

H. J. MÜLLER.
FRINGE LOOM.

APPLICATION FILED FEB. 13, 1912.

Patented Nov. 12, 1912.

5 SHEETS—SHEET 1.

1,044,226.

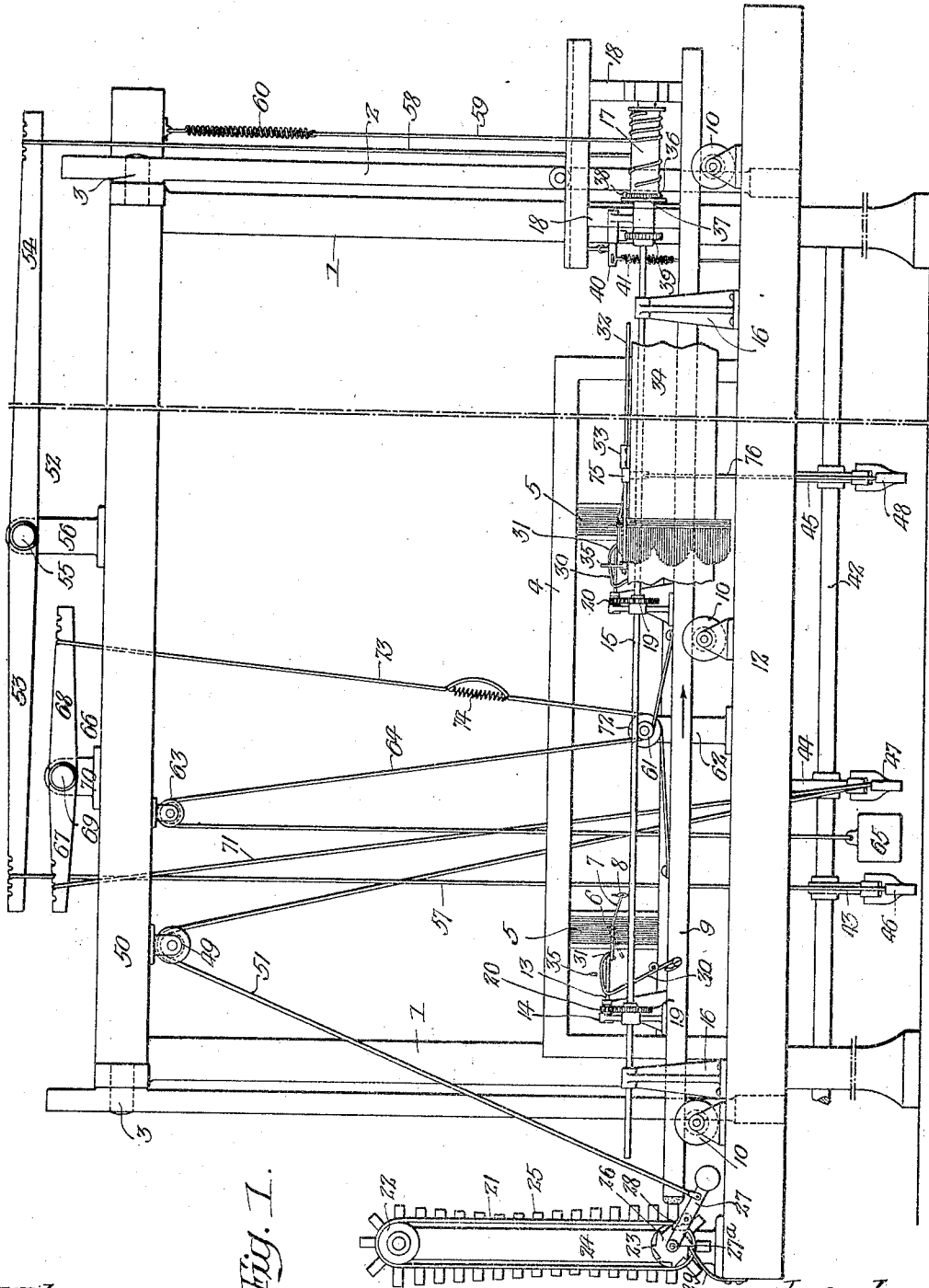


Fig. 1.

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5 SHEETS-SHEET 2.

