Aug. 4, 1964

J. J. McGRATH ETAL

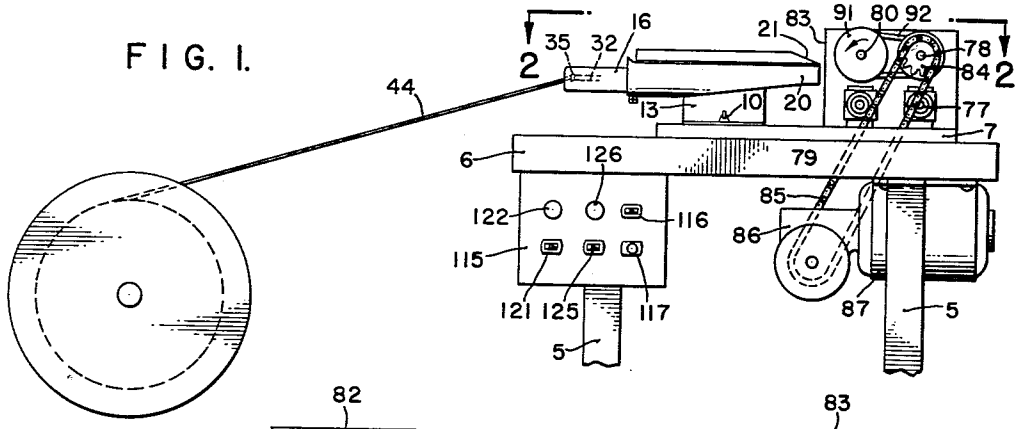
3,143,456

METHOD OF AND APPARATUS FOR ADHERING CORD TO FABRIC STRIPS AND STRIPS PREPARED THEREBY

Filed Feb. 13, 1961

3 Sheets-Sheet 1

FIG. 1.



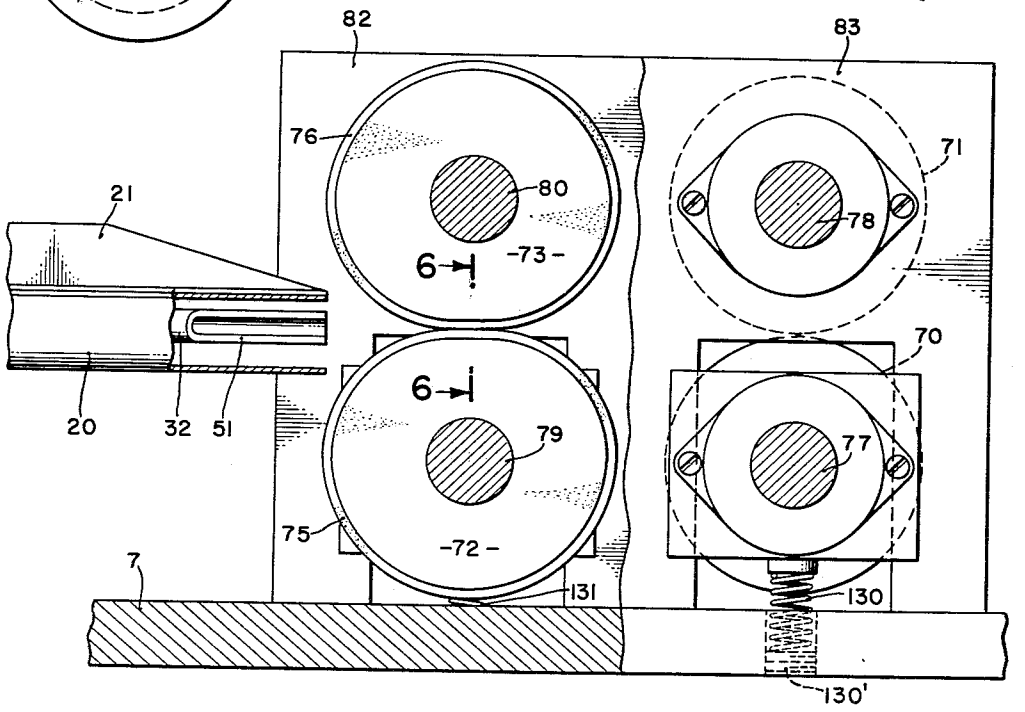
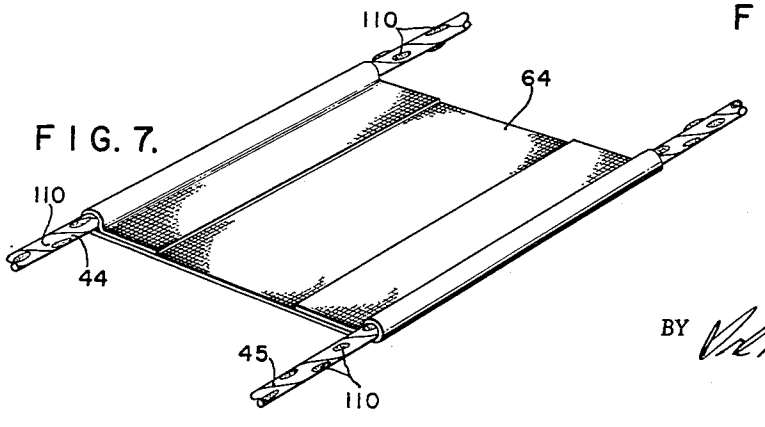


