Oct. 13, 1959 H. E. WILLIAMS 2,908,107

METHOD OF PRODUCING INSULATING PADS FOR UPHOLSTERY

Filed Jan. 13, 1958 2 Sheets-Sheet 1

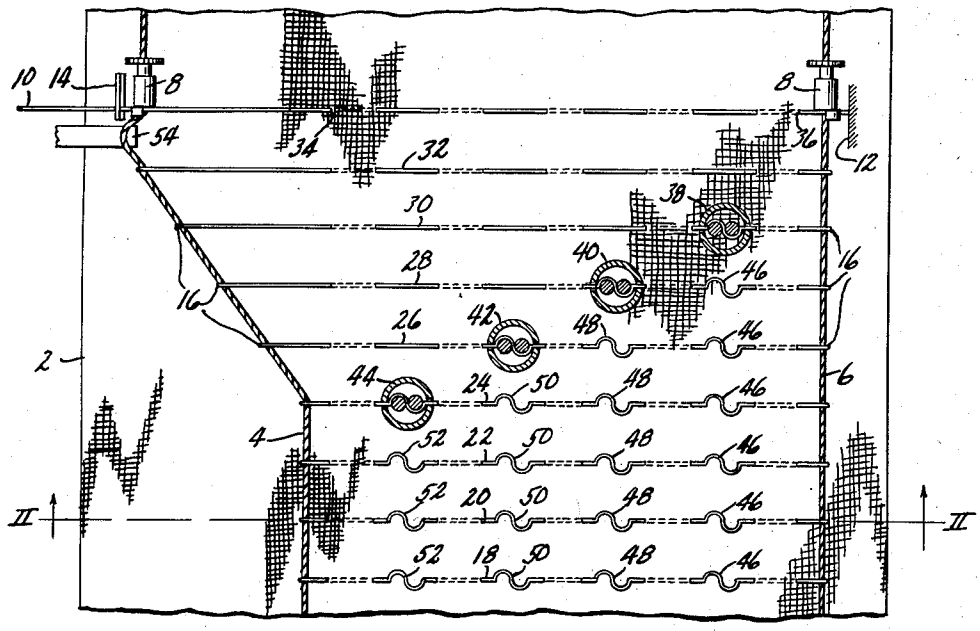


FIG. 1

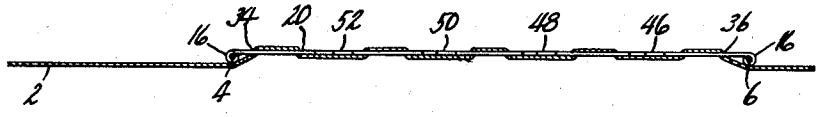


FIG. 2

INVENTOR.
Harold E. Williams
BY
John A. Hamilton
Attorney

Oct. 13, 1959 H. E. WILLIAMS 2,908,107

METHOD OF PRODUCING INSULATING PADS FOR UPHOLSTERY

Filed Jan. 13, 1958 2 Sheets-Sheet 2

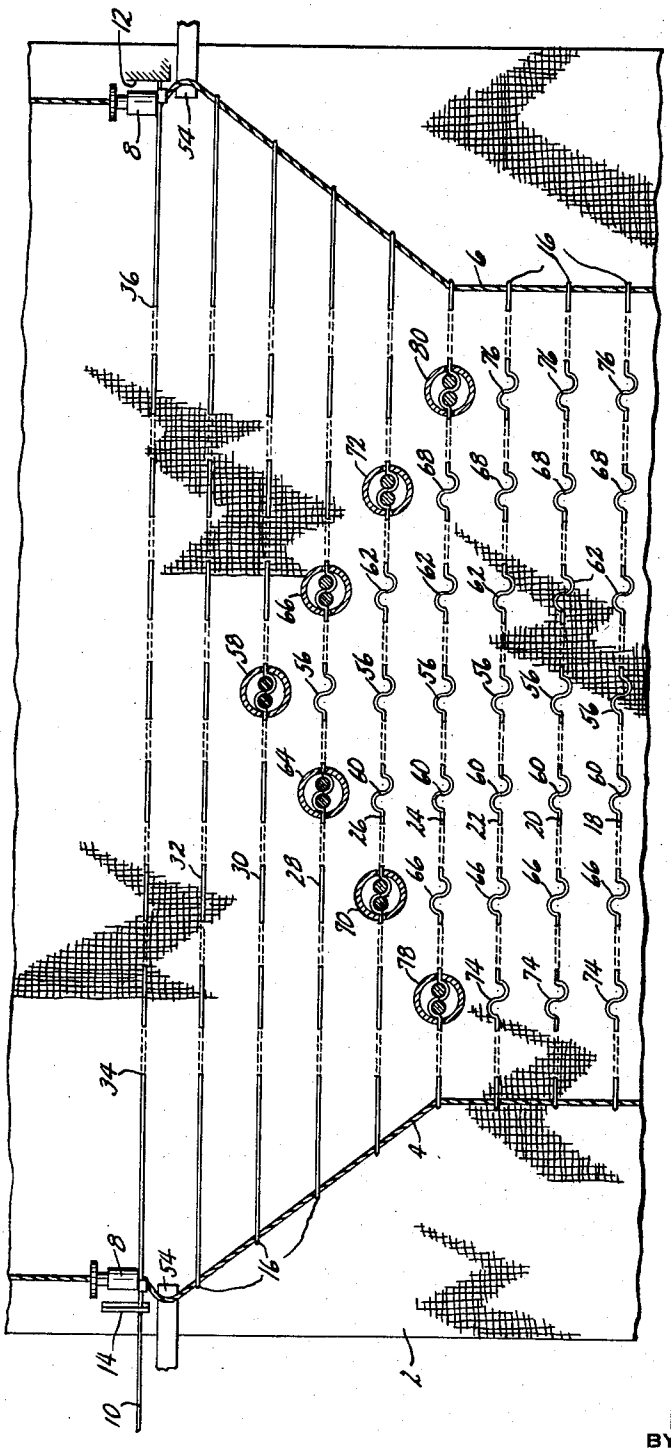


FIG. 3

INVENTOR
Harold E. Williams
BY John A. Hamilton
Attorney

United States Patent Office 2,908,107
Patented Oct. 13, 1959

2,908,107

METHOD OF PRODUCING INSULATING PADS FOR UPHOLSTERY

Harold E. Williams, Carthage, Mo., assignor of one-half to Bess P. Williams, Carthage, Mo.

Application January 13, 1958, Serial No. 708,681

8 Claims. (Cl. 45—138)

This invention relates to a new and novel method of producing insulating pads for upholstery, and has particular reference to a method of producing insulating pads which are "contoured," that is, of any desired shape.

Upholstery insulating pads constitute generally a reinforced fabric formed of various combinations of cloth fabric, wires, and cords. This reinforced fabric is in use disposed between the spring assembly of a seat or chair and the layers of padding and upholstery which overlie said spring assembly. The principal function of the pad is to positively retain the padding material, and to prevent it from working downwardly into the spaces within or between the individual springs which make up the spring assembly. An extremely popular form of upholstery insulating pad constitutes a sheet of burlap or the like having spaced apart parallel wires threaded or stitched therethrough, the corresponding ends of said wires being twisted about or otherwise secured to a pair of pliable cords extending at right angles to said wires respectively adjacent opposite edges of said burlap. Customarily, this form of pad is produced in a continuous operation in which the burlap and cords are advanced intermittently past a forming station. At each pause in this movement, suitable apparatus at this forming station threads a wire through the burlap, cuts the wire to its proper length, and twists the wire ends about said cords. This process has the advantages of speed and economy, but is obviously not adapted to produce a pad wherein the width of said pad, that is, the distance between said cords, is variable. In other words, the provision of means for cutting the wires at variable lengths, and of means for spacing the cords and the wire attaching means at variable distances apart, have presented extremely complicated problems which could be solved only by expensive and involved methods and apparatus.

Accordingly, the principal object of the present invention is the provision of a method whereby, in the forming of an insulating pad of the class described, all of the wires are cut initially at a uniform length, and twisted about the cords while at the initial length, then shortened as required to produce a pad of the desired shape. Generally, this object is accomplished by crimping each wire at one or more places along its length whereby to decrease the effective overall length thereof, the degree of shortening depending either on the number of places the wire is crimped, or on the extent of each crimping operation.