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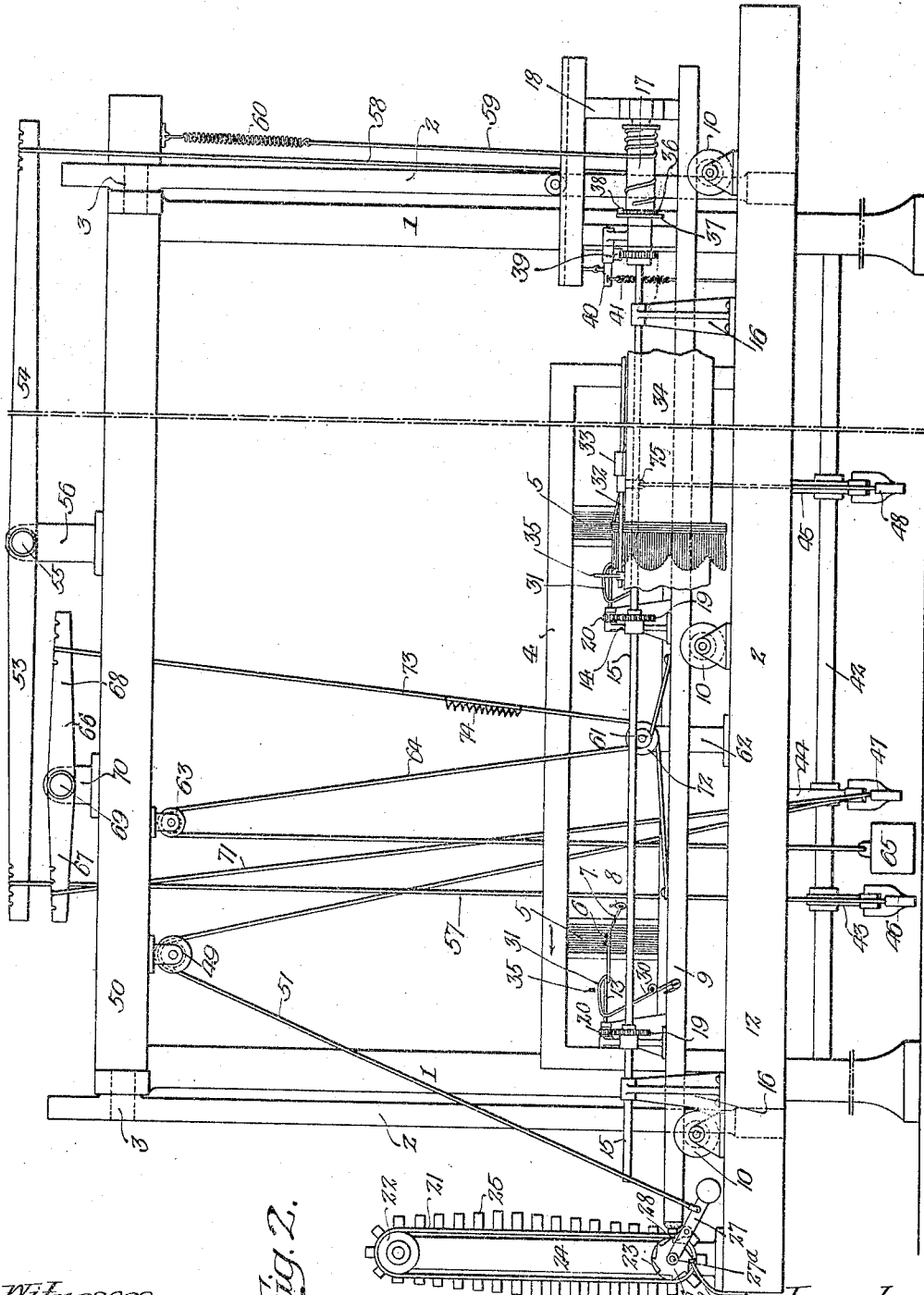


Fig. 2.

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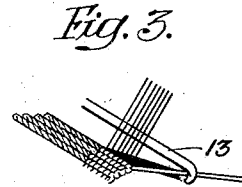
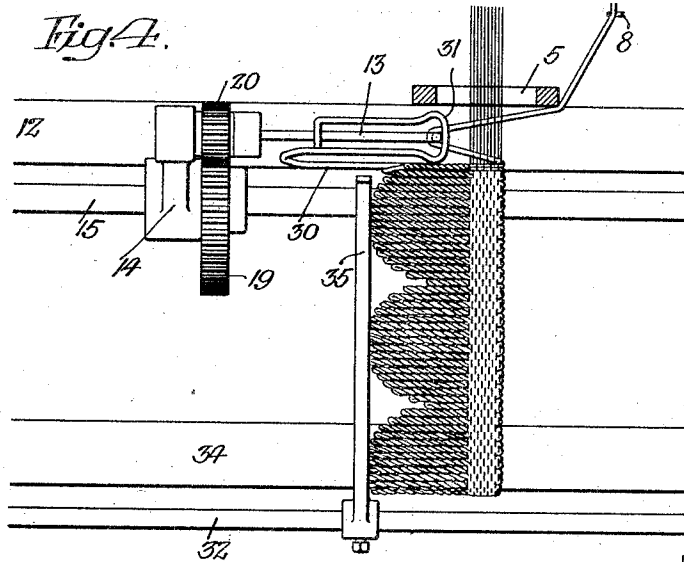


Fig. 5.