FIG. 3.

FIG. 7.



JOHN J. McGRATH
NATHAN M. WEISS
INVENTORS.

BY

ATTORNEY.

Aug. 4, 1964

J. J. McGRATH ETAL

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3 Sheets-Sheet 2

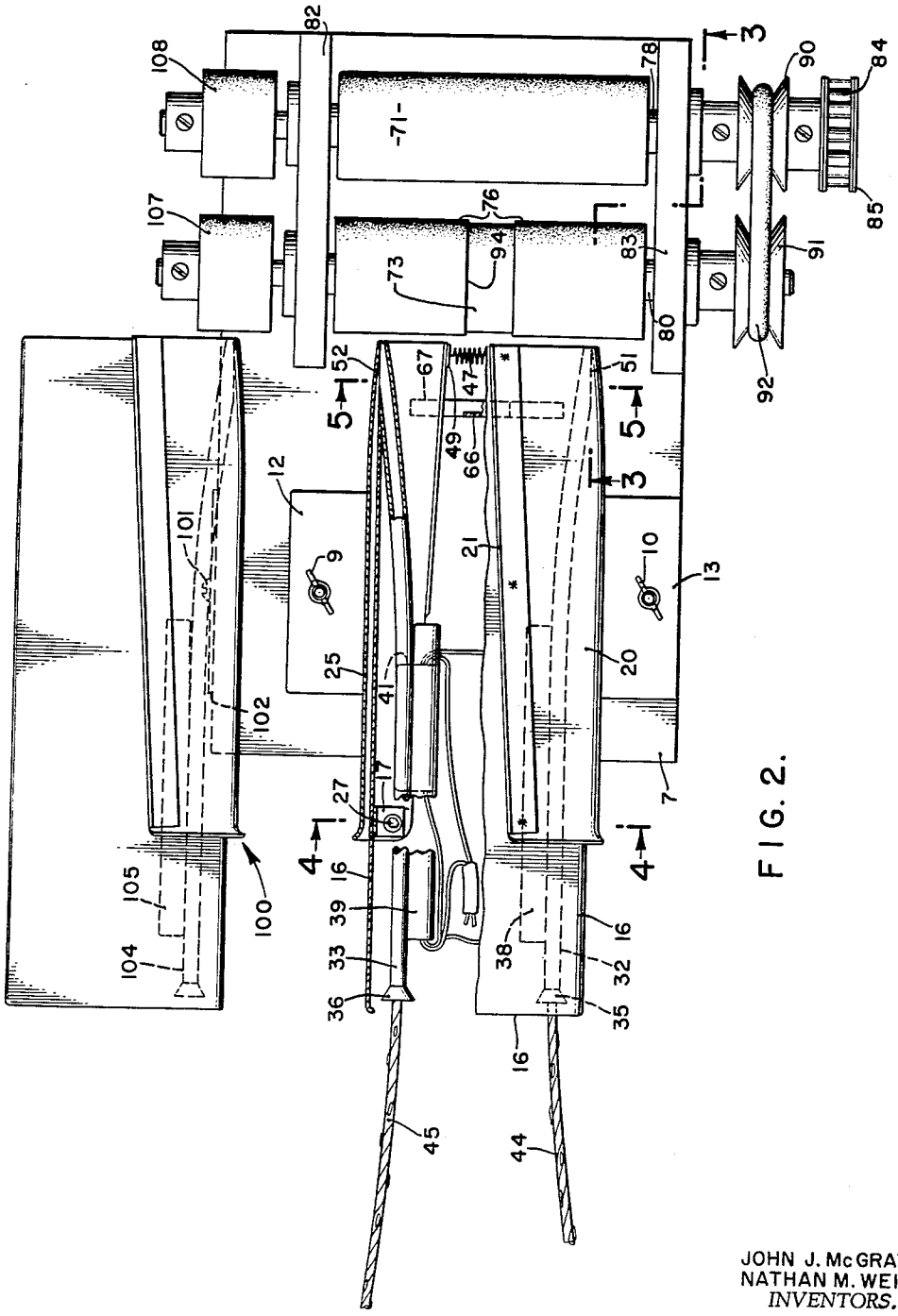


FIG. 2.

