

Aug. 29, 1950

H. SHERMAN
PLEATING OF DRAPERIES

2,520,787

Filed Oct. 26, 1949

3 Sheets-Sheet 1

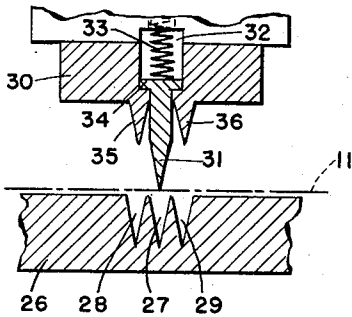


FIG. 3.

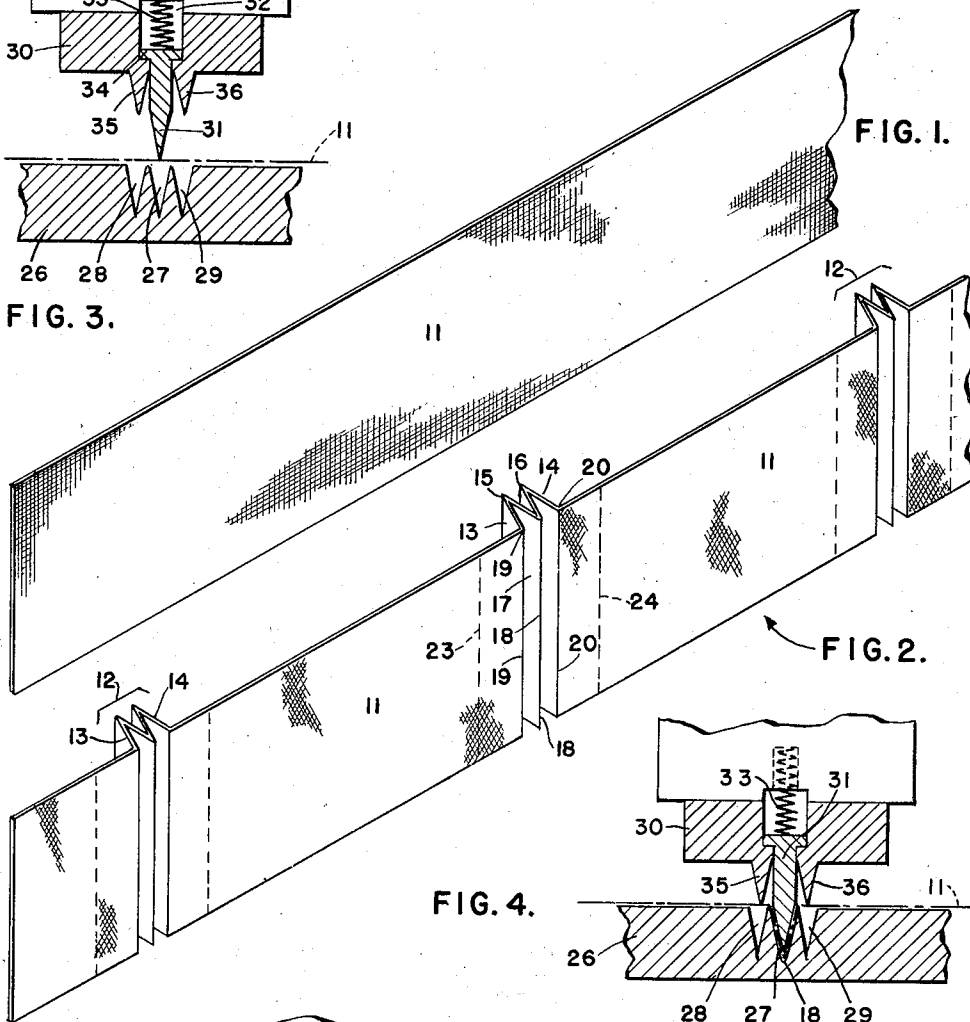


FIG. 1.

FIG. 2.

FIG. 4.

