

[54] **OVEREDGING APPARATUS**

[72] Inventor: Donald W. Fowler, Decatur, Ga.

[73] Assignee: Textiles, Inc., Newark, N.J.

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[51] Int. Cl. D05b 21/00

[58] Field of Search 112/121.15, 121.11, 121.12,
112/121.29, 2, 203, 262; 198/181

[56] **References Cited**

UNITED STATES PATENTS

2,714,360 8/1955 Saxby 112/2
2,722,903 11/1955 Larkin 112/121.15

2,355,023 8/1944 Wiren 112/121.12
3,377,967 4/1968 Szentkuti et al. 112/121.12
3,438,625 4/1969 Ramsey et al. 112/121.29 UX
3,467,037 9/1969 Frydryk 112/262 X
3,485,490 12/1969 Ramsey et al. 112/121.29 UX

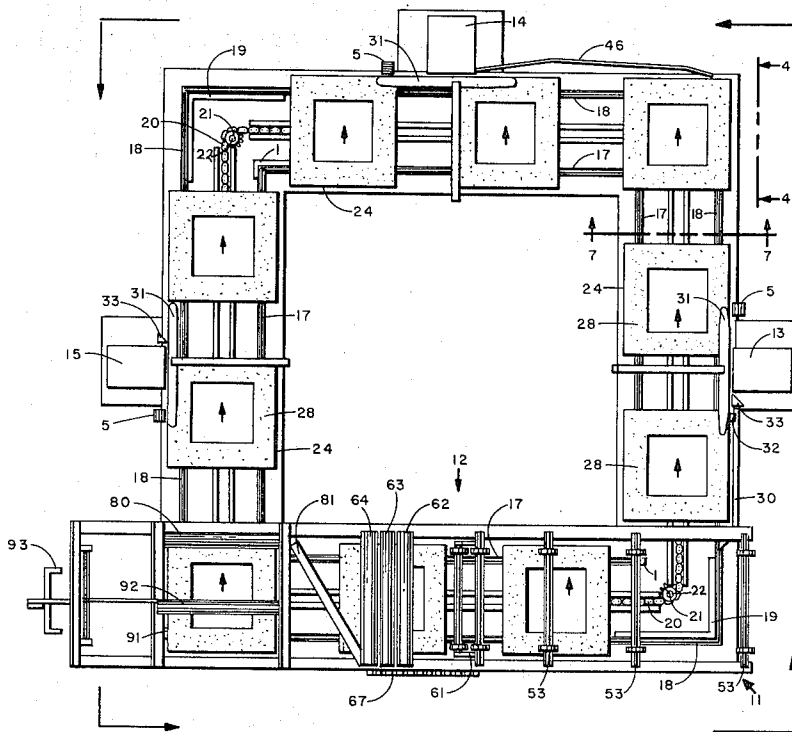
Primary Examiner—James R. Boler

Attorney—Popper, Bain, Bobis & Gilfillan

[57] **ABSTRACT**

An overedging apparatus in which a fabric article having a plurality of sides is transported on a carrier over a course having a plurality of sides; the carrier successively presents each side of the article to a different sewing machine on each course, which sewing machine applies a finished, unravelable edge to each ravelable edge of the article; the carrier changes courses without reorientation.