JOHN J. McGRATH
NATHAN M. WEISS
INVENTORS.

BY Virl R. Hoshaw

ATTORNEY.

Aug. 4, 1964

J. J. McGRATH ETAL

3,143,456

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3 Sheets-Sheet 3

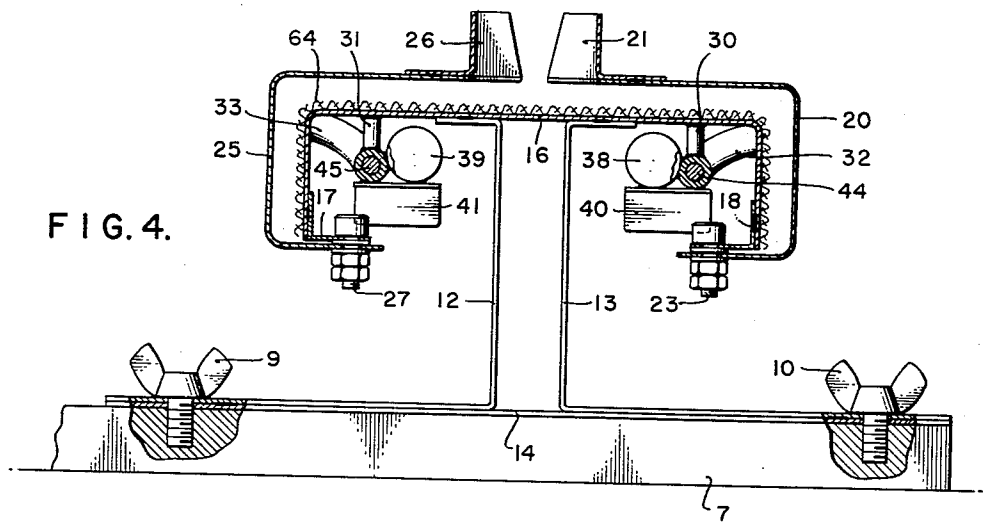


FIG. 4.