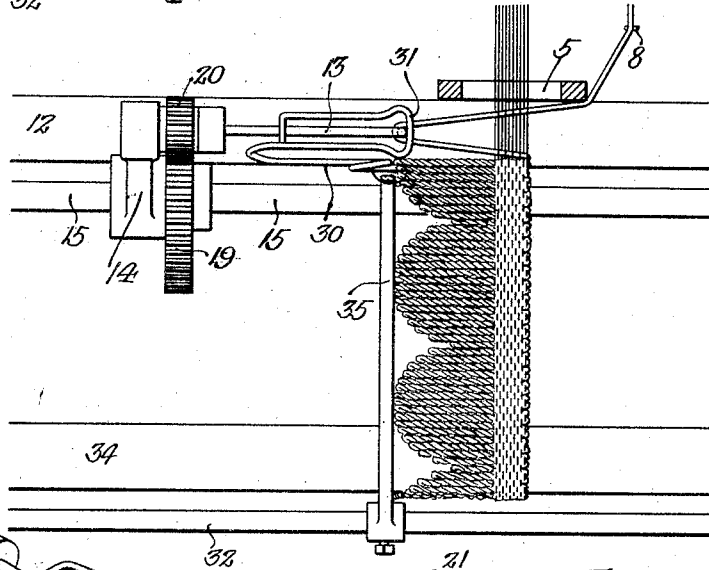
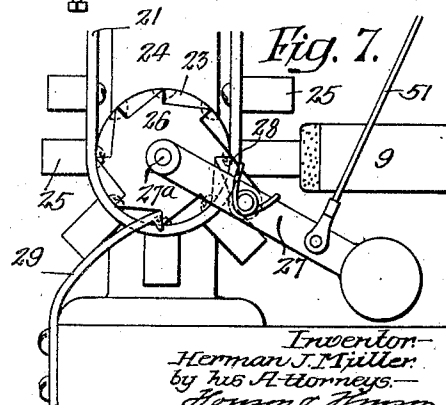
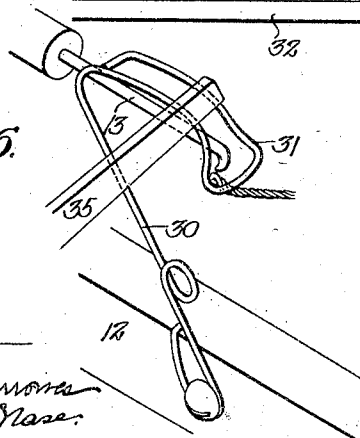


Fig. 6.



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FRINGE LOOM.

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5 SHEETS--SHEET 4.

Fig. 8.

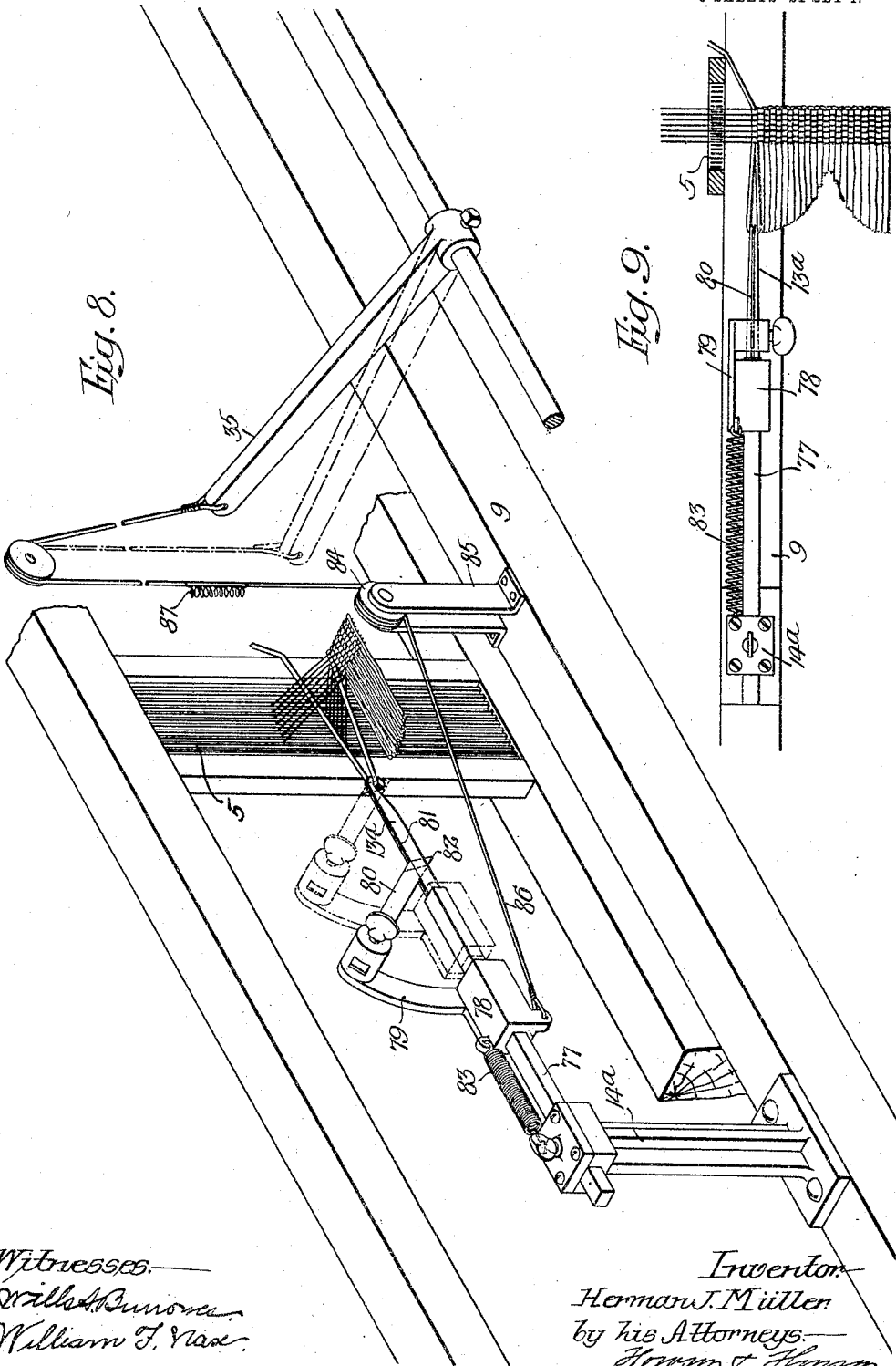


Fig. 9.

