DRAPE PLEATING APPARATUS

ABSTRACT: An apparatus for forming spaced groups of three pleats in the upper edge of a drape. The apparatus includes an elongated base, a stationary drape clamp adjacent one end of the base, a carriage mounted on the base and movable lengthwise thereof, a movable drape clamp on the carriage and movable therewith toward and away from the stationary clamp, and a pleating mechanism extending between the clamps for pleating the upper edge of a drape held thereby. The pleating mechanism includes a series of plates which are interconnected by hinges and the ends of which are hinged to the respective clamps. A lazy tong closes and opens the series of hinged plates in response to movement of the movable clamp toward and away from the stationary clamp. A separate tucking tool inserts portions of the upper edge of the drape between adjacent hinged plates of the pleating mechanism.
THE PRESENT INVENTION relates in general to an apparatus for pleating drapes, and since it is particularly applicable to an apparatus for forming spaced groups of pleats, usually three in each group, in the upper edge of a drape, it will be considered in such connection herein for convenience.

Making drapes in the home is a difficult and time-consuming process because, to my knowledge, the upper edges of the drapes are always pleated by hand. Also, the results are frequently inferior to commercially made drapes, even with an experienced seamstress, because it is virtually impossible to obtain uniform pleats in each group, and uniform spacing of the groups, by hand.

I am aware that commercial drape pleating machines are available, but these are, to my knowledge, much too cumbersome and expensive for home use.

SUMMARY AND OBJECTS OF INVENTION

With the foregoing as background, a primary object of the invention is to provide a drape pleating apparatus which is particularly suitable for home use, although not limited thereto, and which is simple and compact, inexpensive to manufacture, and easy to operate even for a seamstress with limited skill.

More particularly, an important object of the invention is to provide a drape pleating apparatus which includes: an elongated base; a stationary drape clamp carried by the base adjacent one end thereof; a carriage mounted on the base and movable lengthwise thereof; another drape clamp mounted on the carriage and movable therewith toward and away from the stationary clamp; and pleating means extending between and interconnecting the two clamps, and contractible and extensible in response to movement of the movable clamp toward and away from the stationary clamp, for pleating a drape edge held by the clamps.

With the foregoing construction, it is merely necessary to place a portion of the upper edge of the drape on the pleating means and grip it with the two clamps on opposite sides of the pleating means. Subsequently, on moving the movable clamp toward the stationary clamp, the pleating means forms a group of three pleats in the portion of the drape between the two clamps.

Another object of the invention is to make the width of the stationary clamp substantially equal to the spacing desired between the groups of pleats. With this construction, when one group of pleats is sewed or pinned, or otherwise permanently secured, it is merely necessary to move such group of pleats lengthwise of the base a distance substantially equal to the width of the stationary clamp, whereupon the two clamps may be reengaged with the upper edge of the drape.

Another object is to provide an apparatus wherein the pleating means includes simply a series of pleats interconnected by hinges and hinged at its ends to the respective clamps, the hinge axes all extending transversely of the path of the movable clamp. With this construction, the portion of the upper edge of the drape which is to be pleated is merely inserted or tucked downwardly into the spaces between adjacent hinged plates of the pleating means, thereby achieving accurate pleating quickly and easily.

Still another object is to provide tucking means, for inserting portions of the drape edge downwardly between adjacent hinged plates, when the series of such plates is closed, which comprises two hinged plates respectively insertable between adjacent hinged plates of the pleating means to form three pleats. Preferably, the tucking means is a separate tucking tool comprising simply two hinged plates respectively provided with integral handles.

Yet another object of the invention is to provide a lazy tong or lazy tong means for closing and opening the series of hinged plates forming the pleating means in response to movement of the movable clamp toward any away from the stationary clamp.

The foregoing objects, advantages, features and results of the present invention, together with various other objects, advantages, features and results thereof which will be evident to those skilled in the drape pleating art in the light of this disclosure, may be achieved with the exemplary embodiment of the invention described in detail hereinafter and illustrated in the accompanying drawings.

DESCRIPTION OF DRAWINGS

In the drawings:

FIG. 1 is a plan view, with parts broken away, showing a drape pleating apparatus or machine which embodies the invention, a pleating means of the machine being shown in its extended or open position.

FIG. 2 is a front elevational view of the machine in the same condition as it is shown in FIG. 1.

FIG. 3 is a transverse sectional view taken as indicated by the arrowed line 3-3 of FIG. 2.