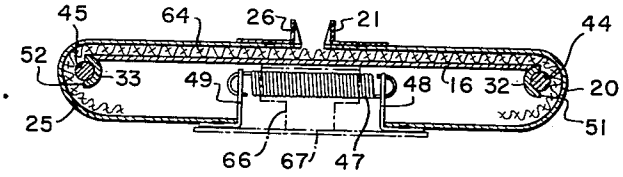


FIG. 5.

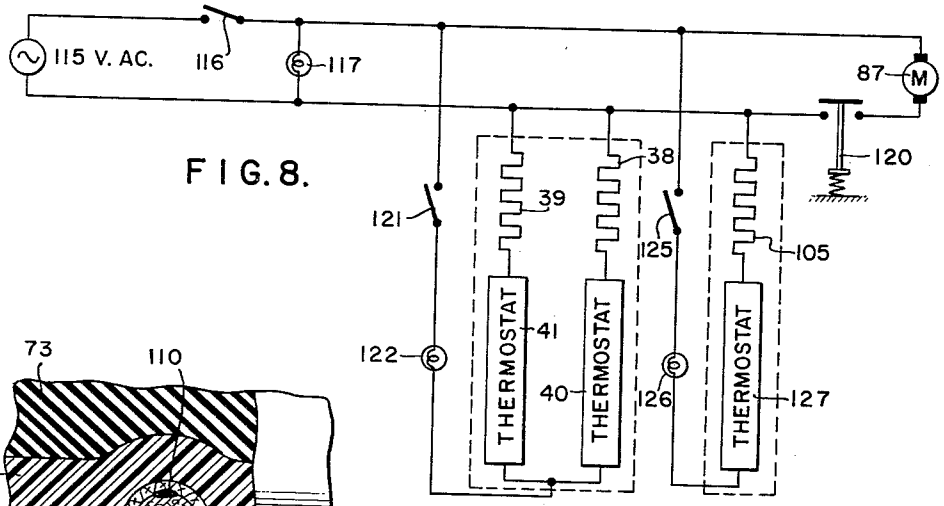


FIG. 8.

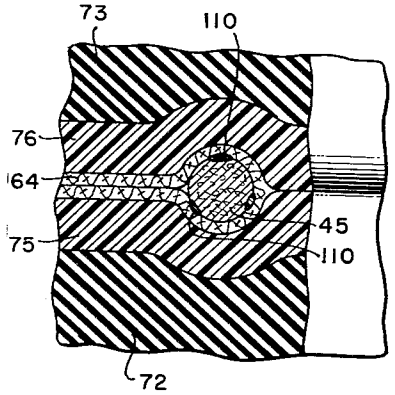


FIG. 6.

JOHN J. McGRATH
NATHAN M. WEISS
INVENTORS.

BY Val R. Hodsdon

ATTORNEY

United States Patent Office 3,143,456 Patented Aug. 4, 1964

3,143,456

METHOD OF AND APPARATUS FOR ADHERING CORD TO FABRIC STRIPS AND STRIPS PREPARED THEREBY

John J. McGrath, Arcadia, and Nathan M. Weiss, San Fernando, Calif., assignors to Southland Cord and Machine Manufacturing Company, Los Angeles, Calif., a corporation of California

Filed Feb. 13, 1961, Ser. No. 88,923
11 Claims. (Cl. 161—101)

This invention relates to the preparation of corded welting or boxing strips for upholstery and particularly to a method of and apparatus for attaching a welting cord to fabric or plastic materials before the final attachment thereof to other portions of cushions, furniture, or other articles.