2 Claims, 9 Drawing Figures



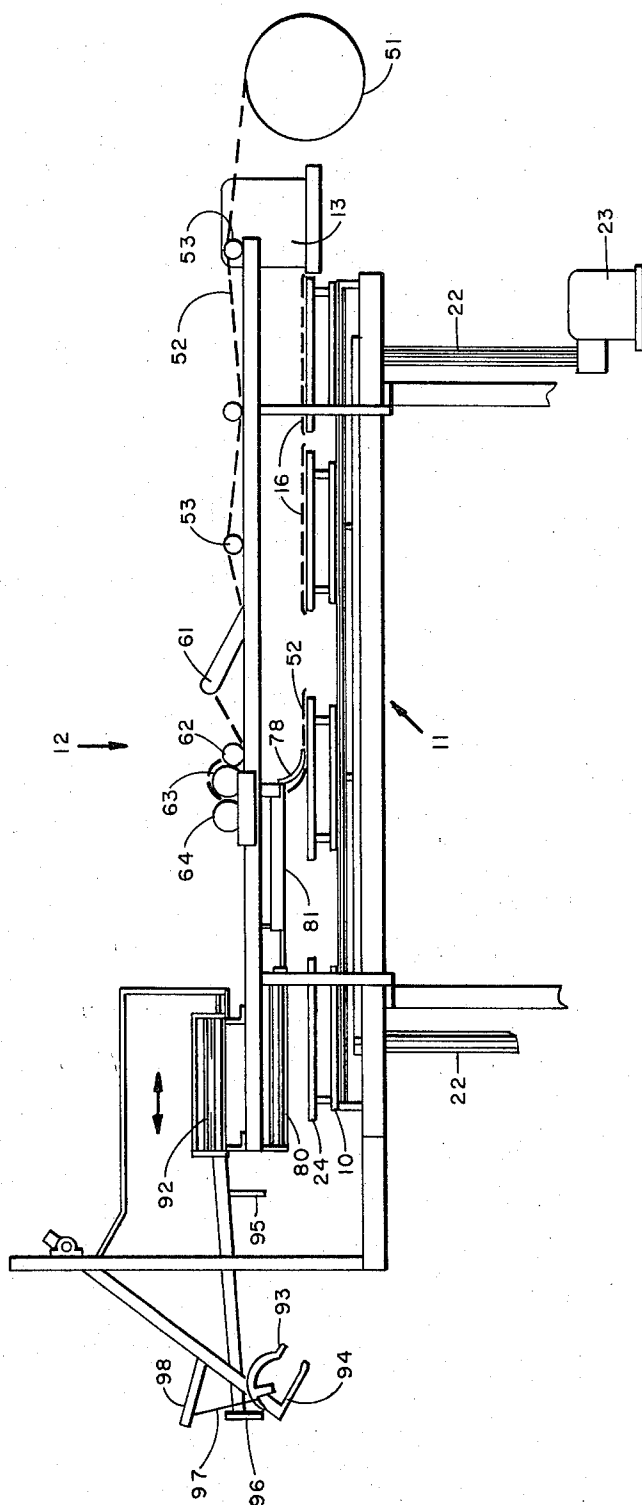


FIG. 1

INVENTOR.
DONALD W. FOWLER
