

Dec. 24, 1968

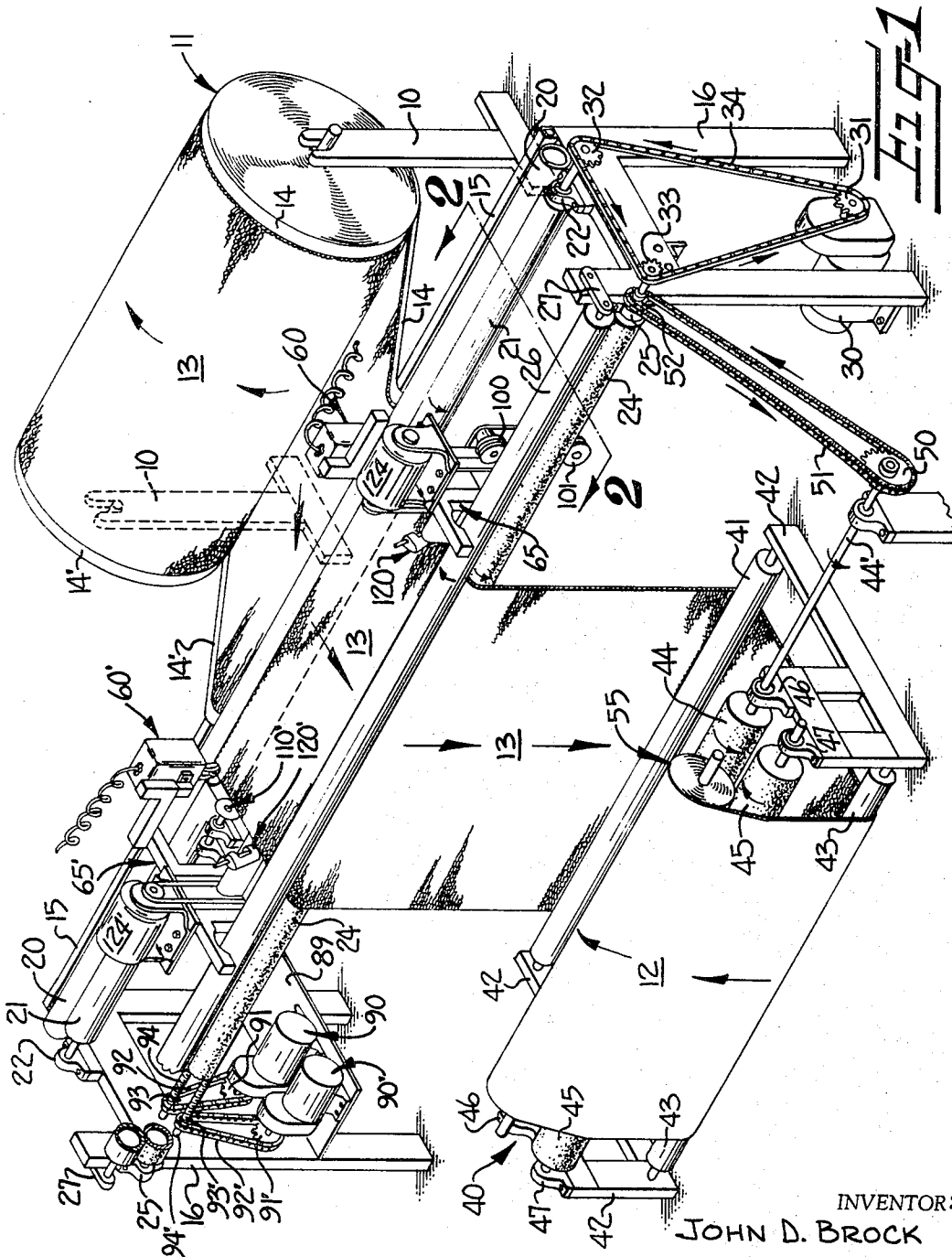
J. D. BROCK

3,417,645

APPARATUS FOR SENSING AND CUTTING ALONG THE EDGE
OF A THICKENED PORTION OF A TRAVELING WEB

Filed July 6, 1965

3 Sheets-Sheet 1



INVENTOR:
JOHN D. BROCK