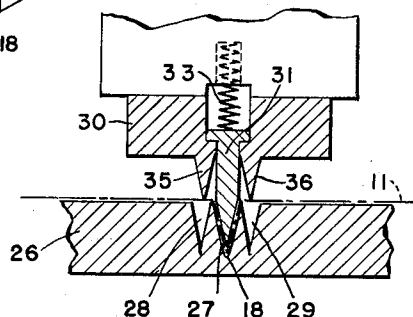
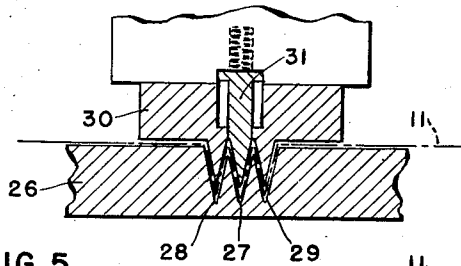


FIG. 5.

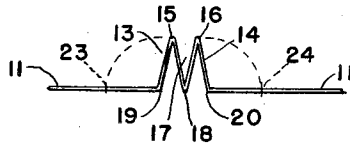


FIG. 6.

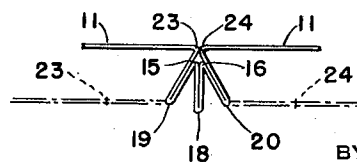


FIG. 7.