FIG. 4 is a longitudinal sectional view taken as indicated by the arrowed line 4-4 of FIG. 1.

FIG. 5 is a view similar to FIG. 4, but showing the pleating means in its contracted or closed position.

FIG. 6 is an enlarged, fragmentary front elevational view similar to a portion of FIG. 2, but showing the pleating means in a partially contracted or closed position.

FIG. 7 is an enlarged, fragmentary perspective view showing the pleating means in a partially contracted or closed position and in the process of forming a group of three pleats in the upper edge of a drape; and

FIG. 8 is a perspective view showing an alternative pleating tool.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENT OF INVENTION

Referring to the drawings, the drape pleating apparatus or machine of the invention is designated generally therein by the numeral 10 and includes as one of its major components an elongated bed 12 which may have any suitable construction. In the particular construction shown for illustrative purposes, the base 12 includes an upwardly facing channel 14, as best shown in FIG. 3. Four posts 16 extend upwardly through the lower wall of the channel 14 adjacent the respective corners thereof and are welded, or otherwise secured to the sidewalls of the channel. The lower ends of the posts 16 are provided thereon with cup-shaped feet 18 of rubber, plastic or the like.

Suitably secured, as by welding, to the upper ends of the posts 16 is a carriage guide 20 forming part of the base 12. In the construction illustrated, the carriage guide 20 includes two longitudinal flanges 22 connected to the upper ends of the posts 16 and facing laterally inwardly toward each other. The carriage guide 20 also includes an upper wall 24 integral with and spaced upwardly from the lower flanges 22. Thus, the carriage guide 20 provides between the lower flanges 22 and the upper wall 24 parallel tracks 26 which extend lengthwise of and are spaced apart laterally of the base 12.

Movable longitudinally of the base 12 in the carriage guide 20 is a carriage 30. In the particular construction shown in the drawings, the carriage 30 comprises simply a flat rectangular plate the longitudinal edges 32 of which are disposed in and movable longitudinally along the respective tracks 26.

The machine 10 includes actuating means 34 for moving the carriage 30 longitudinally of the base 12 along the tracks 26. The actuating means 34 is shown as including a transverse shaft 36, FIG. 3, extending through and rotatable relative to the upright sidewalls of the channel 14. A knob 38 on the shaft 36 on the front side of the machine 10 serves to rotate the shaft. Fixed on the shaft 36 is a pinion gear 40 which is meshed with a rack 42 formed integrally with or suitably secured to the underside of the carriage 30 and extending longitudinally thereof. As will be apparent, by rotating the knob 38, the carriage 30 may be moved back and forth lengthwise of the base 12. Preferably, the knob 38 is located adjacent one end of the base.
Mounted on the base 12 adjacent the knob 38 is a stationary drape clamp 44 for gripping the upper edge 46 of a drape 48. The stationary clamp 44 includes a lower plate 50 seated on and suitably secured to the upper wall 24 of the carriage guide 20, as by welding. The stationary clamp 44 also includes an upper plate 52 pivotally connected to the lower plate 50 by a hinge 54 located forwardly of the base 12 and paralleling the tracks 26. As will be appreciated, the upper plate 52 may be pivoted upwardly into the broken line position of FIG. 3 to permit the upper edge 46 of the drape 48 to be placed on the lower plate 50, whereupon the upper plate is swung downwardly into the solid-line position of FIG. 3.

Considering how the lower and upper plates 50 and 52 clamp the drape edge 46 therewith, a bolt 56 welded or otherwise secured to the lower plate 50 extends upwardly therethrough and further extends upwardly through an opening 58 in the plate upper plate 52. The opening 58 has the same configuration as a wingnut 60 threaded on the upper end of the bolt 56. Consequently, when the wingnut 60 is in the position shown in solid lines in FIGS. 1 and 3, for example, it holds the upper plate 52 down to clamp the drape edge 46 between the two plates 50 and 52. However, by rotating the wingnut 60, 90° into the broken line position of FIG. 3, it is aligned with the complementary opening 58 so that the upper plate 52 can be swung upwardly into its broken line position, FIG. 3, to permit removal of the drape edge 46, or longitudinal movement thereof, as will be discussed hereinafter.

Also, for a reason to be discussed hereinafter, the width of the stationary clamp 44, i.e., its dimension lengthwise of the base 12, is substantially equal to the desired spacing between groups 62 of triple pleats 64, FIG. 7, to be formed in the drape edge 46.