BY *Parrott, Bell, Seltzer, Park & Heard*

ATTORNEYS

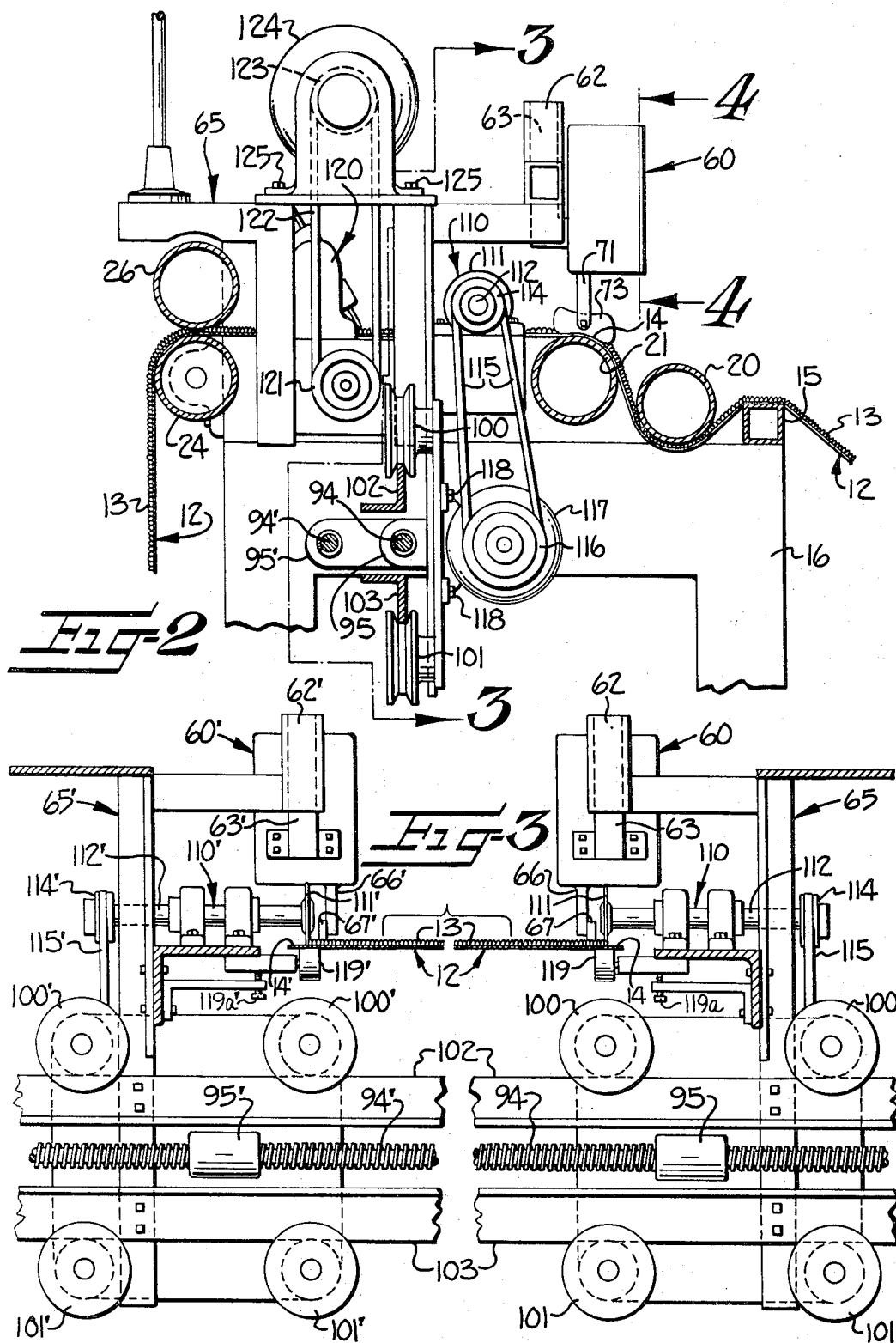
Dec. 24, 1968 J. D. BROCK 3,417,645
APPARATUS FOR SENSING AND CUTTING ALONG THE EDGE
OF A THICKENED PORTION OF A TRAVELING WEB
Filed July 6, 1965 3 Sheets-Sheet 2