INVENTOR:
HARRY SHERMAN,
BY
Arthur H. Hadden
ATTORNEY

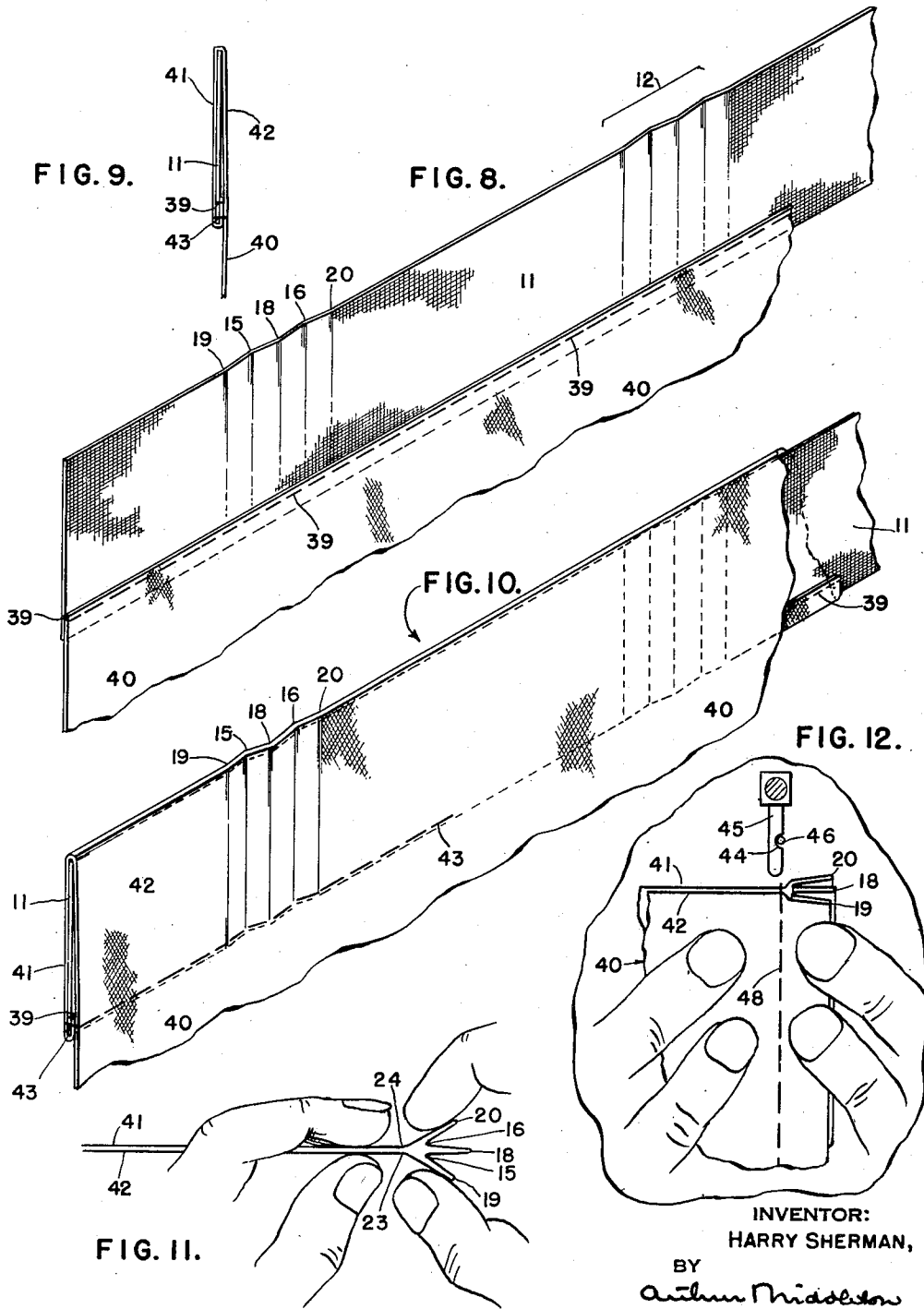
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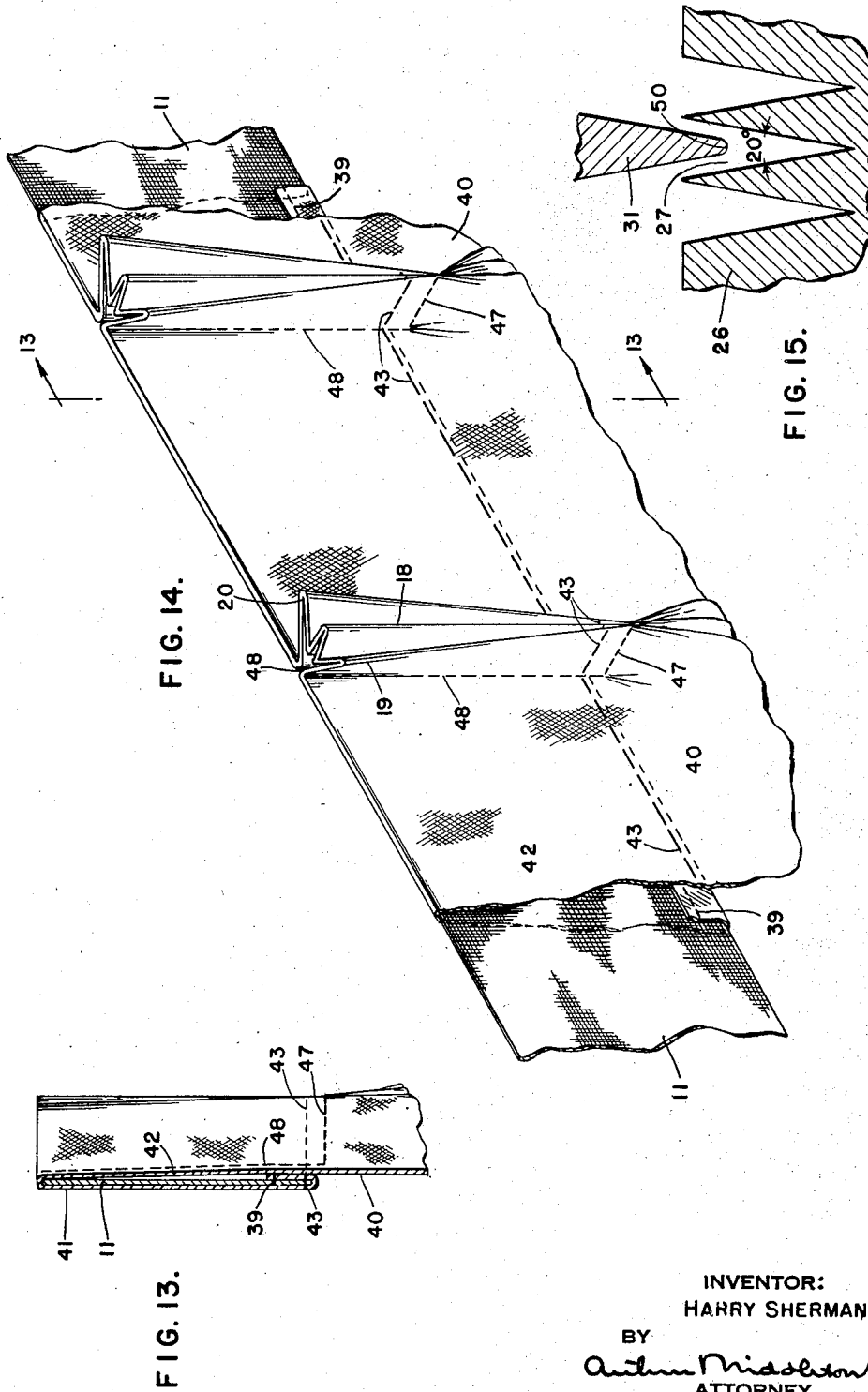
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UNITED STATES PATENT OFFICE