BY
POPPER, BAIN, BOBIS
& GILFILLAN
ATTORNEYS

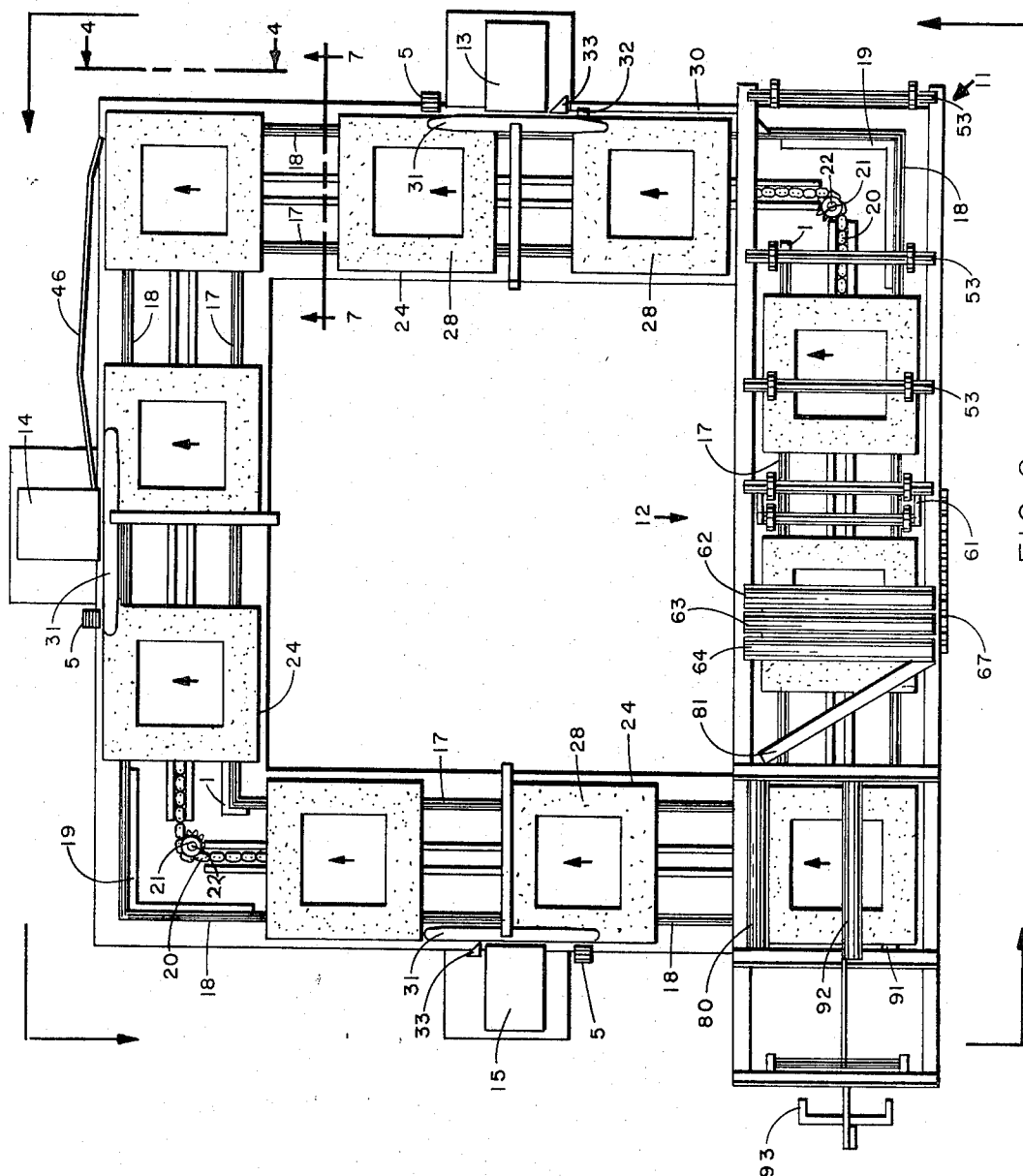


FIG. 2

INVENTOR.