3,417,645

OF A THICKENED PORTION OF A TRAVELING WEB

Filed July 6, 1965

3 Sheets-Sheet 2



Dec. 24, 1968

J. D. BROCK

3,417,645

APPARATUS FOR SENSING AND CUTTING ALONG THE EDGE
OF A THICKENED PORTION OF A TRAVELING WEB

Filed July 6, 1965

3 Sheets-Sheet 3

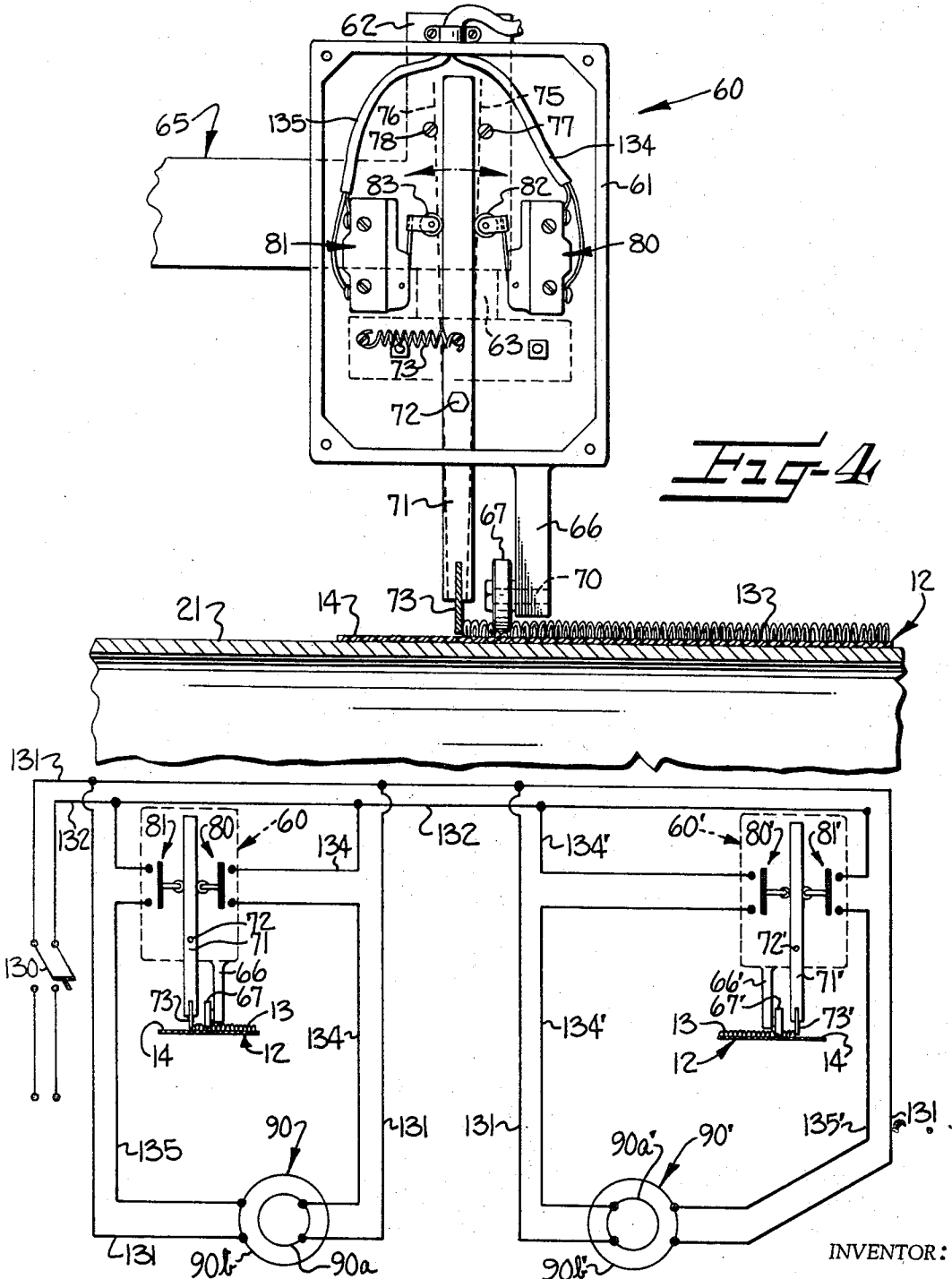


Fig-4

Fig-5

INVENTOR:

JOHN D. BROCK

BY *Carratt, Bell, Seltzer, Park & Heard*

ATTORNEYS

1

3,417,645

APPARATUS FOR SENSING AND CUTTING ALONG THE EDGE OF A THICKENED POR- TION OF A TRAVELING WEB

John D. Brock, Dalton, Ga., assignor of fifty percent to
Richard A. Burnette, Dalton, Ga.
Filed July 6, 1965, Ser. No. 469,608
10 Claims. (Cl. 83—368)

ABSTRACT OF THE DISCLOSURE

Apparatus for sensing the edge of a thickened portion of a traveling web having both thickened and unthickened portions. Movement of the edge sensing means in either direction from a neutral position will actuate a switch to compensate for variations in the transverse position of the traveling web.

This invention relates to apparatus for sensing the edge of a thickened portion of a traveling web and more particularly to an apparatus for sensing and cutting along the edge of a thickened portion of a traveling web.

In the manufacture of tufted carpets, rugs or similar items, a pre-woven base fabric in web form is employed and this web is tufted to produce a thickened tufted web. Normally, the tufting operation does not cover the entire base fabric and a portion of untufted base material is left on each longitudinal edge of the tufted web. These portions of untufted base material will vary in width along the longitudinal edges depending upon deviations in the path of travel of the base material through the tufting machines and depending upon variances in the width of the base material as woven. These longitudinal portions of untufted base material are cut or trimmed from the tufted web and the cut edges are usually bound, as by overedge sewing, to produce a finished carpet having uniform edges thereon.

Heretofore, these cutting operations have usually been done on a traveling tufted web entirely manually by an operator or semi-automatically by an operator with the use of certain machines. These manual or semi-automatic cutting operations necessarily involved a large number of operators, time consumption, inefficiency and costliness. Also, the human element involved in these manual or semi-automatic operations by an operator produced a tendency toward non-uniformity in the finished carpets inasmuch as the operator's skill alone was depended upon for cutting the tufted webs along the edge of the thickened or tufted portion of the traveling webs.

With these conventional cutting operations, it is very difficult to always cut exactly along the edge of the thickened or tufted portion of the web inasmuch as it is very difficult to maintain the traveling web in a uniform path of travel without variations in the transverse position of the web during its travel. This also was a necessarily slow operation inasmuch as the operators were required to visually align the cutting mechanism with the edge of the thickened or tufted portion of the traveling web and therefore, the speed of travel of the webs was necessarily slow.

It is, therefore, an object of this invention to provide an apparatus for sensing the edge of a thickened portion of a traveling web and to compensate for variations in the transverse position of the traveling web.

It is a more specific object of this invention to provide apparatus for sensing and cutting along the edge of the thickened portion of a traveling web and to maintain

2

the sensing means and cutting means in alignment with the edge of the thickened portion of the traveling web to compensate for variations in the transverse position of the traveling web and to insure cutting of the web along the edge of the thickened portion thereof.

