherein said shock pads are of a resilient compressible material and are mounted directly on said blades adjoining said edges and projecting beyond said edges so that upon closing movement of said blades, said pads engage said filling strand material prior to engagement of said impact edges therewith.

15. In a loom for weaving having means forming a series of sheds for warp strands; a stationary supply of filling strand material at one side of the loom; a filling puller having an elongated portion adapted to be reciprocated longitudinally into and through the sheds transversely of the warp strands; at least one gripping jaw at the free end of said portion so that retraction of said puller pulls a length of said filling strand material through the shed, means to actuate said jaw when said puller is inserted through said shed to grip the filling strand material from said stationary supply, and when the puller is withdrawn from the shed to release the gripped filling strand material; a lay having a reed projecting through said shed operable to be reciprocated longitudinally of the warp strands to beat said length of filling strand material up into the fell of the cloth at the forward end of the shed; and severing mechanism to sever the length of inserted filling strand material from said stationary supply at a point adjacent the lateral edge of the shed on the one side of the loom prior to the advance of the lay and reed to beat-up said inserted filling strand material; the improvement wherein said severing mechanism comprises:

a pair of blades disposed on opposite sides of the filling strand material and pivoted about a common pivot on said loom,

an operator connected to said blades operable to pivot the same into engagement with said strand material and with each other to sever the strand material, and

means carried by said lay and operating upon said operator to actuate the operator during forward movement of said lay to sever said filling strand material length from said supply prior to beat-up of said strand material by the reed.

16. A loom according to claim **15** wherein said operator for the severing mechanism includes an actuator arm in the path of movement of said lay-carried means having a projection thereon operable to provide an impact engagement of said blades upon engagement of said lay-carried means therewith to thereby sever said strand material by impact.

17. A loom according to claim **16** wherein said blades have impact edges aligned with the pivot of said blades whereby upon engagement of said projection with said lay-carried means, said impact edges engage flush against one another.

18. A loom according to claim **16** including shock pads mounted on one side of said blades on opposite sides of said strand and perable upon closing movement of said blades to firmly support said strand material in advance of engagament of said blades therewith to confine the impact on said strand material by said blades.

19. A loom according to claim **18** including friction pads engaging said strand material in spaced relation to the other side of said severing mechanism to firmly support said strand material during impact.

References Cited

UNITED STATES PATENTS

929,346	7/1909	Tilp	139—130
1,476,480	12/1923	Ambler	139—127
1,943,662	1/1934	Emery et al.	139—123 X
2,022,741	12/1935	Ryan	139—130
3,323,557	6/1967	Matsushita	139—130 X

FOREIGN PATENTS

681,348	1/1930	France.
149,947	4/1904	Germany.

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