DONALD W. FOWLER

BY

POPPER, BAIN, BOBIS
& GILFILLAN
ATTORNEYS

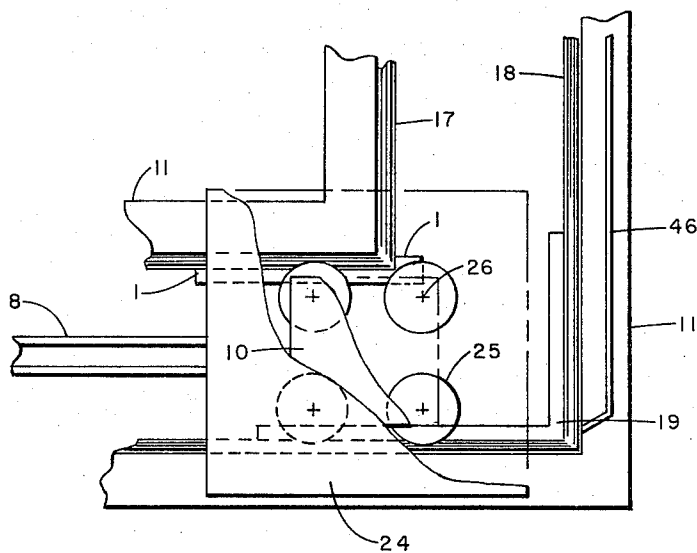


FIG. 3

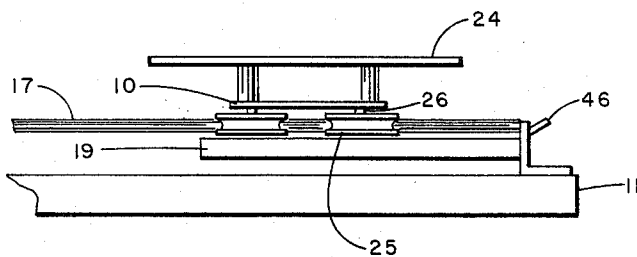


FIG. 4

INVENTOR
DONALD W. FOWLER

BY

POPPER, BAIN, BOBIS
& GILFILLAN
ATTORNEYS

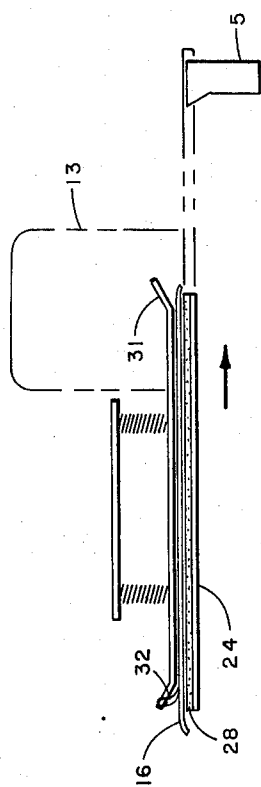
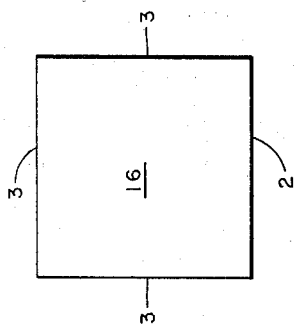