It has been found by this invention that the above objects may be accomplished by providing means for sensing the edge of a thickened portion of a traveling web comprising a sensing member adapted to engage the edge of the thickened portion of a traveling web and adapted to move transversely of the web between a first position and a second position under the influence of the edge of the thickened portion of the web depending upon the transverse position of the web during its travel, first and second switch means operatively associated with the sensing member and being actuated by the sensing member upon movement of the sensing member to the first position and to the second position, and means responsive to the actuation of either of the first and second switch means to compensate for variations in the transverse position of the traveling web.

To cut the traveling web along the edge of the thickened portion thereof, a cutting means is provided which is spaced from the sensing member and maintained in alignment therewith in a longitudinal direction of travel of the web for cutting the web along the edge of the thickened portion thereof after the web passes the sensing member.

In the use of the above described apparatus, it has been found by this invention that variations in the thickness of the thickened portion of the traveling web would cause the sensing member to lose contact with the edge of this thickened portion if the sensing member is maintained in a constant vertical position relative to the edge of the thickened portion of the traveling web. This would result in failure of the sensing member to sense the edge of the thickened portion and failure of the cutting means to always cut the traveling web along the edge of the thickened portion.

It is, therefore, a further object of this invention to provide apparatus for maintaining the sensing member in a proper vertical position to engage the edge of the thickened portion of the traveling web regardless of variations in the thickness thereof.

This object may be accomplished by providing vertically movable means carrying the sensing member in horizontally spaced relationship thereto and in predetermined vertical relation thereto and to a supporting means for the traveling web and adapted to engage and be held in a relative vertical position on the thickened portion of the traveling web depending upon the thickness thereof to maintain the sensing member in a corresponding vertical position to engage the edge of the thickened portion of the traveling web regardless of variations in thickness thereof and to prevent engagement of the sensing member with the unthickened portion of the web.

It is to be understood that while this invention has been described above and will be described hereinafter more specifically in terms of a tufted carpet, that the apparatus of this invention and the function thereof is equally as applicable to any type of traveling web having a thickened portion therein and wherein it is desirable to cut or perform some other operation along the edge of this thickened portion of the traveling web.

Some of the objects and advantages of the invention having been stated, other objects and advantages will appear as the description proceeds when taken into conjunction with the accompanying drawings, in which—

FIGURE 1 is a perspective view of apparatus incorporating the features of the present invention;

FIGURE 2 is an enlarged vertical sectional view taken substantially along the line 2—2 of FIGURE 1;

FIGURE 3 is a vertical sectional view taken substantially along the line 3—3 of FIGURE 2;

FIGURE 4 is an enlarged vertical sectional view taken substantially along the line 4—4 of FIGURE 2; and

FIGURE 5 is a schematic view of the electrical circuit for the apparatus shown in FIGURE 1.

Referring now to the drawings and more particularly to FIGURE 1, the apparatus incorporating the features of the present invention includes stationary support members, generally indicated at 10, resting on the floor and adapted to support a wound roll 11 of a tufted or otherwise formed continuous web 12 having a thickened portion 13 and unthickened longitudinally extending edge portions 14.

The web 12 is led from the roll 11 over a stationary bar 15 which is secured to and supported at each of its ends by identical stationary frame portions 16 which are resting on the floor. The web 12 then passes under a stationary tension roll 20 which is also secured at the opposite ends thereof to stationary frame portions 16.

The web is then passed over a first driven roll 21 which is journaled at its opposite ends for rotation in bearings 22 mounted on the stationary frame portions 16. The web 12 then passes over a second driven sand roll 24 which is journaled at its opposite ends in bearings 25 mounted on the stationary frame portions 16. A roll 26 is pivotally mounted at its opposite ends on frame portions 16 by levers 27 such that the weight of the roll 26 will hold it in engagement with the driven roll 24 so that the web 12 will be sandwiched therebetween for providing the proper frictional contact between the web 12 and the roll 24.

The driven rolls 21 and 24 are driven by a motor 30 secured to the floor and including a driven sprocket 31 thereon. The roll 21 includes a sprocket 32 on one end thereof beyond the bearing 22 and the roll 24 includes a sprocket 33 on one end thereof beyond the bearing 25. An endless chain 34 passes around the driven sprocket 31 of the motor 30 and around the sprockets 32 and 33 on the rolls 21 and 24 to drive these rolls in the direction of travel of the web 12, as may be seen by the arrows in FIGURE 1.

From the above apparatus, the web 12 is led to a winding mechanism, generally indicated at 40, comprising an idler roll 41 journaled for rotation at its opposite ends in stationary frame portions 42, a second idler roll 43 journaled at its opposite ends in stationary frame portions 42, and two winding rolls 44 and 45 journaled at their opposite ends in bearings 46 and 47, respectively, mounted on stationary frame portions 42. The roll 44 is a driven roll and includes a sprocket 50 mounted on an extension shaft 44' thereof and adapted to receive an endless drive chain 51 therearound which also passes around a sprocket 52 on the driven roll 24 so that rotation of the driven roll 24 by the motor 30 will drive the roll 44. In operation, the web 12 passes under rolls 41 and 43 and is wound into a roll 55 between the rolls 44 and 45.