2,520,787

PLEATING OF DRAPERIES

Harry Sherman, Laurelton, N. Y.

Application October 26, 1949, Serial No. 123,596

4 Claims. (Cl. 223-30)

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This invention relates to home decorating hangings such as window curtains, draperies and valances, especially of the pinch-pleat type. It is an object of this invention to provide a simpler and more accurate method of making and spacing these pleats than has heretofore been devised.

A pinch-pleat usually comprises spaced apart groups of knife pleats, with each group usually comprising three pleats extending radially from a substantially common center. These pleats are sewed into permanent position for a short distance from the supported edge of the curtain and therebelow they merge into softer or lesser curved pleats. The supported edge of the curtain is reinforced with a band-like strip of buckram or other stiffening material, extending transversely of the curtain, over which strip the curtain is passed on each side thereof, so that the strip is enclosed by a fold of the curtain fabric.

Up to the present time, so far as I know, pinch-pleated curtains, draperies and valances, which utilize buckram or some other stiffening strip covered by the fabric of the hanging, have always been made in the same comparatively slow fashion. After the buckram is enclosed by the curtain fabric, the machine operator measures a certain distance from the edge of the hanging, along the stiffened portion thereof, and folds the stiffened portion at a point which would form the center pleat of a group of three pleats. From this point, at another measured distance, a row of stitching is made laterally along the stiffening, which permits enough space for forming the other two pleats of the group.

The pleats are formed free hand by grasping the center point and forcing the fabric-covered stiffening inwards into a fan-like shape, which is then held in permanent place by a short row of stitching extending transversely from and slightly below the lateral row of stitching. This process is repeated with each group of pleats, which may number from as little as three to five in narrow width curtain or drapery hangings to as many as from ten to fifty or more in extra wide hangings or valances. Great care must be exercised to make each group of pleats identical in form and size, and to space each group equidistantly in accordance with a predetermined measurement.

It is obvious that this conventional method of making pinch-pleats is not only tedious and time-consuming, but requires sewing machine operators who become skilled at this work only by long experience. So it is one of the objects

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of this invention to eliminate entirely the necessity for any measuring, and to assure perfectly formed pleats and accurate spacing between the groups of pleats.

This object is accomplished by first pre-pleating a shape-retaining reinforcing strip such as of buckram, in a machine pleater, thereby causing all the pleats to be precisely identical and the groups of pinch-pleats to be precisely identically spaced apart. When this pre-pleated buckram is sewed into the curtain, the natural spring-back in the buckram causes the curtain to conform to the shape of the pre-pleated strip. Therefore, it may be said that the curtain falls into a semi-pleated state, which requires only stitching to attain permanence. Since there is no measuring to do, and since the curtain maker has only to press together with the fingers the clearly visible preformed pleats, it is obvious that this type of operation can be accomplished very much faster and with far less skillful workers than the present day conventional method.

The design of such a machine pleater presents a problem if the desired accuracy is to be realized, so it is another object of this invention to devise such a machine. The object is attained by having male and female dies for making one group of pinch-pleats by having at least one pleat of the group made before the others—in other words, to make the pleats of each group progressively with a slight lag in time between the instant one is made and the others are made. By having one made slightly earlier than the others, the buckram strip is held against displacement by the first contact of the dies against movement or misalignment of the strip during the making of the other adjacent pleats.

Another object of this invention is to determine any critical angle or configuration of the pleat-forming parts of the dies that may be necessary for their maximum efficiency to operate without sticking; without adherence of starch thereon from the buckram; and without cracking or splitting the buckram.