FIG. 5

FIG. 6

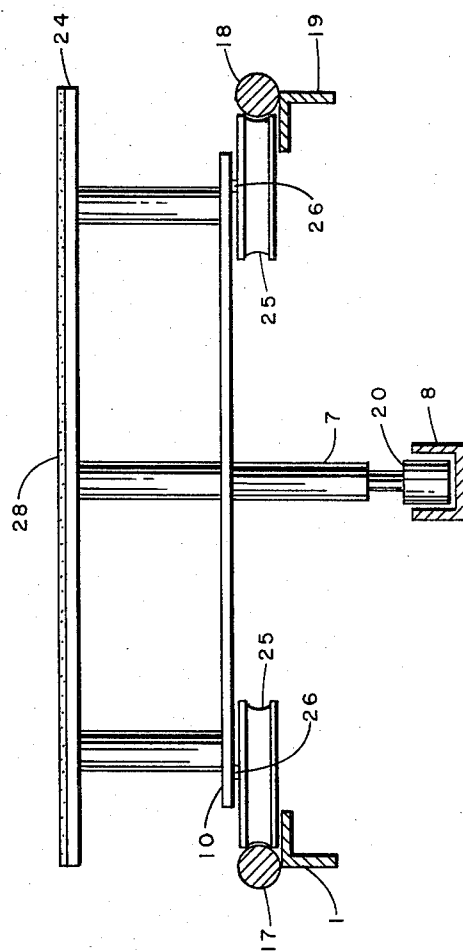


FIG. 7

BY

INVENTOR
DONALD W. FOWLER

POPPER, BAIN, BOBIS
& GILFILLAN
ATTORNEYS

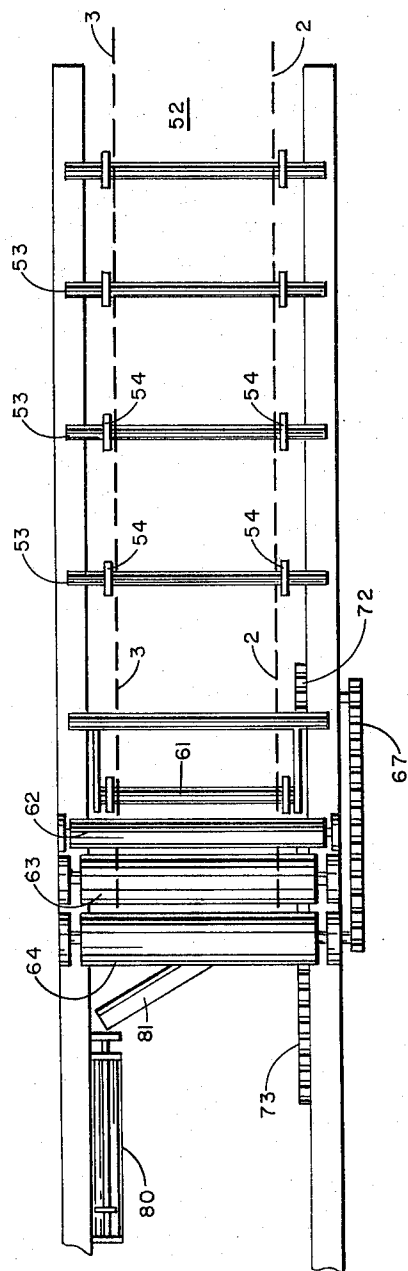


FIG. 8

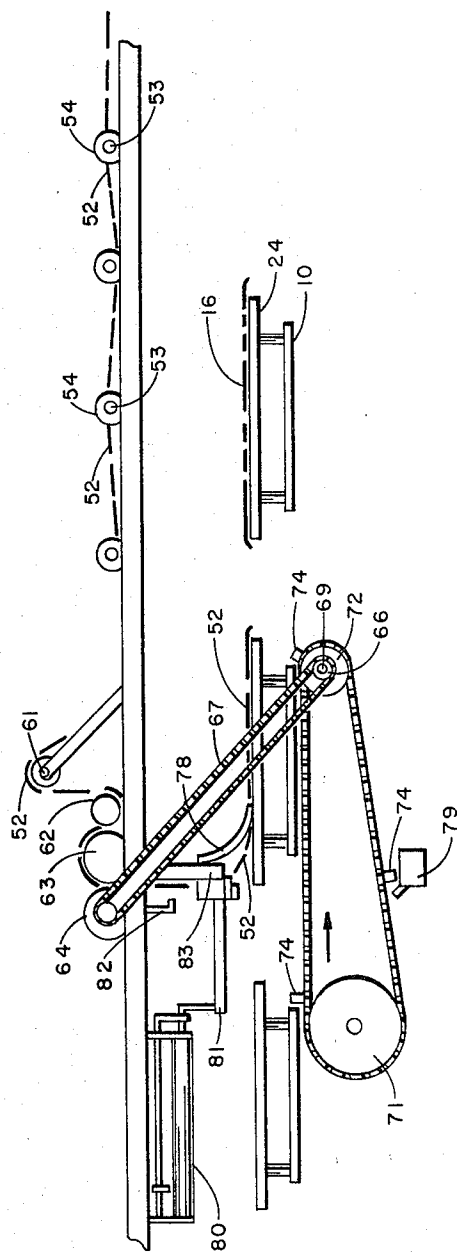


FIG. 9

INVENTOR
DONALD W. FOWLER

BY

POPPER, BAIN, BOBIS
& GILFILLAN
ATTORNEYS

OVEREDGING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates generally to an apparatus for applying a finished edge to fabric (e.g., wiping towels, handkerchiefs etc.) so that they will not unravel during use, and it relates particularly to an apparatus which will continuously and automatically apply a ravel-resistant edge or a finished edge to a multi-sided fabric piece.

2. Description of Prior Art

In the preparation of wiping towels, towel-size fabric pieces are cut from large sheets of fabric. The selvage of such fabric pieces is resistant to tearing and unraveling, but the other edges not having a selvage, will soon tear or fray and make the product unusable. The same problem exists in the manufacture of handkerchiefs, where it is solved by applying a hem. Sails for vessels, covers, certain parts of garments, and other fabric items similarly require the application of finished edges so that they will not unravel. The finishing operation is usually performed by operatives having skill in the operation of sewing machines. The operator presents the fabric piece to the sewing machine, and the conventional edging or serging is applied. The thread extending from the piece is cut, the next side of the fabric piece is similarly serged and so on, until all sides are overedged or serged. With the increase in labor costs for skilled workers, and the scarcity of trained workers, means have been sought to develop automatic machinery which would rapidly perform the operations formerly done by trained and skilled workers, and would perform such operation accurately, automatically, more speedily and at much lower costs.