For sensing the edge of the thickened portion 13 of the traveling web 12, a sensing means, generally indicated at 60, is disposed in the vicinity of the longitudinal edge of the traveling web 12 between the driven rolls 21 and 24. In the drawings, there is illustrated a sensing means on each of the longitudinal edges of the traveling web 12 and it is to be understood that one or both of these sensing means may be utilized in the apparatus described herein according to needs of the manufacturer. Inasmuch as both of the sensing means and associated mechanism are identical, except that the same are allochirally arranged, only one will be described in detail hereinafter and the other will be denoted in the drawings by like reference numerals with the prime notation added.

The sensing means 60 comprises a hollow housing 61

mounted for vertical movement in a hollow sleeve member 62 by an arm member 63 secured to the housing 61 and telescopically received within the sleeve 62 so that the housing 61 may move vertically up and down relative to the sleeve 62. The sleeve 62 is mounted on a horizontally movable carriage, generally indicated at 65, which will be described in more detail hereinafter.

The housing 61 includes a vertically disposed elongate supporting member 66 secured thereto and extending in the direction of the traveling web 12. The supporting member 66 includes a roller 67 mounted thereon by a pin 70 and is adapted to engage and ride on the thickened portion 13 of the traveling web 12 to hold the housing 61 in a relative vertical position above the traveling web 12 depending upon the thickness of the thickened portion 13.

Then sensing means 60 further includes a generally vertically extending elongate sensing member 71 passing through a slot in the lower portion of the housing 61 and pivoted to the housing 61 by a bolt 72 to be carried by the housing 61 in horizontally spaced relationship to the supporting member 66. The sensing member 71 extends from the housing 61 in the direction of the traveling web 12 and includes a web engaging portion 73 disposed at a predetermined, usually lower, vertical position relative to the supporting member 66 to engage the edge of the thickened portion 13 of the traveling web 12. The web engaging portion 73 is disposed above a supporting means, which, as illustrated in the drawing, is the roll 21, so that the web will be supported thereunder to prevent sagging and thereby insure engagement of the portion 73 with the edge of the thickened portion of the web. The web engaging portion is shaped, as shown in FIGURE 2, to fit over the roll 21.

The sensing member 71 is adapted to move under the influence of the edge of the thickened portion 13 of the traveling web 12 transversely of the web 12 between a first position, illustrated by the dotted line 75 in FIGURE 4, to a second position, illustrated by the dotted line 76 in FIGURE 4, depending upon the transverse position of the web during its travel. This movement of the sensing member 71 is restrained by bolts 77 and 78 secured to the housing 61 and defining the above described first and second positions, as may be seen in FIGURE 4. The sensing member 71 is biased in the direction of the edge of the thickened portion of the traveling web by a tension spring 73 having one end secured to the housing 61 and the other end secured to the sensing member 71.

The sensing member 71 will be held in a corresponding vertical position by the supporting member 66 and the housing 61, usually above the unthickened portion 14 of the web 12, to engage the edge of the thickened portion 13 of the web 12 regardless of variations in the thickness thereof and to prevent engagement of the sensing member with the unthickened portion of the web inasmuch as the housing 61 will be raised and lowered by the supporting member 66 when the thickness of the thickened portion 13 of the web 12 increases or decreases.

The sensing means 60 further includes first and second switches 80 and 81 which are normally open switches secured to the interior of the housing 61 and including actuating members 82 and 83, respectively, which are adapted to be engaged by the sensing member 71 to close the switches when the sensing member is moved to the above described first and second positions, respectively, under the influence of the edge of the thickened portion 13 of the traveling web 12. The switch 80 is adapted to be actuated or closed by the member 71 upon movement thereof to the first position, represented by the line 75 in FIGURE 4. The other switch 81 is adapted to be actuated or closed by the member 71 upon movement thereof to the second position, represented by the line 76 in FIGURE 4. Neither of the switches 80 and 81 are actuated or closed when the sensing member is maintained

substantially midway between the first and second positions, as illustrated in solid lines in FIGURE 4.

The switches 80 and 81 are electrically connected, as will be more fully described hereinafter, to a reversible motor 90 mounted on a shelf 89 secured to one of the stationary frame portions 16. The switches 80 and 81 are adapted to drive the reversible motor 90 in opposite directions upon either of the switches being actuated by the sensing member 71, as described above. The reversible motor 90 includes a driven sprocket 91 adapted to receive an endless driving chain 92 therearound which also passes around a sprocket 93 on a threaded shaft 94. The threaded shaft 94 is journaled for rotation at its opposite ends in the stationary frame portions 16 and passes through an internally threaded hollow sleeve 95. The sleeve 95 is mounted on a plate forming a portion of the carriage 65. The carriage 65 is mounted for horizontal movement transversely of the traveling web 12 by two rollers 100 and two rollers 101 riding on angle-shaped track members 102 and 103, respectively, which pass between and are secured to the stationary frame portions 16.

In operation, as one of the switches 80 or 81 is actuated or closed by the sensing member 71, the motor 90 will be driven in either a clockwise or counterclockwise direction to rotate the threaded shaft 94 to move the sleeve 95 and thus the carriage 65 toward or away from the edge of the thickened portion 13 of the traveling web 12, as will be described more fully hereinafter.

Movement of the carriage 65 will carry with it the sensing means 60 and when the sensing member 71 has moved into alignment with the edge of the thickened portion 13 of the traveling web 12, the sensing member 71 will be moved from engagement with the switches 80 or 81 to the middle position, illustrated in solid lines in FIGURE 4, to allow the switches 80 or 81 to open and stop the operation of the motor 90.