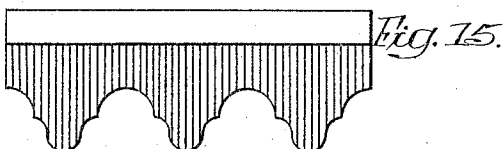
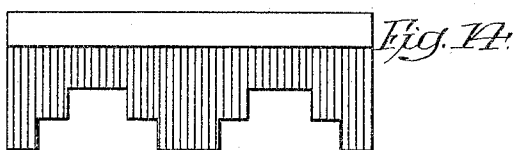
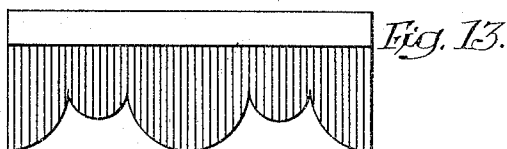
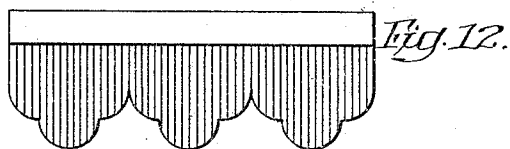
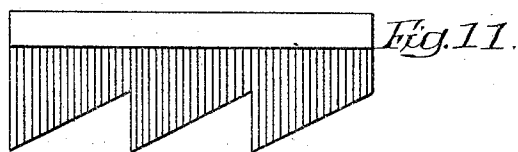
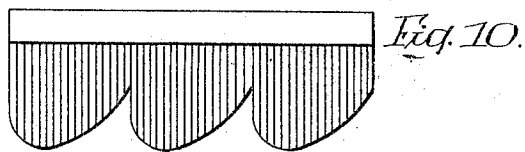
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FRINGE LOOM.
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5 SHEETS—SHEET 5.



Witnesses—
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William F. Ness

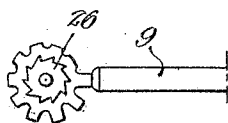


Fig. 16
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UNITED STATES PATENT OFFICE.

HERMAN J. MÜLLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE HENSEL SILK MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

FRINGE-LOOM.

1,044,226.

Specification of Letters Patent.

Patented Nov. 12, 1912.

Application filed February 13, 1912. Serial No. 677,291.

To all whom it may concern:

Be it known that I, HERMAN J. MÜLLER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain improvements in Fringe-Looms, of which the following is a specification.

My invention relates to the manufacture of fringe and consists primarily of improvements in mechanism for making woven fringe in which the strands or bullions are produced by the free ends of interwoven weft threads.

The chief object of my invention is to construct a machine that will be capable of producing a fringe having a large number of strands of twisted bullion per inch and that said strands may be of variable lengths so as to have their free ends form scallops or other predetermined variable contours.

Another object is that the mechanism constituting my invention will be durable, of simple construction and can be readily changed to make different designs.

Another object of my invention is to provide mechanism whereby the variable length strands of bullion may be cut.

These and other objects, which will be brought out in the specification, I attain in the following manner, reference being had to the accompanying drawings, in which:

Figure 1, is a front elevation of sufficient of a fringe loom to illustrate my invention; Fig. 2, is a view similar to Fig. 1 showing different positions of certain of the elements of my improved mechanism. Fig. 3, is a perspective view showing the strand-inserting and twisting-hook within the warp shed. Fig. 4, is an enlarged fragmental sectional plan view of certain of the elements which I employ in my invention. Fig. 5, is a view showing different positions of the elements shown in Fig. 3 during another stage of the operation. Fig. 6, is a perspective view showing a strand of bullion being "knocked off" the twisting hook; Fig. 7, is a fragmental elevation of design or strand length controlling mechanism which I employ; Fig. 8, is a perspective view showing strand cutting mechanism which I employ; Fig. 9, is a plan view of the mechanism shown in Fig. 8, after the lay has beaten up the bullion before the cutter acts; Figs. 10 to 15 inclusive, are diagrammatic views of some of the forms of fringe capable of being

made on my improved machine; and Fig. 16, is a modification of the strand length regulating mechanism which I employ.

Referring to the drawings, 1 is the main frame of the loom to which the lay 2 is pivotally attached at 3. The reed frame 4 carried by the lay 2 is provided with a plurality of series of reed blades 5; the number of said series being according to the number of the lengths of fringe being made. Warp threads 6 pass between the reed blades and are controlled by heddles or jacquard to form the shed for the insertion of weft yarn 7 in the usual manner. The weft 7, which constitutes the material for the strands of bullion in the manufacture of the fringe, may be controlled by heddles 8 or equivalent means to raise and lower them into and out of the path of a hook in a manner and for the purpose hereinafter described. A bar 9 is slidably mounted on anti-friction rollers 10 supported on the lay beam. A series of rotatable twisting hooks 13, one for each length of fringe being made, are mounted in journal standards 14 attached to the bar 9.