It is well known in the manufacture of upholstered furniture and the like that cords are enclosed along the edge of cushions and other portions of a piece of furniture. Heretofore, the method of and apparatus for attaching the cords was by passing the material and cord through a sewing mechine and stitching one edge portion of the material around a cord. The other edge portion would then be sewn around another cord to form a boxing strip. This boxing strip was then sewn to either top or bottom portions of cushions or other portions of furniture or other articles. By this previous method, it was found that the subsequent stitching of the strip material to the front and backing members of cushions or other portions of furniture was not only difficult and time-consuming, but the double perforations of the material unnecessarily weakened it, particularly if the material was a plastic. Also, it was found difficult to maintain a uniform spacing between two cords attached to the edge portions of a boxing strip. As mentioned above, the manner of producing the boxing strip was to sew one cord to one edge portion of a strip and then sew another cord to the other edge portion, which required continuous checking and measuring of the distance between cords.

The present invention is one in which one cord or two cords may be simultaneously attached to the edge portion or portions of a strip of fabric or plastic material to produce a single corded or boxing strip very rapidly and accurately. This method does not weaken the material by the subsequent stitching of the boxing strip to the top and bottom portions of cushions or other portions of upholstered furniture, since there is only one row of stitches. A uniform separation between the cords is always obtained, and the joining of the ends of two strips to provide a particularly long boxing strip is rapidly accomplished.

In the past, when it was desired to join a sewed boxing strip to another strip, it was necessary for the operator to cut the threads at the end of the strip containing the cords in order to join the ends of the two pieces together. With the present invention, it is only necessary to separate the cords from the material by a slight pull, since the two cords and material are adhesively joined.

The principal object of the invention, therefore, is to facilitate the production of corded welting and boxing strips for upholstery or other articles.

Another object of the invention is to provide an improved method of and apparatus for producing corded strips, such as boxing strips, for upholstery and similar articles.

A further object of the invention is to provide improved apparatus for rapidly attaching cords to material to provide boxing strips for upholstery.

A still further object of the invention is to provide an improved boxing strip.

A better understanding of this invention may be had

from the following detailed description when read in connection with the accompanying drawings, in which:

FIG. 1 is an elevational view of the apparatus embodying the invention;

FIG. 2 is a plan view of the apparatus taken along the line 2—2 of FIG. 1;

FIG. 3 is an elevational view of the wrapping and advancing rollers embodied in the apparatus shown in FIGS. 1 and 2;

FIG. 4 is a cross-sectional view taken along the line 4—4 of FIG. 2;

FIG. 5 is a cross-sectional view taken along the line 5—5 of FIG. 2;

FIG. 6 is a detail view taken along the line 6—6 of FIG. 3;

FIG. 7 is a perspective view of a boxing strip produced by the invention; and

FIG. 8 is a schematic circuit diagram of the heating and power supply embodied in the invention.

Referring, now, to the drawings in which the same numerals indicate like elements, a stand or table has legs 5, and a top plate 6, and has mounted thereon a base plate 7 to which is attached by thumb screws 9 and 10 a pair of brackets 12 and 13 which are welded to a plate 14 to strengthen the structure. To the right-angled upper flanges of brackets 12 and 13, attached by welding or other suitable manner, is a U-shaped plate 16, the ends of which are welded to brackets 17 and 18. Plate 16 is shown broken away in FIG. 2.

As viewed in FIG. 4, surrounding the forward portion of the plate 16 is a pair of U-shaped guiding or folding plates 20 and 25, plate 20 having a front-tapered upright flange portion 21 welded thereto or formed therefrom, while the bracket 18 at the other end of the plate 20 is pivoted on a pin bolt 23 which fixedly positions plate 16. The U-shaped plate 25 surrounds the left hand portion of the fixed plate 16 and has a forward tapered bracket 26 welded thereto or formed therefrom, the bracket 17 at the other end of the plate 25 being pivoted on a bolt 27 to which the other end of plate 16 is fixedly attached. By referring to FIGS. 2, 4, and 5, it is noted that the cover plates 20 and 25 are separated from fixed plate 16 at their rear ends to permit the easy entrance of fabric material 64, the space between the plates decreasing toward the forward ends thereof, which is to the right in FIG. 2. (See FIGS. 4 and 5.) The pivoting of plates 20 and 25 on bolts 23 and 27 permits the forward ends of plates 20 and 25 to be separated from the forward end of plate 16 by the insertion of a finger between brackets 21 and 26, or any suitable mechanical means. This permits the easy feeding of material 64 between plates 16, 20, and 25, and past the forward ends of the plates.