SUMMARY OF THE INVENTION

It has been found that an apparatus could be devised which would conduct a carrier for fabric pieces around four courses; fabric pieces destined to become wiping towels or the like, come to this machine with only one edge having the usual selvage which does not unravel. This fabric piece is loaded onto a carrier which is lead around a track; the track is generally rectangular i.e. it has four courses, the first of which is the course at which the fabric was loaded on a carrier (the loading station). The carrier then proceeded on the second course, changing direction without rotating. Since the carrier always maintains the same orientation, it presents the first of three raw edges on the second course, the second raw edge on the third course, and the third raw edge on the fourth course. On each of the second, third and fourth courses, a continuously operating sewing machine, performing an edging or serging stitch is located, and the respective unfinished edges of the fabric piece are presented to the sewing machine. The edge is appropriately guided to the sewing machine, which edges or serges the fabric piece on each side, and the thread is cut off from the fabric piece after each edge is applied. When all of the edges are serged, the carrier is unloaded as it re-enters the first course, and a new piece is put in its place. If the sewing machines are of the kind to apply a hemstitch, linen or cotton fabric squares having hems folded onto them, can be similarly finished by the application of the hemstitch. The same procedures can be readily applied to the finishing or other items, with great reduction in cost, and vastly improved speed of production.

THE DRAWINGS

These objects and advantages, as well as other objects and advantages may be attained by the device shown by way of illustration in the drawings in which:

FIG. 1 is a side elevational view of the overedging machine looking at the carrier loading station;

FIG. 2 is a top plan view thereof; with arrows showing the constant orientation of the carrier;

FIG. 3 is a partial top plan view showing a carrier on the track approaching the entry upon a succeeding course;

FIG. 4 is a side elevational view of the carrier on the track with one rail removed;

FIG. 5 is a side elevational view of a carrier, showing the high friction top surface, a fabric piece resting thereon, and a pressure foot sliding over the fabric piece engaging it with the carrier;

FIG. 6 is a top plan view of a fabric piece having one selvage edge and three raw edges;

FIG. 7 is an elevational view of a carrier with the subcarrier towed by the chain in the tracks;

FIG. 8 is a top plan view of the loading station showing the fabric feed and cutters; and

FIG. 9 is a partial side elevational view of the loading station.

PREFERRED EMBODIMENT

The overedging apparatus provides a generally rectangular frame 11. At one side (first course) of the rectangular frame 11, there is a loading station 12, at the next side (second course) of the rectangular frame 11, there is a first edging or sewing machine 13; beyond the first edging machine 12, on the next side (third course) of the frame 11, there is a second edging machine 14, and on the next side (fourth course) of the frame 11, there is a third edging machine 15. The sewing or edging machines 13, 14, 15 are of the kind which apply to the edge of a piece of fabric 16 an overedge stitch which forms a binding on the raw edge of the piece of fabric 16 that prevents it from raveling or fraying. Fabrics ordinarily used in the preparation of wiping towels, covers, handkerchiefs and the like may or may not have a selvage at one edge which does not ravel. It is the selvage edge that is disposed outwardly on the first course. The other three edges, being cut from a larger piece or bolt, are a raw or unfinished, and are subject to fraying or raveling. The present apparatus provides a serged, finished or unravelable edge on the three raw edges, thereby providing a fabric piece or towel 16 which does not fray or deteriorate during use.

Mounted on the rectangular frame 11, there are a pair of opposing tracks 17, 18. These tracks 17, 18 extend to form the four sides of a rectangular course. At each corner of the outer track 18 there is an L-shaped support 19. At each corner of the inner track 17 there is a straight support 1 with an offset end. The tracks 17, 18 are continuous, and the ends merge with the beginning to form a continuous, rectangular circuit.