The identical sensing means 60' also includes the same type of apparatus described above and this apparatus is represented in the drawing by like primed reference numerals and will not be described in detail herein.

For cutting the untufted or unthickened portion 14 of the traveling web 12 along the edge of the tufted or thickened portion 13, there is provided a cutting mechanism, generally indicated at 110. The cutting mechanism 110 comprises a rotary cutting blade 111 mounted for rotation on a shaft 112 which is journaled in bearings 113 secured to the carriage 65. The shaft 112 has a pulley 114 on the other end thereof which receives a driving belt 115 which also passes around a driven pulley 116 on the driven shaft of a motor 117. The motor 117 is bolted to the carriage 65 by bolts 118, may be seen in FIGURE 2. The rotary cutting member 111 engages the periphery of and cooperates with a rotary supporting member 119, secured to the carriage 65, for producing a cutting action. The pressure of member 119 against cutting member 111 may be adjusted, as by an adjusting screw 119a. The cutting member 111 is also aligned with the sensing member 71 in the longitudinal direction of the web 12 and is adapted to cut the traveling web 12 along the edge of the thickened portion 13 after the same has been sensed by the sensing member 71. The cutting means 110 is also movable with the carriage 65 to align with the edge of the thickened portion 13 of the traveling web 12 in the manner described above. The sensing mechanism 60' also includes a cutting mechanism 110', as may be specifically seen in FIGURE 3, and the components of this cutting mechanism 110' are represented by like reference numerals with prime notations added and will not be further described herein.

Following cutting of the traveling web 12, the web passes an overedge sewing machine, generally indicated at 120, which is mounted on the carriage 65 in alignment with the cutting mechanism 110 and the sensing member 71. The sewing machine 120 includes a pulley 121 for

driving the sewing instrumentalities and which is adapted to receive a driving belt 122 which also passes around a driven pulley 123 of a motor 124. The motor 124 is bolted to the carriage 65 by bolts 125, as may be seen more clearly in FIGURE 2. Thus, the overedge sewing mechanism 120 is mounted for horizontal movement transversely of the traveling web 12 on the carriage 65 and is adapted to bind the cut edges of the traveling web 12 after the unthickened portion 14 has been cut therefrom by the cutting mechanism 110 to form a finished carpet or the like. The carriage 65' also carries an identical sewing machine 120', the components of which are indicated in the drawings by like reference numerals with prime notations added and will not be further described herein.

Referring now to the schematic wiring diagram of FIGURE 5, a master switch 130 is disposed in lines 131 and 132 which lead from any convenient source of electrical energy, such as a male plug 33 adapted to be inserted in a female electrical outlet. The line 131 leads to the winding 90a of motor 90 and to the winding 90a' of motor 90'. A line 134 leads from the winding 90a of motor 90 through the switch 80 of sensing means 60 and connects with the line 132 to complete the circuit when the switch 80 is closed. A similar line 134' also leads from the winding 90a' of the motor 90' to the switch 80' of the sensing means 60' and connects with the line 132 to complete the circuit when the switch 80' is closed.

The line 131 also leads to the winding 90b of motor 90 and a line 135 leads from the winding 90b through the switch 81 of the sensing means 60 and connects with the line 132 to complete the circuit when the switch 81 is closed. A similar line 135' leads from the winding 90b' of the motor 90' through the switch 81' of the sensing means 60 and connects with the line 132 to complete the circuit when the switch 81' is closed.

Thus, when the traveling web 12 moves to the left, as viewed in FIGURE 3, the edge of the thickened portion 13 will move the sensing member 71 to the first position, represented by the dotted line 75 in FIGURE 4, to close switch 80 and thus complete a circuit through the winding 90a of motor 90. This will cause the motor 90 to rotate in a counterclockwise direction to rotate the threaded shaft 94 in a counterclockwise direction to move the carriage 65 to the left, as viewed in FIGURE 3. This will move the sensing member 71 to a position midway between the above described first and second positions to allow the switch 80 to open breaking the circuit and stopping movement of the carriage 65. This action will also align the cutting mechanism 110 and the sewing machine 120 with the edge of the thickened portion 13 of the traveling web 12.

Like operations will occur to close each of the switches illustrated in FIGURE 5 to align both of the sensing means 60 and 60', the cutting mechanism 110 and 110', and the sewing machine 120 and 120' with the edges of the thickened portion 13 of the traveling web 12 regardless of variations in transverse positions thereof.