Mounted on the carriage 30 for movement therewith longitudinally of the base 12 toward and away from the stationary clamp 44 is a movable clamp 66 similar or identical to the stationary clamp 44. More particularly, the movable clamp includes a lower plate 68 and an upper plate 70 pivotally connected to the lower plate by a hinge 72 forwardly of the base 12 and paralleling the tracks 26. A wingnut 74 threaded on a bolt 76 secured to the lower plate 68 serves to clamp the drape edge 46 between the two plates 68 and 70. The upper plate 70 is provided with an opening 78 similar to the opening 58 and complementary to the wingnut 74. When the wingnut 74 is aligned with the opening 78, the upper plate 70 may be swung upwardly into an inoperative position to release the drape edge 46.

The movable clamp 66 is slidable longitudinally of the base 12 on the upper surface of the upper wall 24 of the carriage guide 20. A bolt 80 extending through the carriage 30 and the lower plate 68 of the movable clamp 66 causes the movable clamp to move back and forth longitudinally of the base 12 with the carriage 30, the bolt 80 being movable in a slot 82 in the upper carriage-guide wall 24.

The movable clamp 66 is maintained parallel to the stationary clamp 44 by a plating means 84 which extends between and interconnects the lower plates 50 and 68 of the stationary and movable clamps 44 and 66. As will be explained, the plating means 84, which is contractable and extensible in response to movement of the movable clamp 66 toward and away from the stationary clamp 44, forms a group 62 of three pleats 64 in the drape edge 46 in response to movement of the movable clamp toward the stationary clamp, with correspondingly spaced portions of the upper drape edge held thereby.

More particularly, the plating means 84 includes a series of hinges 88 having axes extending transversely of the path of the movable clamp 66 and parallel to the plane of the drape 48. The end pleating plates 86 in the series are pivotally connected to the respective lower plates 50 and 68 of the stationary and movable clamps 44 and 66 by hinges 90 paralleling the hinges 88. The widths of the pleating plates 86 are all equal so that the spacings between the various hinges 88 and 90 are all equal also.

In the particular construction illustrated, wherein it is desired to produce groups 62 of three pleats 64, there are six of the pleating plates 86. As will be explained, one pleat 64 is formed over each pair of adjacent pleating plates 86.

As the series of pleating plates 86 is contracted and extended in response to movement of the movable clamp 66 toward and away from the stationary clamp 44, the pleating plates 86 themselves pivot between open and closed positions, as shown in FIGS. 4 and 5, respectively. FIGS. 6 and 7 show the pleating plates 86 in partially closed positions.

The drape pleating machine 10 includes a lazy tong or lazy tong means 92 for closing and opening the pleating plates 86 in response to movement of the movable clamp 66 toward any and away from the stationary clamp 44. More particularly, as best shown in FIG. 6, the lazy tong 92 includes four long links 94 having ends pivotally connected to the pins of the end hinges 88 and the middle hinge 88. The midpoints of the long links 94 are pivotally connected to the pins of the intervening hinges 88. The opposite ends of two of the long links 94 are pivotally interconnected by a pin 96. Similar pins 96 pivotally interconnect the opposite ends of the other two long links 94 and two short links 98, respectively. The opposite ends of the two short links 98 are pivotally connected to the pins of the respective hinges 90.

It will be apparent that, with the foregoing lazy tong construction, the pleating plates 86 are caused to move from the open positions of FIG. 4 to the movable clamp 66 toward any and away from the stationary clamp 44. As the pleating plates 86 are being closed in response to movement of the stationary clamp 44 toward the movable clamp 66, the portion of the upper edge 46 of the drape 48 which is disposed between and held by the two clamps is caused to be pleated by the pleating plates 86 in combination with a pleating or tucking tool 100 for inserting or tucking portions of the drape edge 46 downwardly into the V's formed by the pleating plates to produce a group 62 of three pleats 64. The manner in which this may be accomplished is clearly apparent from FIG. 7 of the drawing.

In the construction illustrated, the pleating tool 100 is a separate hand-operated device composed of two pleating plates 102 respectively insertable into the V's formed by the pleating plates 86 and interconnected along their upper edges by a hinge 104. Integral flanges 106 projecting laterally outwardly in opposite directions from the upper edges of the pleating plates 102 serve as handles. As will be apparent, assuming that the pleating tool 100 is used to push the drape edge 46 downwardly into the V's formed by the pleating plates 86 as these pleating plates are closed, the hinged connection between the pleating plates 102 of the tool 100 permits the pleating plates 102 to close concurrently.