A chain 20 is conducted along the center of the path described by the tracks 17, 18 being guided by a channel shaped guide 8. This chain 20 is supported at each corner where it changes course by a sprocket 21 mounted on a shaft 22. One shaft 22 is operably connected through a reduction gear to a motor 23.

Rectangular carriers 24 are provided to run on the tracks 17, 18. The sub-carrier 10 is provided with four pulley-type wheels 25 mounted on axles 26 on the bottom of the carrier 24. (See FIGS. 3 & 4). When the carrier 24 is positioned above the track with the wheels 25 embracing the tracks 17 and 18, the carrier 24 rides along the tracks until it reaches the end of a course, and then, without turning, commences to move sidewise at an angle of 90° along the second course. The supports 1, 19 hold the wheels 25 on the track at the corners, while the inner front wheel momentarily leaves the inner track 17 and, after the carrier 24 changes direction, the outer rear wheel momentarily leaves the outer track 18.

The selvage edge 2 of the cloth is positioned outwardly on the first course where there is no sewing machine. A post 7 is attached to the carrier 24, and the sub-carrier 10. Its lower end connects to the chain 20 which traverse a chain guide 8 as it progresses around the four courses. The carrier 24 then enters the second course of the rectangular frame 11 approaching the first edging machine 13. It is noted that the first raw edge 3 of the fabric on the carrier 24 is presented on the second course to the first edging machine 13, since the carrier 24 has changed direction without turning. Note the arrows on

the carriers 24 in FIG. 2 which denote that, although the carriers change direction, they maintain the same orientation, presenting to the sewing machines 13, 14, 15, the three raw edges 3, 3, 3 successively. The carrier moves past a fabric guide 30, which keeps the fabric 16 from draping down over the edge of the carrier 24, and guides it toward the edging machine 13 at the first edging station. The guide 30 is electrically conductive and discharges static electricity from the fabric. Positioned above the fabric guide is a spring loaded pressure-foot 31. As the carrier 24 moves under the spring loaded pressure-foot 31, the foot presses the fabric 16 against the high friction surface 28 on the top of the carrier 24, thereby holding the fabric 16 firmly in place as the first edge 3 is being sewn and finished. A portion of the fabric overlays the edge of the carrier 25 and this portion encounters a pivotably mounted finger or guide 32, which smoothes the fabric edge 3 for passage into the wedge-shaped guide 33 that leads to the sewing head. The guide 33 insures that the edge of the fabric is properly positioned with respect to the needles of the sewing head.

After the full length of the fabric has been edged by the sewing machine 13, the carrier 24 continues toward the end of the second course; the carrier engages a trimmer 5 (not shown in detail). Selvage trimmer are well known in the industry and readily available (Tek-matic Sales Co., Inc., West Englewood, N.J.). A vacuum pump sucks the fabric edge to a position where it engages a motor driven cutter which severs the thread from the sewing machine 13 as the carrier 24 passes by. The same edging and trimming operations are performed on the third and fourth courses.

The loading station 12 is the start and finish point for the carriers 24. At the loading station, fabric squares 16 are placed on the carriers 24, and are removed when the three raw sides 3, 3, 3 are edged.

A spool of fabric 51 is mounted on the frame 11 and a strip of fabric 52 is fed over a series of rods or guides 53. Adjustable collars 54 are positioned in accordance with the width of the fabric strip 52 to guide it smoothly to a metering device. The selvage 2 is disregarded in positioning the collars 54, for it is not sewn. The raw edges 3 govern the position of the collars 54, so that the fabric will be guided to the carriers 24 with sufficient overlap beyond the carriers to be overedged.

The strip 52 is led upwardly over a tension roller 61 and under a tension roller 62. From there it passes between a feed roller 63, and a driven feed roller 64, moving downwardly toward the carriers 24. The driven roller 64 is operated in timed relation to the passage of the carriers, so that fabric squares 16 are delivered to each passing carrier 24.