A shaft 15 journaled in standards 16 on the lay beam 12 is rotated in one direction by drum 17, the latter being journaled in an extension 18 of the bar 9. Gear wheels 19 are keyed to the shaft 15 and mesh with pinions 20 on the respective twisting hooks 13 so as to impart a rotary movement to the said hooks 13 when the shaft 15 is actuated by the drum 17.

A design belt 21 is supported adjacent to the end of the slidable bar 9 by two pulleys 22 and 23 rotatably mounted on the standard 24; the latter being attached to the lay beam 12. Mounted so as to extend from the outer surfaces of a belt 21 are a plurality of variable length lugs or projections 25 which are designed to co-act with the slidable bar 9 to effect variable length strands of bullion in a manner more fully set forth hereinafter.

A ratchet wheel 26 is secured to the pulley 23. A weighted lever 27 is loosely pivoted at 27^a and supports an actuating pawl 28 adapted to move the pulley 23 and design belt 21 by engaging the teeth of the ratchet wheel 26. A spring detent pawl 29 is secured to the lay beam 12 and serves to prevent a back movement of a pulley 23. The axis of the pulley 23 is substantially on a line with the center of the path of move-

ment of the bar 9 and the lugs or projections 25 are so connected to the belt 21 that a movement of one tooth of a ratchet wheel 26 will bring each successive lug 25 in alignment with the center of the bar 9 and the axis of the pulley 23.

Springs 30 are attached to the bar 9 and have their tops bent substantially parallel and adjacent to the twisting hooks 13. The ends 31 are slightly bent downward and form a return run as clearly shown in Fig. 5. These springs 30 act as a resilient medium to knock off the strands of bullion from the hooks 13. A rock shaft 32 is mounted in bearings 33 on the main loom breast beam 34. "Knock off" levers 35 are keyed at various points throughout the length of the rock shaft 32 and are adapted to strike the tops and return runs of the "knock off" springs 30. A ratchet wheel 36 is fixed on the drum 17. A disk 37 is keyed to the shaft 15 and is provided with a drag pawl 38 adapted to pass over or engage the tooth of the ratchet 36 according to the direction in which the drum 17 is rotated. A position ratchet wheel 39 is keyed to the shaft 15 and is controlled by a pawl 40, and a spring 41 and acts to insure the correct positioning of the twisting hooks 13 just before the "knock off" in the usual manner. A cam shaft 42 is rotatably supported in the main frame 1 and carries cams 43, 44 and 45 operable to move levers 46, 47 and 48 respectively. A pulley 49 is supported on the main structure on the transverse beam 50 of the frame 1 and serves as an anti-friction guide for a cord 51, said cord 51 having its ends attached respectively to the weight 27 and the cam lever 47. A lever 52 having arms 53 and 54 is pivoted at 55 to a standard 56 mounted on the transverse beam 50; a cord 57 connects arm 53 with the cam lever 46; a cord 58 has one end attached to and wound around the drum 17 and the other end connected to the arm 54 of the lever 52. A cord 59 has one end attached to and wound around the drum 17 in direction opposite to the winding of the cord 58, and has its other end attached to a spring 60 suspended from the transverse beam 50. A pulley 61 is mounted on a standard 62 attached to the lay beam 12; a pulley 63 is attached to the transverse beam 50 and forms together with the pulley 61, an anti-friction guide for a cord 64. Said cord 64 having one end attached to the slidable bar 9 at a point to one side of the axis of the pulley 61, and the other end supports a weight 65 clearly shown on Figs. 1 and 2. A lever 66 having arms 67 and 68 is pivoted on 69 to a journal standard 70 attached to the transverse beam 50. A cord 71 has one end connected to the arm 67 and the other end attached to the cam lever 47. A pulley 72 is supported on a standard 62 and forms an anti-

friction guide for a cord 73, having one end attached to the slidable bar 9 to the opposite side of the axis of the pulley 61 to which the end of the cord 64 is attached, and has the other end attached to the arm 68 of the lever 66. A tension spring 74 has its ends attached to the cord 73 and forms a take up for the latter during one stage of the operation as clearly shown in Fig. 1. A lever 75 is keyed to the rock shaft 32. A cord 76 has one end attached to the lever 75 and the other end attached to the cam lever 48.

When it is desired to produce cut-strand fringe elements such as are shown in Figs. 8 and 9 are substituted for the rotatable hooks 13 and the drum 17 is rendered inoperative. The hooks shown in Figs. 8 and 9 at 13^a are adjustably supported within standard 14^a and have no rotary motion in the present instance. The shanks of the hooks 13^a are preferably made rectangular in cross section as shown at 77 and form bearings for slides 78. The said slides 78 have arms 79 extending therefrom which serve as supports for adjustable knives 80. The forward end of the hooks 13^a are slotted at 81 and it is within these slots that the knives 80 are adapted to move. The slides 78 are held in their normal positions by tension springs 83. Pulleys 84 are mounted on standards 85 attached to the slidable bar 9. These pulleys 84 act as anti-friction guides for cords 86 having their ends attached respectively to the slides 78 and the "knock off" levers 35. Springs 87 having their ends attached to respective cords 86 act as take up means to keep the cords 86 taut during the cutting of the variable lengths of strands.