Another object is the provision of a method as described above wherein each wire is stitched through the burlap and is crimped successively at a plurality of points thereof exposed by said stitching, the first crimp being performed at a point of the wire the position of which relative to the fabric is not affected by the eventual shortening of the wire, and successive crimps being formed at points spaced consecutively farther away from the initial crimp. In this manner the wire is pulled longitudinally through the fabric as it is shortened, but

only smooth, uncrimped portions of the wire. Since no crimped wire portion is drawn through the fabric, the wire will slide freely through the fabric, and the fabric will remain smooth and undistorted.

Another object is the provision of a method as described which provides for the fact that the cords must have a greater length thereof between successive wires when said cords extend diagonally relative to said wires rather than at right angles thereto. This is accomplished by introducing slack in the cord or cords between each successive pair of wires, just before the wire ends are twisted about said cords. The amount of slack to be introduced is of course determined by the eventual difference in the lengths of the two wires which will subsequently be caused by the crimping as described.

Other objects are simplicity and economy, convenience and dependability, flexibility to produce nearly any desired shape, and adaptability for use in producing other types of wire-reinforced fabrics.

With these objects in view, as well as other objects which will appear in the course of the specification, reference will be had to the drawing, wherein:

Fig. 1 is a schematic layout illustrating the method forming the subject matter of my invention, showing the formation of an insulating pad wherein only one of the pliable side cords is deviated from a straight line,

Fig. 2 is a sectional view taken on line II—II of Fig. 1, and

Fig. 3 is a schematic layout similar to Fig. 1 but illustrating the formation of an insulating pad wherein both of the pliable side cords are deviated from straight line formation.

Like reference numerals apply to similar parts throughout the several views, and referring first to Figs. 1 and 2, the numeral **2** applies to a continuous strip of burlap or other suitable fabric, only a section of which is shown. It will be understood that in carrying out my process, this strip of burlap is advanced intermittently in a downward direction as viewed in Fig. 1. A pair of cords **4** and **6** extend longitudinally over said burlap, respectively adjacent the opposite edges thereof, and are advanced concurrently with said burlap strip. These cords are customarily pliable, being formed of fiber, twisted paper, or the like, and it will be further understood that initially the cords are spaced apart at a distance equal to the maximum spacing thereof in the finished insulating pad.

The cords pass respectively through a pair of wire twisting heads **8** which are fixed to suitable machine parts and do not move with the burlap. As has been stated previously, the burlap and the cords are advanced intermittently downwardly, and the amount of movement in each step corresponds to the desired spacing between the wires. At each pause in the movement thereof, a wire **10** is extended transversely across the burlap, and is stitched through said burlap. This is accomplished without bending the wire by first crimping the burlap longitudinally as shown in Fig. 2, then projecting the wire through the burlap in a straight line. The crimping of the burlap, and the guiding of the wire, is accomplished by suitable dies, not shown. As shown, the wire is inserted from the left, the end thereof eventually coming to rest against a fixed stop **12** just to the right of cord **6**. The wire is then cut off just to the left of cord **4** by suitable cutters **14**. The wire thus extends between cords **4** and **6**, and has end portions extending outwardly from the cords, these end portions being of sufficient length to be twisted about the cords, as indicated at **16**. Twisting heads **8** are then actuated by any suitable means to twist said wire ends around said cords, said wires engaging said cords with a tight clamping action to prevent slippage on said cords. The wire is then com-

pletely secured, and the burlap and cords are advanced to permit insertion of the next wire. The wires shown in Figs. 1 and 2, in the order of their insertion, are indicated by the numerals **18**, **20**, **22**, **24**, **26**, **28**, **30**, **32** and **10**. It will be seen that the span between the point **34** of the first entry of the wire into the burlap and the point **36** of the last exit of the wire from the burlap must be confined within the span of the finished pad at its narrowest width, for a purpose which will appear.