The roller 64 is driven by a chain 67 that rides on a sprocket 66 mounted on a shaft 69. A second sprocket 72 is mounted on the same shaft 69. Timing lugs 74 are mounted on timing chain 73 that is supported at the opposite end by a third sprocket 71. The timing chain 73 is positioned so that its top course is in general parallelism with the course traversed by the sub-carriers 10, and the timing lugs are positioned to be intercepted by the sub-carriers. The sub-carriers 10 then move the timing chains 73 and the drive chain 67 to feed the fabric strip 52 in timed relation to the movement of the carriers 24. As the fabric strip 52 moves down, it passes cutting blades 81, 83, and drapes over the top of the carrier 24. A flat spring 78 presses the strip 52, as it is fed, against the top of the carrier 24. The timing chain 73 has carried a timing lug 74 to a point where it engages an electroswitch 79 at the time when a sufficient length of the strip has been delivered. The electroswitch 79 then activates a cylinder 80 to operate the blade 81 to sever the fabric strip 52. An air jet 82 blows continuously on the

strip 52 so that it is against the fixed blade 83. After the fabric piece 16 has been cut from the strip 52, the cylinder 80 returns to normal position, to await the next signal.

The unloading of the carrier 52 takes place after the piece 16 has been edged by the sewing machine 15 on the fourth course. The carrier 24 engages an electroswitch 91 which operates the cylinder 92. This moves the fingers 93, 94 toward the moving carrier 24. As the fingers 93, 94 reach the edge of the carrier, they receive between them the edge 3 of the fabric 16. The lug 95 engages and trips the pivotable finger 93 so that the fabric 16 is seized between the pivotable finger 93 and the fixed finger 94. The cylinder 92 having reached its maximum extension, returns to starting position. The fingers 93, 94 with the fabric 16 between them returns to the starting position shown in FIG. 1. At this point, the pivotable finger 93 encounters the lug 96 which pivots it to open position, releasing the fabric. The pivotable finger 93 snaps from open to closed position by means of the spring 97 attached at one end to the support 98 and at the other end to the finger 93. Each of the serging machines 13, 14, 15 is driven continuously by its own separate motor (not shown).

Automatic edging of wiping towels is the primary function of the machine. But it can be adapted to hem handkerchiefs, and numerous other items. Additional or fewer courses may be provided for on the track, so that different shaped fabrics may be finished on one, two, six, seven or eight course tracks.

The foregoing description is merely intended to illustrate an embodiment of the invention. The component parts have been shown and described. They each may have substitutes which may perform a substantially similar function; such substitutes may be known as proper substitutes for the said components and may have actually been known or invented before the present invention.

What is claimed is:

1. An overedging apparatus comprising:
 - a. a fabric carrier having a plurality of side edges,
 - b. a continuous track having a plurality of courses,
 - c. the carrier mounted on the track,
 - d. means to drive the carrier around the track,
 - e. the carrier maintaining the same orientation as it moves around the track from course to course,
 - f. each side edge of the carrier successively disposed in general parallelism respectively, with each successive course of the track,
 - g. a sewing machine disposed on a course of the track and positioned to edge a raw edge on a fabric piece as the carrier moves by,
 - h. means to operate the sewing machine,
 - i. a spool of fabric,
 - j. means to feed fabric from the spool onto the carrier,
 - k. means to cut-off a predetermined length of fabric from the spool and leave it draped on the carrier,
 - l. a timing chain positioned in general parallelism with the course of the carrier,
 - m. A lug on the carrier position to be engaged by the carrier and to drive the chain as the carrier moves,
 - n. a shaft rotated by the timing chain,
 - o. a chain operably connected to the shaft, and
 - p. a pinch roller driven by the chain to feed the fabric onto the carrier.
2. The device according to claim 1 comprising:
 - a. a second lug on the timing chain,
 - b. an electroswitch positioned to be engaged by the second lug and operably mounted to the means to cut-off a predetermined length of fabric from the spool.

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