Referring, again, to FIG. 4, a post 30 and a post 31 support a pair of tubes 32 and 33, respectively, which diverge as they extend from their funnel ends 35 and 36, respectively, to their exit ends. Alongside of tube 32 is a heating unit 38, and alongside of tube 33 is a heating unit 39, these units being controlled by respective thermostats 40 and 41. In FIG. 2, two cords 44 and 45 are shown entering the tubes 32 and 33, respectively. As mentioned above, the plates 20 and 25, pivoted on bolts 23 and 27, respectively, may be separated by placing a finger between the upper flanges 21 and 26 of the respective plates, or by a suitable mechanical means. To return the plates 20 and 25 to their operative positions, a spring 47 is attached between brackets 48 and 49, which, in turn, are attached to the front ends of plates 20 and 25.

The brackets 48 and 49 not only provide a mounting for the ends of spring 47 but serve as guides for an edge

or edges of a strip of material passing between plate **16** and plates **20** and **25**.

As shown at **51** for tube **32**, and **52** for tube **33**, in FIGS. 2 and 3, the outer sides of the ends of the tubes are removed or cut away so that the cords **44** and **45**, as shown in FIG. 5, will contact material **64** at these points, the ends of the tubes **32** and **33** being welded, or otherwise suitably fastened, to the fixed plate **16**. Thus, plates **20** and **25** fold the material **64** around the cords so that certain longitudinal portions thereof come in contact with the cords. A bracket **66**, depending from the fixed plate **16**, has a lower plate **67** to support the ends of the plates **20** and **25**.

The cords **44** and **45** are moved by hand through the tubes **32** and **33** until they slightly extend from the cutaway portions of the tubes at **51** and **52**. The material **64**, to which the cords are to be attached is then manually laid over the rear end of fixed plate **16** and fed under the plates **20** and **25**, the forward ends of which are separated against the tension of spring **47** until the material slightly extends from the forward ends of the plates.

To pull the cords and material continuously through the folder unit just described, four resilient rollers **70**, **71**, **72**, and **73** are provided, the rollers **72** and **73** being in contact and covered with layers **75** and **76** of a particularly resilient silicon plastic. The other rollers **70** and **71**, which are in contact, and the cores of rollers **72** and **73** are of a resilient material having a shore, or hardness, such as to not only pull the cords and material through the folders above described but also to "cuddle" or completely wrap the material around the cords as shown in FIG. 7.

The rollers **71** and **73** are mounted on driven shafts **78** and **80**, respectively, and rollers **70** and **72** are mounted on shafts **77** and **79**, respectively, these shafts being mounted in bearings in frame members **82** and **83** on the base **7**. The shaft of roller **71** has mounted on the end thereof a sprocket **84** which, by means of a chain **85**, through a gear box **86**, is driven by a motor **87**. By means of a pulley **90** and a pulley **91**, shafts **78** and **80**, respectively, are interconnected by an O-ring belt **92**, the roller **71** driving the roller **73**, the lower rollers **70** and **72** being driven by frictional contacts with the driven rollers. It will be noted that roller **73** has a recess **94** in the central portion thereof to permit the passage of a zipper in the event a zipper is to be used in the boxing strip. To obtain the required pressure between the rollers **70** and **71**, a spring **130**, the tension of which is adjustable by set screws **130'**, is used, a similar spring **131** and set screw being provided for rollers **72** and **73**.