Thus it may be seen, that this invention has provided an apparatus for sensing and cutting along the edge of a thickened portion of a traveling web to maintain the sensing means and the cutting means in alignment with the edge of the thickened portion and to maintain the sensing means in a proper vertical position to engage the edge of the thickened portion of the traveling web regardless of variations in the thickness thereof.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

What is claimed is:

1. Apparatus for sensing the edge of a thickened portion of a traveling web having both thickened and unthickened portions comprising:

- (a) an edge sensing member adapted to engage the edge of the thickened portion of the traveling web and adapted to move transversely of the web between a first position and a second position under the influence of the edge of the thickened portion of the web depending upon the transverse position of the web during its travel;
 - (b) vertically movable thickness sensing means carrying said edge sensing member in horizontally spaced relationship at a predetermined vertical position and adapted to engage the thickened portion of the traveling web for sensing the thickness thereof and for maintaining said edge sensing member in a relative vertical position above the unthickened portion of the web to engage the edge of the thickened portion of the web regardless of variations in thickness thereof;
 - (c) first and second switch means operatively associated with said edge sensing member, said first switch means being actuated by said edge sensing member upon movement of said edge sensing member to said first position, said second switch means being actuated by said edge sensing member upon movement of said edge sensing member to said second position, and neither of said first and second switch means being actuated when said edge sensing member is maintained substantially midway between said first and second positions; and
 - (d) means responsive to actuation of either of said first and second switch means to compensate for variations in the transverse position of the traveling web.
2. Apparatus for sensing the edge of a thickened portion of a traveling web, as set forth in claim 1, in which said vertically movable thickness sensing means comprises a housing mounted above the traveling web for vertical movement and having a vertically disposed elongate supporting member secured thereto and extending therefrom in the direction of the traveling web and adapted to engage and ride on the thickened portion of the traveling web to hold said housing and said edge sensing member in a relative vertical position above the web depending upon the thickness thereof.
3. Apparatus for sensing the edge of a thickened portion of a traveling web, as set forth in claim 2, in which said edge sensing member comprises a generally vertically extending elongate member pivoted within said housing to be carried thereby and extending therefrom in the direction of the traveling web to engage the edge of the thickened portion of the traveling web and to be adapted to move transversely thereof under the influence of the edge.
4. Apparatus for sensing the edge of a thickened portion of a traveling web having both thickened and unthickened portions comprising:
- (a) vertically movable means comprising a housing mounted above the traveling web for vertical movement and having a vertically disposed elongate supporting member secured thereto and extending therefrom in the direction of the traveling web and adapted to engage and ride on the thickened portion of the traveling web to hold said housing in a relative vertical position above the traveling web depending upon the thickness thereof;
 - (b) a generally vertically extending elongate sensing member pivoted within and carried by said housing in horizontally spaced relationship to said supporting member and extending therefrom in the direction of the traveling web at a predetermined vertical position relative to said supporting member to engage the edge of the thickened portion of the traveling web above the unthickened portion thereof and being adapted to move transversely of the web between a first position and a second position under the influence of the edge of the thickened portion of the

- web depending upon the transverse position of the web during its travel, said sensing member being held in a corresponding vertical position by said vertically movable means to engage the edge of the thickened portion of the web regardless of variations in thickness thereof;
 - (c) first and second switch means carried within said housing and adapted to be actuated by said sensing member, said first switch means being actuated by said sensing member upon movement of said sensing member to said first position, said second switch means being actuated by said sensing member upon movement of said sensing member to said second position, and neither of said first and second switch means being actuated when said sensing member is maintained substantially midway between said first and second positions; and
 - (d) means responsive to actuation of either of said first and second switch means to compensate for variations in the transverse position of the traveling web.
5. Apparatus for sensing and cutting along the edge of a thickened portion of a traveling web having both thickened and unthickened portions comprising:
- (a) An edge sensing member adapted to engage the edge of the thickened portion of the traveling web and adapted to move transversely of the web between a first position and a second position under the influence of the edge of the thickened portion of the web depending upon the transverse position of the web during its travel;
 - (b) vertically movable thickness sensing means carrying said edge sensing member in horizontally spaced relationship at a predetermined vertical position and adapted to engage the thickened portion of the web for sensing the thickness thereof and for maintaining said edge sensing member in a relative vertical position above the unthickened portion of the web to engage the edge of the thickened portion of the web regardless of the variations in thickness thereof;
 - (c) first and second switch means operatively associated with said edge sensing member, said first switch means being actuated by said edge sensing member upon movement of said edge sensing member to said first position, said second switch means being actuated by said edge sensing member upon movement of said edge sensing member to said second position, and neither of said first and second switch means being actuated when said edge sensing member is maintained substantially midway between said first and second positions;
 - (d) cutting means spaced from said edge sensing member and aligned therewith in the longitudinal direction of travel of the web for cutting the web along the edge of the thickened portion thereof after the web passes said edge sensing member;
 - (e) means responsive to actuation of either of said first and second switch means to maintain said edge sensing member and said cutting means in alignment with the edge of the thickened portion of the traveling web to compensate for variation in the transverse position of the traveling web and to insure cutting of the web along the edge of the thickened portion thereof.
6. Apparatus for sensing and cutting along the edge of a thickened portion of a traveling web, as set forth in claim 5, in which said vertically movable thickness sensing means comprises a housing mounted above the traveling web for vertical movement and having a vertically disposed elongate supporting member secured thereto and extending therefrom in the direction of the traveling web and adapted to engage and ride on the thickened portion of the traveling web to hold said housing and said edge sensing member in a relative vertical position above the web depending upon the thickness thereof.

7. Apparatus for sensing and cutting along the edge of a thickened portion of a traveling web, as set forth in claim 6, in which said edge sensing member comprises a generally vertically extending elongate member pivoted within said housing to be carried thereby and extending therefrom in the direction of the traveling web to engage the edge of the thickened portion of the traveling web and to be adapted to move transversely thereof under the influence of the edge.