FIG. 8 shows an alternative pleating tool 110 of one-piece construction, comprising pleating plates 112 integrally interconnected by a resilient, semibular handle 114. The latter acts as a hinge permitting closing of the plates 112 concurrently with the plates 86.

It will be understood that pleating tools, not shown, with other numbers of pleating plates may be used for other numbers of pleats 64 in each group 62, i.e., one plate for a two-pleat group, three-hinged plates for a four-pleat group, and so forth.

EXPLANATION OF OPERATION OF INVENTION

With the stationary and movable clamps 44 and 66 open, and with the series of pleating plates 86 extended or open, a portion of the upper edge 46 of the drape 48 is placed on top of the lower clamp plates 50 and 68 and the pleating plates 86. The width of the portion of the drape edge 46 which is placed on top of the lower plate 50 of the stationary clamp 44 corresponds to the width desired between the corresponding vertical edge of the drape 48 and the first group 62 of three pleats 64. This width may or may not be equal to the width of the stationary clamp 44.
Next, the two clamps 44 and 66 are closed and locked, and the knob 38 is rotated to move the clamp 66 towards the clamp 44. This causes the series of pleating plates 86 to begin to close so as to begin to form V's between adjacent pleating plates 86. At the same time, the pleating plates 102 of the tool 100 are inserted downwardly into such V's to cause the portion of the drape edge 46 between the two clamps 44 and 66 to conform to the configuration of the closing pleating plates 86. Eventually, the series of pleating plates 86 reaches the fully closed position of FIG. 5 to complete the formation of a group 62 of three pleats 64. Thereupon, the pleating tool 100 may be withdrawn and the just-formed group 62 of pleats 64 may be secured temporarily or permanently, by pinning or sewing, or in any suitable manner.

The foregoing accomplished, the clamps 44 and 66 are opened and the drape edge 46 is moved lengthwise of the base 12 into a position such that the previously-formed group 62 of pleats 64 is located on the opposite side of the stationary clamp 44, i.e., on the right side thereof as viewed in FIG. 5, for example. Next, the clamps 44 and 66 are closed and locked and the foregoing operations are repeated. This results in the formation of a second group 62 of pleats 64, not shown, spaced from the first by a distance substantially equal to the width of the stationary clamp 44. Thus, this clamp serves as an automatic spacing means, which is an important feature.

The foregoing operations are repeated until the entire upper edge 46 of the drape 48 has been pleated.

Although an exemplary embodiment of the invention has been disclosed herein for purposes of illustration, it will be understood that various changes, modifications and substitutions may be incorporated in such embodiment without departing from the invention. For example, although the drape pleating machine 10 has been disclosed as capable of forming spaced groups of triple pleats, the invention may be embodied in machines for forming spaced groups of double pleats, quadruple pleats, and the like, or other, entirely different, types of pleats.

1. In a drape pleating apparatus, the combination of:
   a. an elongated base;
   b. a stationary drape clamp carried by said base adjacent one end thereof;
   c. a carriage mounted on said base and movable longitudinally thereof;
   d. a movable drape clamp mounted on said carriage and movable therewith toward and away from said stationary clamp;
   e. pleating means extending between said clamps, and contractable and extend extensible in response to movement of said movable clamp toward and away from said stationary clamp, for pleating a drape edge held by said clamps; and
   f. said pleating means including a series of hinged plates which are interconnected by hinges and the ends of which are connected by hinges to said clamps, respectively, said hinges having axes extending transversely of the path of said movable clamp.

2. A drape pleating apparatus as defined in claim 1 including lazy tong means for closing and opening said series of hinged plates in response to movement of said movable clamp toward and away from said stationary clamp.

3. A drape pleating apparatus according to claim 1 including tucking means for inserting portions of a drape edge held by said clamps between adjacent ones of said hinged plates when said pleating means is contracted.

4. A drape pleating apparatus as defined in claim 3 wherein said tucking means includes hinged plates respectively insertable between adjacent hinged plates of said pleating means.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION


Inventor(s) Northrop H. Ketchum

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 74, "any" should be --and--;
Column 2, line 21, "4-" should be --4-4--;

Column 3, line 17, omit "plate" (first instance);
Column 3, line 23, "broken line" should be --broken-line--;
Column 3, line 25, " " " " " " "
Column 6, line 14, delete "extend".

Signed and sealed this 30th day of March 1971.

(SEAL)
Attest

EDWARD M. FLETCHER, JR. WILLIAM E. SCHUYLER,
Attesting Officer Commissioner of Patents