By selecting the size of the pulleys **90** and **91**, the rollers **70** and **71** are driven at a slightly higher speed than the rollers **72** and **73** to maintain a tension in the boxing strip between the rollers to prevent twisting of the material. Therefore, as mentioned above, the ends of cords **44** and **45** and material **64** are brought in contact at the cutaway ends of tubes **32** and **33** where the plates **16**, **20**, and **25** have lapped the edge portions of the strip **64**. The strip and enclosed cords are fed to the rollers **72** and **73**, which completely wraps the material over the cords under pressure, rollers **70** and **71** doing the primary pulling and ensuring complete wrapping. By using two pairs of rollers, the adhesive has an opportunity to dry to some extent during travel between the two pairs of rollers to ensure complete bonding of the cords to the material.

To attach a single cord to the edge portion of a strip of material of varying widths, a single unit shown generally at **100** is used, this unit being a duplicate of the unit shown in the lower portion of FIG. 2. This unit is attached by a screw **101** to a bracket **102** on the base plate **7**. The unit **100** has a cord tube **104** and a heater **105** under which is a thermostat similar to thermostats **40** and **41**. To "cuddle" the material over the cord when using the folder **100**, four end rollers, mounted on the ends of shafts **77**, **78**, **79**, and **80**, two of which are shown at **107** and **108**, are used. These rollers have the same construction as rollers **70**, **71**, **72**, and **73**, and accomplish the same result.

An enlarged detail of a cord attached to a fabric is shown in FIG. 6, where the plastic coverings **75** and **76** are shown deformed to accommodate the cord **45**, three adhesive spots **110** being shown between the cord **45** and the material **64**. These spots are on the cord in spiral rows on the low points of the cord and as smears on the high points, as described and claimed in our copending application, Serial No. 78,562, filed December 27, 1960. The adhesive spots are heated by the tubes **32**, **33**, and **104** as the cords pass therethrough until the adhesive becomes tacky. The material and cords are then brought in contact at the cutaway sections **51** and **52**, and since the adhesive is in spiral rows, there will always be some adhesive between the longitudinal portions of the material and cords at sections **51** and **52** to fix the spacing of the cords and material. However, the adhesive remains sufficiently tacky so that when the material and cords are positioned between the rollers, a complete bond is obtained around the entire cords, as shown in FIG. 7. Since the distance between the cutaway portions of tubes **32** and **33** remains fixed at all times, the boxing strip will have a constant or uniform width at all times.

To control the operation of the apparatus, a panel **115** attached to the table top **6** is provided (see FIGS. 1 and 8). The heaters and motor are provided with power from the normal house supply of 115-volts A.C., which is fed to the apparatus over a main switch **116** when closed, a telltale light **117** being energized to indicate that switch **116** is closed. The motor **87** is energized when a foot switch **120** is actuated. To energize the heaters **38** and **39**, a switch **121** is closed, the energization of the heaters being indicated by a telltale lamp **122**. A separate switch **125** and telltale lamp **126** is provided for the heater **105** and its thermostat control **127**.

By the use of a specially prepared cord having specially applied solid adhesive spots thereon, as described and claimed in our above-mentioned copending application, the adhesive becoming tacky under heat, provided as described above or by hot air, a very satisfactory attachment between a welting cord and fabric is obtained. Two cords may be simultaneously attached to form a boxing strip rapidly and which will be of uniform width at all times. Since the material is not sewn to form the strips, there is no double stitching to weaken the material. If it is desired to obtain a different width strip, it is only necessary to exchange a folding unit having one separation with a folding unit having the desired separation. Since each folding unit is provided with a similar pair of brackets **12** and **13** with the same separation between wing nuts **9** and **10**, the substitution of one folding unit for another is quickly accomplished.

Although a heating and control unit is shown for each tube, it is to be understood that a single heating and control unit could be used.

We claim:

1. A boxing strip for use on upholstery and furniture, comprising a strip of material of a predetermined width, a welting cord integrally attached to a longitudinal edge portion of said strip, said edge portion being wrapped around said cord, and said strip of material and said welting cord being joined together by a thermoplastic material which holds them in fixed relation with respect to each other, the contacting portions of said strip being unattached.