The operation of the foregoing mechanism is as follows:—The shaft 42 is rotated by pulleys or gears (not shown) from the main drive, and the cams 43, 44 and 45 impart a reciprocating motion to the levers 46, 47 and 48 respectively. The lay beam 12 and the associate elements contained thereon receives the usual back and forward movement. The warp threads 6 are controlled to form sheds at predetermined instances in the usual manner. A downward movement of the lever 47, effected by the cam 44, causes the cord 73 to slide bar 9 in the direction indicated by an arrow in Fig. 1, to move the hooks 13 through the sheds which are formed in their respective warp threads, as shown in Fig. 3 and at the same time to raise the weight 65. At this stage of the operation, the lay is back and the heddle eyes 8, controlling the weft threads 7, are in their lowest positions. The heddles 8 are then raised by the shafts, or other well known mechanism not shown, so as to move the weft threads 7 under the hooked ends of the twisting hooks 13 as clearly shown in Fig. 3. As soon as the cam 44 releases the

lever 47, the weight 65, which was consequently raised by the sliding movement of the bar 9 in the direction above mentioned, will tend to move the bar 9 and the hooks 13 in the opposite direction, as indicated by the arrow in Fig. 2. The weft threads 7 at this time being in the path of the hooked ends of the twisting hooks 13 will be caught thereby and pulled through the respective sheds, as clearly shown in Figs. 3 and 4, until the end of the bar 9, adjacent the design plate 21, is stopped by coming in contact with one of the lugs 25. Thus it will be seen that if the said end of the bar 9 comes in contact with a short lug, as shown in Fig. 2, the strands drawn by the needles will be longer (see Figs. 2 and 4) than if the said end of the bar 9 should come in contact with a long lug on the same design belt as shown in Figs. 1 and 3. After the hooks 13 have drawn the strand through the sheds, as shown in Figs. 1 to 4, the lay beats up the said strands and the sheds change so as to lock the strands therein. The cam 43 then acts to lower the lever 46, to operate the cords 57 and 58, to rotate the drum 17 in one direction; the drag pawl 38 is thus affected by the ratchet wheel 36 to rotate the disk 37, the shaft 15, gear wheels 19, pinions 20, and twisting hooks 13 thus imparting a twist to the several strands held by the hooks 13. The rotation of the drum 17 as just described causes the cord 59 to be wound thereon and thereby attenuate the spring 60. As soon as the cam 44 allows the lever 47 to rise, the attenuated spring 60 contracts and, by rotating the drum in the opposite direction to that just described, re-winds the cord 58 on the drum so as to be ready for the next twisting action. The cam 45 then lowers the lever 48 and thereby rocks the rock shaft 32 and knock off arms 35. The "knock off" arms, in turn, strike the springs 31 and knock off the twisted strands or bullion as clearly shown in Fig. 6. The sheds are again opened and the actions of the several parts are repeated as above described.

Each time that the lever 47 is lowered, the cord 51 will raise the weighted lever 27 and cause the pawl 28 to move the ratchet wheel 26. In the present instance, as shown in the drawings, a movement of the ratchet wheel equal to one tooth thereof is sufficient to bring a successive lug 25 in alinement with the slidable bar 9 and the axis of the pulley 23, although it will be understood that the mechanism could be constructed to require more than the movement of the weighted lever to bring a successive lug in alinement with the bar 9 if it was so desired and without departing from the spirit of my invention.

As shown in Figs. 1 and 2 the design belt contains two repeats of lugs; each repeat

being arranged to control the drawing of variable length strands as shown in Figs. 1 to 9, and forming a scalloped edge fringe.

Many designs of fringe edgings can be made by the mechanism of my invention, it merely being necessary to arrange the lugs on the design belt to correspond with the contour of the edging desired. For example, instead of having the lugs 25 evenly diminishing and increasing in length as shown in Figs. 1 and 2 they may be arranged so that the shortest lug would be adjacent the longest lug and to produce a step-shaped edging such as is shown in Fig. 11. The length of the upper runs of the springs 31 are made relative to the shortest and longest strands desired, so that the said springs are always in the path of the "knock off" arms. As the slidable bar 9 always moves to the same limit when sliding away from the design belt 21 but does not always move the same distance toward the design belt, the spring 74 prevents a slack in the cord 73 when the bar 9 is abutting a high link.

In the operation when it is desired to cut the strands instead of twisting them, a downward movement of the arm 35 slides the knife into contact with and cuts the strands after the latter has been pulled the desired distance.

Instead of having the design mechanism in the form of a belt having lugs thereon I could substitute a rotatable plate having a stepped or other irregular periphery as shown in Fig. 16. Also, while it has been customary, in fringe looms of the type illustrated in the accompanying drawings, to use cords to effect several of the movements of the elements it will be understood that these movements can be effected in any other manner without departing from the spirit of my invention.

I claim:

1. The combination, in a fringe loom, in which wefts are interwoven with warps to form bullion strands, of weft carrying means; and means for moving the weft carrying means to different extents and between the sheds of the warp to pull variable length strands of the weft therebetween.

2. The combination, in a fringe loom, in which wefts are interwoven with warps to form bullion strands, of weft carrying means; means for moving the weft carrying means to different extents and between the sheds of the warp to carry variable length strands of the latter therebetween; and means for actuating the said weft carrying means to twist the strands of weft.