As the wires **18**, **20**, **22**, etc. proceed away from twisting heads **8**, they are acted upon selectively by a series of crimping heads **38**, **40**, **42** and **44** which are spaced apart transversely between cords **4** and **6**, and which are also spaced apart in the direction of travel of the burlap. Each of these heads is operable, when lowered into engagement with a portion of any of the wires exposed at the upper surface of the burlap, to crimp said wire to shorten the effective length thereof, as shown. The drawing illustrates an S-shaped crimp, but the form thereof is immaterial to the present invention. Thus as each wire passes under bead **38**, a crimp **46** may be formed therein, and beads **40**, **42** and **44** are respectively operable to form crimps **48**, **50** and **52**. Moreover, since the heads **38**, **40**, **42** and **44** operate on wires consecutively farther away from twisting heads **8**, it is obvious that the crimps **46**, **48**, **50** and **52** of each wire must be formed consecutively in that order. It will be understood that the twisting heads **38**, **40**, **42** and **44** may be caused to operate in any predetermined pattern, so long as the crimps in each wire, regardless of the number required, are formed in the sequence as above stated. It will be apparent that by regulating the number of crimps formed in each wire, and/or by regulating the length of wire taken up by each crimp, each wire may be shortened to any desired degree, and the side contours of the pad, as defined by the cords **4** and **6**, may be formed in nearly any pattern desired.

It is important that each wire crimp be formed at a portion of the wire the position of which relative to the burlap fabric will not be changed by the subsequent formation of other crimps in the wire. Thus in Fig. 1, wherein the side of the pad defined by cord **6** is designed to remain straight while the side defined by cord **4** is deviated from a straight line as shown, the first crimp **46** in each wire is formed closest to cord **6**, and the crimps **48**, **50** and **52** are formed successively in that order. Cord **6** is constrained to travel in a straight line by any suitable means, and each of the crimping heads is operable, as it forms the crimp, to draw wire to form the crimp from the left. As each crimp is formed, that portion of the wire between the crimp and cord **4** is caused to be drawn slidably through the burlap fabric **2**. This is possible since the wire is smooth, and since if the crimps are formed in the sequence set forth, it is never necessary to draw a crimped portion of any wire through the fabric. Thus the sequence of crimping is an important step in my process.

It will be seen that as cord **4** is drawn into non-parallel relation to cord **6** by the crimping as described, cord **4** must be disposed diagonally to the wires, rather than at right angles thereto as is cord **6**. Thus there must be a greater length of cord **4** between any successive pair of wires which are eventually to be of different lengths, if the wires are to be maintained parallel and the finished pad smooth and undistorted. This added length of cord is introduced by a hook **54** engaging cord **4** between wire **10** and wire **32**, which is the wire just previously inserted, and deflecting said cord outwardly as shown, whereby to introduce slack in the cord before wire **10** is twisted thereabout. The amount of this slack is of course dictated by the eventual difference between the lengths of wires **10** and **32** after said wires are crimped, and may be regulated by positioning hook **54** to cause any degree of deflection of the cord which may be necessary. The hook is operated by any suitable means, not shown, to introduce variable amounts of slack as required, or to be moved to an inoperative position if the two wires between which it is positioned are eventually to be of equal length. It will be understood that cords **4** and **6** are drawn from reels or other suitable supports under frictional tension, so that hook **54** may function to draw the extra length of cord necessary. The hook must be moved out of engagement with the cord as the burlap is advanced, in order to permit wire **10**, the last wire twisted around said cord, to pass over said hook.

The process illustrated in Fig. 3 is substantially the same as that illustrated in Figs. 1 and 2 except that both of cords **4** and **6** are deviated from their original straight line position in order to produce a pad which is contoured along both edges. In the process as thus practised, it will be apparent that both of cords **4** and **6** will extend diagonally to the wires, and that a slack introducing hook **54** must be provided for cord **6** as well as for cord **4**. Also, since in the form of pad shown the only portion of each wire the position of which relative to fabric **2** is not affected by crimping is the midpoint thereof, the first crimp **56** in each wire requiring crimping, is formed at the midpoint thereof by a crimping head **58**. The next two crimps **60** and **62** in each wire may be formed simultaneously respectively at opposite sides of crimp **56**, by crimping heads **64** and **66**. Consecutively, the next crimps **66** and **68** are formed by crimping heads **70** and **72**, and crimps **74** and **76** are formed by heads **78** and **80**. Also, all of the crimping heads are adapted to draw wire to form the crimp from the wire reach extending between said head and the closest cord **4** or **6**. Therefore, as each wire is shortened, only straight, uncrimped portions thereof will be caused to slide through the fabric. The crimping of the wires as shown in both of Figs. 1 and 3 also has the advantage in the finished product that the crimping anchors the burlap against sliding movement along the wires, and thus prevents displacement of the burlap after extended periods of usage in upholstery structures.