2. A boxing strip for use on upholstery and furniture as set forth in claim 1 wherein a second welting cord is integrally attached to a second longitudinal edge portion of said strip by a thermoplastic material, said second edge portion being wrapped around said second welting cord, and each of said welting cords having a uniform separation therebetween.

3. A method of attaching an adhesive-covered welting

cord to a strip of material comprising heating a dry adhesive on said cord to a predetermined temperature sufficient to make said adhesive tacky, advancing said cord and material in contact subsequent to said heating to adhere said cord along a certain longitudinal section of said material, and then completely wrapping said cord with said material during the further advancement of said cord and material to adhere said cord to said material at certain areas of contact between said cord and material, the contacting portions of said strip of material being unattached to each other.

4. A method in accordance with claim 3 in which a pair of said adhesive-covered cords is provided, said cords being spaced a predetermined distance from one another, simultaneously heating the adhesive on said cords to a tacky condition, advancing said cords and material in contact subsequent to the heating to adhere said cords along certain longitudinal sections of said material, and then completely wrapping said cords with said material during the further advancement of said cords and material to adhere said cords to said material, the contacting portions of said material being unattached.

5. An assembly for attaching a welting cord to a strip of material, comprising, a tube through which welting cord is passed and having one side of its discharge end portion removed, a material support plate for said strip of material which is integral with said tube and aligned with its longitudinal axis, a U plate partially surrounding said tube and said material support plate and spaced therefrom, the opening in said tube formed by said removed portion facing the curved portion of said U plate, and means for heating said tube so that the welting cord when it leaves the tube at said discharge end portion is heated.

6. An assembly as set forth in claim 5 wherein roller pressure means is disposed behind the discharge end of said tube to pull the strip of material and the welting cord continuously through the assembly.

7. An assembly for attaching a welting cord to a strip of material, comprising a pair of laterally spaced tubes through which welting cord is passed, each tube having one side of its discharge end portion removed, a material support plate which is disposed between and integral with said tubes, a U plate partially surrounding each tube and the adjacent part of said material support plate, the opening in each of said tubes formed by said removed portion facing the curved portion of said U plate, and means for heating said tubes so that the welting cord when it leaves the tubes at said end portions is heated.

8. An assembly for attaching a welting cord to a strip of material, comprising, a material support plate having a surface along which material is moved longitudinally,

a heated tube for carrying a welting cord and which has a discharge opening close to said surface of the support plate and spaced therefrom, said tube adjacent said discharge opening being inclined at a slight angle with respect to the support plate surface and having the side thereof immediately adjacent said support plate surface cut-away to expose the side of the welting cord as it moves toward the discharge end of said heated tube, the discharge end of the tube being positioned close enough to the support plate so that the heated welting cord emerging from the heated tube is pressed firmly against the material being moved along the support plate surface.

9. An assembly for attaching a welting cord to a strip of material, comprising, a pair of material support plates each having a surface along which material is moved longitudinally, a heated tube associated with each of said support plates for carrying a welting cord therethrough, each of said tubes having an opening close to the surface of its corresponding support plate and spaced therefrom, each of said tubes adjacent its respective discharge opening being inclined at a slight angle with respect to its corresponding support plate surface and having the side thereof immediately adjacent its respective support plate cut-away to expose the side of the welting cord as it moves toward the discharge end of the tube, the discharge end of the tube being positioned close enough to its respective support plate surface so that the welting cord emerging from the heated tube and the material moving along the support plate are pressed firmly together.

10. An assembly for attaching a welting cord to a strip of material as set forth in claim 9 wherein each of said material support plates are hinged, and the ends thereof immediately adjacent the discharge tube are transversely movable.

11. An assembly for attaching a welding cord to a strip of material as set forth in claim 10 wherein rolling pressure means is disposed behind said movable ends of said material support plates to thereby pull the strip of material and welting cord continuously through the assembly.

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