3. The combination, in a fringe loom, in which wefts are interwoven with warps to form bullion strands, of weft carrying means; means for moving the weft carrying means to different extents and between

successive sheds of the warp to carry variable length strands of the weft between the said sheds of the warp.

4. The combination in a fringe loom in which wefts are interwoven with warps to form bullion strands, of a hook, means for moving the hook into successive warp sheds to receive a thread, means for moving the hook out of the warp sheds; and means for varying the extent of the movement of the hook in successive sheds to produce strands of variable lengths.

5. The combination in a fringe loom in which wefts are interwoven with warps to form bullion strands, of a hook, means for moving the hook into the successive shed of the warp to receive a bullion forming thread; means for moving the hook while holding the bullion thread out of the sheds; and means for predeterminingly varying the distance of the outward movement of hook in certain sheds of the warp.

6. The combination in a fringe loom in which wefts are interwoven with warps to form bullion strands, of a hook, means for moving the hook into the successive shed of the warp to receive a bullion forming thread; means for moving the hook while holding the bullion thread out of the sheds; and means for predeterminingly varying the distance of the outward movement of hook in certain sheds of the warp; and means for knocking the bullion strand off the hook after the latter has completed its outer movement.

7. The combination, in a fringe loom, in which wefts are interwoven with warps to form bullion strands, of weft carrying means; means for moving the weft carrying means to different extents and through certain of the warp sheds to draw variable length looped strands of the weft yarn through the sheds of the warp; means for interweaving the warp and the weft; and means for actuating the weft carrying means to twist the looped strands of weft.

8. The combination in a fringe loom in which wefts are interwoven with warps to form bullion strands, of the lay; a hook mounted on the lay; means for moving the hook into a shed of the warp; means for feeding a thread to the hook; means for moving the hook, while holding the thread, out of the shed; means for limiting the outward movement of the hook, said limiting means having a variable contour whereby the distance of movement of the hook is varied.

9. The combination in a fringe loom in which wefts are interwoven with warps to form bullion strands, of a lay; a bar slidable on said lay; a hook mounted on the bar and adjacent the warp; means for moving the bar to slide the hook into a shed of the warp; means for feeding yarn to the hook;

means for sliding the bar to move the hook, while holding the yarn, out of the shed; means having a variable contour for limiting the distance of outward movement of the hook and bar.

10. The combination, in a fringe loom in which wefts are interwoven with warps to form bullion strands, of a lay; a bar slidable on said lay; a hook adjacent one side of the warp lease and carried by the bar; means operable upon the bar to move the hook into the warp sheds; means for feeding the weft to the hook; means operable upon the bar to pull the loops of the weft through the sheds of the warp; and means limiting, to different extents, the possible movement of the hook when pulling the said loops of the weft through the sheds of the warp to produce variable length strands.

11. The combination, in a fringe loom in which wefts are interwoven with warps to form bullion strands, of a lay; a bar slidable on said lay; a hook adjacent one side of the warp lease and carried by the bar; means operable upon the bar to move the hook into the warp sheds; means for feeding the weft to the hook; means operable upon the bar to cause the hook to pull the loops of the weft through the sheds of the warp; means limiting, to different extents, the possible movement of the hook when pulling the said loops of the weft through the sheds of the warp to produce variable length strands; and means for actuating the hook to twist the said loops of the weft.

12. The combination in a fringe loom in which wefts are interwoven with warps to form bullion strands, of a lay; a bar slidable on said lay; hooks adjacent respective leases of warps, and carried by the bar; means operable upon the bar to move the hooks into the sheds of their respective warps; means for feeding the wefts to the hooks; means operable upon the bar to pull loops of the wefts through the sheds of the warps; and means cooperating with the bar for limiting, to a different extent the lengths of the weft loops in certain of the successive warp sheds.

13. The combination in a fringe loom in which wefts are interwoven with warps to form bullion strands, of a lay; a bar slidable on the lay; a shaft journaled on the lay; a hook rotatably mounted on said bar; a pinion keyed to said hook; a gear wheel keyed to said shaft, and meshing with the pinion on the hook; means operable upon the bar to move the hook into the sheds of the warp; means for feeding a strand of yarn to the hook; means operable upon the bar to move the hook out of the shed, and to pull a loop of the said yarn through the warp shed; means for inclosing the loop within the warp shed; means for rotating the shaft to twist the loop held by the hook; means for

varying to a different extent the outward movement to said bar; and means for disengaging the twisted strands from the hook.

14. The combination in a fringe loom of a
5 lay; a bar slidable on the lay; a plurality of
hooks rotatably mounted on the bar; a shaft
rotatably mounted on the lay; a pinion
keyed to each of the hooks; a plurality of
10 gear wheels keyed to the shaft, and each
meshing with a respective pinion of the
hooks; means operable to move the hooks
into respective warp sheds; means for feed-
ing yarn to the hooks while in the warp
15 sheds; means operable upon the bar to move
the needles out of the sheds, and thereby
draw loops of the yarn between the warp
sheds; a spring adjacent each hook; a rock
shaft; a plurality of arms keyed to the rock
20 shaft, each of said arms at all times being
adjacent a respective spring; means for ro-
tating the first main shaft to twist the loops
of yarn; means for varying to a different
extent in certain of the warp sheds the out-
ward movements of the hooks; and means
25 for actuating said rock shaft to strike the
said springs, to disengage the twisted strands
from the hooks.