It will be understood that when a pad of the desired contour and size has been produced by the consecutive insertion, twisting, and crimping of the wires, the pad may be cut off from the continuous burlap strip by severing said strip transversely, and cutting cords **4** and **6**. It is therefore possible to set the crimping beads and hooks **54** to operate in a repetitive cycle, and the process is therefore well adapted to use with automatic machinery. Nevertheless, it is to be understood that the various physical apparatuses shown or suggested are merely illustrative of one way of carrying out my process. The proces is not dependent on the apparatus shown, but could be carried out by many different machines, or even manually.

It will be apparent also that while I have illustrated and described certain specific methods, minor variations thereof could be carried out without departing from the spirit of the invention as defined by the scope of the appended claims.

What I claim as new and desire to protect by Letters Patent is:

1. A method of producing an insulating pad for upholstery comprising a sheet of pliable fabric, a plurality of parallel, spaced apart wires stitched through said fabric, and a pair of pliable cords extending along opposite edges of said sheet transversely to said wires and secured respectively to the opposite ends of said wires, said pad being of non-uniform width as determined by the distance between said cords in a direction parallel to said wires, said method comprising first arranging said cords in parallel relation on said fabric sheet at a spacing equal to the maximum width of the finished pad, stitching wires of uniform length through said fabric in parallel, spaced apart relation at right angles to said cords, securing the opposite ends of each wire respectively to said cords, and

finally crimping certain of said wires to lessen the effective lengths thereof whereby to draw said cords closer together to produce a pad of the desired non-uniform width.

2. A method as defined in claim 1 wherein the span of each wire stitched through said fabric is less than the minimum width of the finished pad, and is positioned within the span of the minimum pad width.

3. A method as defined in claim 1 with the additional step of introducing slack into said cords between successive pairs of wires before both of said wires are secured thereto, said slack increasing the length of cord between said wires to permit said cord to extend diagonally between said wires when said wires are of unequal length in the finished pad, whereby said wires may remain parallel in the completed pad.

4. A method as defined in claim 1 wherein the span of each wire stitched through said fabric is less than the minimum width of the finished pad, and is positioned within the span of the minimum pad width, and with the additional step of introducing slack into said cords between successive pairs of wires before both of said wires are secured thereto, said slack increasing the length of cord between said wires to permit said cord to extend diagonally between said wires when said wires are of unequal length in the finished pad, whereby said wires may remain parallel in the completed pad.

5. A method as recited in claim 1 wherein the crimping of each wire requiring shortening is performed by forming one or more separate crimps successively in said wire, the number of crimps in each wire being determined by the degree of shortening required, the first crimp in each wire being formed at a point thereof the position of which relative to said fabric will not be affected by the shortening of the wire, and each successive crimp being formed between the crimp just previously formed and one of said side cords.

6. A method as defined in claim 1 wherein the span of each wire stitched through said fabric is less than the minimum width of the finished pad, and is positioned within the span of the minimum pad width, and with the

additional step of introducing slack into said cords between successive pairs of wires before both of said wires are secured thereto, said slack increasing the length of cord between said wires to permit said cord to extend diagonally between said wires when said wires are of unequal length in the finished pad, whereby said wires may remain parallel in the completed pad and wherein the crimping of each wire requiring shortening is performed by forming one or more separate crimps successively in said wire, the number of crimps in each wire being determined by the degree of shortening required, the first crimp in each wire being formed at a point thereof the position of which relative to said fabric will not be affected by the shortening of the wire, and each successive crimp being formed between the crimp just previously formed and one of said side cords.

7. A method as recited in claim 6 for producing a pad wherein the first of said cords is maintained at all times in its original position relative to said fabric, and the width of said pad being varied by shortening said wires to draw the second of said cords toward said first cord, the first crimp in each wire being formed adjacent said first cord, and each successive crimp in said wire being formed therein between the crimp just previously formed and said second cord.

8. A method as recited in claim 1 for producing a pad wherein the width thereof is varied by shortening said wires to draw both of said cords inwardly from their original positions relative to said fabric, the first crimp in each wire requiring shortening being formed at the midpoint thereof, successive crimps in said wire being formed successively in both directions from said first crimp.

References Cited in the file of this patent

UNITED STATES PATENTS

548,420	Baner	Oct. 22, 1895
2,283,116	Young	May 12, 1942
2,300,718	Williams et al.	Nov. 3, 1942
2,648,842	Shockey et al.	Aug. 18, 1953