8. Apparatus for sensing and cutting along the edge of a thickened portion of a traveling web having both thickened and unthickened portions comprising:

- (a) vertically movable means comprising a housing mounted above the traveling web for vertical movement and having a vertically disposed elongate supporting member secured thereto and extending therefrom in the direction of the traveling web and adapted to engage and ride on the thickened portion of the traveling web to hold said housing in a relative vertical position above the traveling web depending upon the thickness thereof;
- (b) a generally vertically extending elongate sensing member pivoted within and carried by said housing in horizontally spaced relationship to said supporting member and extending therefrom in the direction of the traveling web at a predetermined vertical position relative to said supporting member to engage the edge of the thickened portion of the traveling web above the unthickened portion thereof and being adapted to move transversely of the web between a first position and a second position under the influence of the edge of the thickened portion of the web depending upon the transverse position of the web during its travel, said sensing member being held in a corresponding vertical position by said vertically movable means to engage the edge of the thickened portion of the web regardless of variations in thickness thereof;
- (c) first and second switch means carried within said housing and adapted to be actuated by said sensing member, said first switch means being actuated by said sensing member upon movement of said sensing member to said first position, said second switch means being actuated by said sensing member upon movement of said sensing member to said second position, and neither of said first and second switch means being actuated when said sensing member is maintained substantially midway between said first and second positions;
- (d) cutting means spaced from said sensing member and aligned therewith in the longitudinal direction of travel of the web for cutting the web along the edge of the thickened portion thereof after the web passes said sensing member; and
- (e) means responsive to actuation of either of said first and second switch means to move said sensing member and said cutting means in alignment with the edge of the thickened portion of the traveling web to compensate for variation in the transverse position of the traveling web and to insure cutting of the web along the edge of the thickened portion thereof.

9. Apparatus for sensing and cutting along the edge of a thickened portion of a traveling web, as set forth in claim 8, in which said housing is mounted for vertical movement on a horizontally movable carriage which is adapted to move transversely of the traveling web, said cutting means is mounted on said carriage for movement therewith, and said means responsive to actuation of said first and second switch means being adapted to move said carriage transversely of the traveling web to align said sensing member and said cutting means with the edge of the thickened portion of the traveling web to compensate for variations in the transverse position thereof.

10. Apparatus for sensing and cutting along the edge of a thickened portion of a traveling web having both thickened and unthickened portions comprising:

- (a) a horizontally movable carriage adapted to move transversely of the traveling web in the vicinity of the edge of the thickened portion of the traveling web;

- (b) vertically movable means comprising a housing mounted on said carriage for vertical movement relative thereto and for horizontal movement therewith above the traveling web and having a vertically disposed elongate supporting member secured thereto and extending therefrom in the direction of the traveling web and adapted to engage and ride on the thickened portion of the traveling web to hold said housing in a relative vertical position above the traveling web depending upon the thickness thereof;

- (c) a generally vertically extending elongate sensing member pivoted within and carried by said housing in horizontally spaced relationship to said supporting member and extending therefrom in the direction of the traveling web at a predetermined vertical position relative to said supporting member to engage the edge of the thickened portion of the traveling web above the unthickened portion thereof and being adapted to move transversely of the web between a first position and a second position under the influence of the edge of the thickened portion of the web depending upon the transverse position of the web during its travel, said sensing member being held in a corresponding vertical position by said vertically movable means to engage the edge of the thickened portion of the web regardless of variations in thickness thereof;

- (d) a supporting means disposed below the traveling web and said sensing member to prevent the traveling web from sagging below said sensing member to insure engagement of said sensing member with the edge of the thickened portion of the traveling web;

- (e) first and second switch means carried within said housing and adapted to be actuated by said sensing member, said first switch means being actuated by said sensing member upon movement of said sensing member to said first position, said second switch means being actuated by said sensing member upon movement of said sensing member to said second position, and neither of said first and second switch means being actuated when said sensing member is maintained substantially midway between said first and second positions;

- (f) cutting means mounted on said carriage for horizontal movement therewith and spaced from said sensing member aligned therewith in the longitudinal direction of travel of the web for cutting the web along the edge of the thickened portion thereof after the web passes said sensing means; and

- (g) means responsive to actuation of either of said first and second switch means to move said carriage transversely of the traveling web to align said sensing member and said cutting means with the edge of the thickened portion of the traveling web to compensate for variations in the transverse position of the traveling web and to insure cutting of the web along the edge of the thickened portion thereof, said means comprising an internally threaded hollow collar mounted on said carriage, a threaded shaft passing through said collar and adapted to rotate in a clockwise direction and a counterclockwise direction to move said collar and said carriage in directions toward said traveling web and away from said traveling web transversely of the traveling web, a reversible motor operatively connected with said threaded shaft and with said first and second switches and adapted to drive said threaded shaft in either direction depending

11

upon which of said first and second switch means is actuated.

References Cited

UNITED STATES PATENTS

3,244,418 4/1966 Henderson ----- 271—59
2,910,122 10/1959 Anderson et al. ----- 83—368

5

12

3,073,197 1/1963 Gowin ----- 83—368
3,156,426 11/1964 Brock ----- 83—368 X

ANDREW R. JUHASZ, *Primary Examiner.*

U.S. Cl. X.R.

242—57.1; 271—59