15. The combination in a loom in which
wefts are interwoven with warps to form
30 bullion strands, of a lease of warp; weft
yarn adjacent to warp, and means movable
to different extents for pulling variable
length loops of the weft through the warp
shed; and means for interweaving the vari-
35 able length loops.

16. The combination in a loom in which
wefts are interwoven with warps to form
bullion strands, of a lease of warp; weft
yarn adjacent to warp, and means movable
40 to different extents for pulling variable
length loops of the weft through the warp
shed; means for interweaving the variable
length loops; and means for twisting the in-
terwoven loops.

17. The combination, in a fringe loom, in
which wefts are interwoven with warps to
form bullion strands, of a lay; a bar slidably
mounted on the lay; a plurality of hooks ro-
tatably mounted on the lay; a pinion keyed
50 to each of said hooks; a plurality of gear
wheels keyed to said shaft, each of said gear
wheels meshing with the respective pinion
of a hook; means for moving the bar in one
direction, to pass the hooks in their respec-
55 tive warp sheds; means for feeding yarn to
the respective hooks; means for moving the
bar in the opposite direction to pull loops of
the weft through the warp sheds; means
having a variable contour upon which the
60 bar abuts and for limiting the distance of
the latter movement of the bar; means for
moving the said bar-limiting means to bring
certain portions of the latter in position to
be abutted by the said bar to limit, to dif-
65 ferent extents for successive sheds of the

warp, the movement of the bar and hooks in
the said latter direction; means for rotating
the said shaft to effect a rotation of the
hooks to twist the said loops; and means for
disengaging the twisted loops from the
70 hooks.

18. The combination in a fringe loom in
which wefts are interwoven with warps to
form bullion strands, of a lay; a bar slidable
on the lay; a hook rotatably mounted on the
75 bar; a shaft rotatably mounted on the lay;
a pinion keyed to the hook; a gear wheel
keyed to the shaft, and meshing with the
hook; means for moving the bar in one di-
rection to move the hook into the warp shed;
80 means for feeding yarn to the hook while
the latter is in the warp shed; means for
moving the bar in the opposite direction, to
pull a loop of the weft through the warp
shed; a standard fixed to the lay; a plurality
85 of pulleys journaled on the standard; a belt
supported by the pulleys, lugs of variable
length projecting from the belt; means for
moving the lugs successively into alinement
to be abutted by the latter movement of the
90 bar; means for rotating the shaft, to twist
the loops into strands; and means for dis-
engaging the strands from the hooks.

19. The combination in a fringe loom in
which wefts are interwoven with warps to
95 form bullion strands, of a lay; a bar slidable
on the lay; a hook rotatably mounted on the
bar; a shaft rotatably mounted on the lay;
a pinion keyed to the hook; a gear wheel
keyed to the shaft, and meshing with the
100 hook; means for moving the bar in one di-
rection to move the hook into the warp shed;
means for feeding yarn to the hook while the
latter is in the warp shed; means for mov-
ing the bar in the opposite direction, to pull
105 a loop of the weft through the warp shed;
a standard fixed to the lay; a plurality of
pulleys journaled on the standard; a belt
supported by the pulleys; lugs of variable
length projecting from the belt; means for
110 moving the lugs intermittently into aline-
ment to be abutted by the latter movement
of the bar; means for rotating the shaft, to
twist the loops into strands; and means for
disengaging the strands from the hooks. 115

20. The combination, in a fringe loom in
which wefts are interwoven with warps to
form bullion strands, of a member; means
for moving the member into the sheds of
the warp; means for feeding a weft to the
120 said member; and means for moving said
member to different extents to draw vari-
able length loops of said weft thread through
the warp sheds to form bullion strands.

21. The combination, in a fringe loom in
125 which wefts are interwoven with warps to
form bullion strands, of a member; means
for moving the member into the sheds of
the warp; means for feeding a weft to the
said member; means for moving said mem- 130

ber to different extents to draw variable length loops of said weft thread through the warp sheds to form bullion strands; and means for actuating said member to twist the said loops.

22. The combination, in a fringe loom in which wefts are interwoven with warps to form bullion strands, of a lay; a bar slidable on the lay; a member mounted on the bar adjacent the warp; means for moving the bar to slide the said member into the shed of the warp; means for feeding the yarn to the said member; means for sliding the bar to move the member, while holding the yarn, out of the shed; and means having a variable contour for limiting, to different extents, the distance of the outward movement of the said bar in successive sheds of the warp.

23. The combination, in a fringe loom in which wefts are interwoven with warps to

form bullion strands, of a lay; a bar slidable on the lay; a member mounted on the bar adjacent the warp; means for moving the bar to slide the said member into the shed of the warp; means for feeding the yarn to the said member; means for sliding the bar to move the member, while holding the yarn, out of the shed; means having a variable contour for limiting the distance of the outward movement of the said bar; and means for actuating the said member, while holding the yarn, to twist the latter.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HERMAN J. MÜLLER.

Witnesses:

AUGUSTUS B. COPPES,
WM. A. BARR.