The best embodiment of the invention now known to me has been chosen for the purpose of illustration in the accompanying drawings but it is to be understood that the showing thereof is illustrative and not limiting because that embodiment is capable of modification and equivalents without departing from the ambit of the appended claims. In the drawings, Figure 1 is an isometric view of a strip of shape-retaining reinforcing material, such as buckram. Fig. 2 is a similar view but with the strip pre-pleated,

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Fig. 3 is a vertical sectional view of the male and female pre-pleating dies in initial position. Fig. 4 is a view similar to Fig. 3, except with the male die in partially descended position, while Fig. 5 shows the male die in fully descended position. Fig. 6 is a partial edge view of the pre-pleated buckram after it has emerged from being die-pleated. Fig. 7 is similar to Fig. 6 but with the pinch-pleats pressed together. Fig. 8 is an isometric view of the pre-pleated buckram stitched at its bottom to the upper edge of the curtain or valance fabric. Fig. 9 shows an end elevation of the buckram to which the fabric has been stitched at the bottom of the buckram and then folded upwardly, over, and around the buckram, thus making a loop that encloses the buckram, with the loop being stitched in that intimately encircling position. Fig. 10 is an isometric view of the parts in the same relationship as shown in Fig. 9. Fig. 11 is a somewhat diagrammatic view of the assembly in the fingers of the operator, while Fig. 12 is a somewhat similar figure but with the assembly just about to be pushed under the presser foot of a sewing machine to sew stitching adjacent to the pinch-pleat. Fig. 13 is a vertical sectional view through the completed pinch-pleated material, while Fig. 14 is an isometric view of the same assembly. Fig. 13 is a view taken along the line 13—13 of Fig. 14. Fig. 15 shows a detail of construction on an enlarged scale.

In the drawings, 11 indicates the strip or band of shape-retaining reinforcing material that is to be pre-pleated, namely such as buckram, suitably stiffened paper, and the like. Such a strip is to be pre-pleated with a group or plurality of pinch-pleats 12 spaced apart at predetermined distances. In the pre-pleated strip, the pleats take the form more or less of the letter W, or M, depending upon which way the pleats are looked at. In Fig. 2 they look like the letter M, having outer legs 13 and 14, terminating in outer bends 15 and 16, with a V-portion 17 therebetween terminating in a bend 18. Leg 13 merges with the strip 11 by a bent shoulder 19 while leg 14 merges by a bent shoulder 20. 23 indicates a line along which a stitch is ultimately made (see 48 in Fig. 12) on one side of the M pleats 12 while 24 represents a similar line on the other side thereof. When the strip is bent as shown in Fig. 6, there is formed the group of pinch-pleats as shown in Fig. 7. The dotted lines in the latter conform to the full lines in Fig. 6.

The strip 11 is pre-pleated by a machine pleater shown in essence in Figs. 3 to 5, wherein 26 indicates a female die having a plurality of grooves therein that are V-shaped in cross-section with a critical acute angularity. The middle groove 27 has parallel side grooves 28 and 29. The reciprocable male die 30 has a complementary central V-shaped ridge 31 retractable and extensible from a recess 32 by means of a spring 33 and shoulder 34 to be able to extend beyond side ridges 35 and 36. The starting position is shown in Fig. 3 where the central ridge 31 in beginning to descend, engages the strip 11 shown in dotted lines. Descent of the ridge 31 continues until position of Fig. 4 is reached wherein the strip is clamped in place between the dies to form the bend 18. Descent then continues while ridge 31 remains stationary as shown in Fig. 5, until the bends 19 and 20 are formed. The male die 30 is then ascended whereupon the parts return to the position shown in Fig. 3.

The strip is then moved laterally of the dies

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until the predetermined quantity of strip has passed therebetween and conditions are ready for the dies to be operated again to pre-pleat another group of pinch-pleats, so this action is repetitive. When the pre-pleated strip has been removed from the dies, a pre-pleated section of it looks like that shown in Fig. 6. The natural stiffness of the buckram causes only the bends 15 and 16 to remain upstanding because the bends 19 and 20 tend to spring more or less flat again, as shown. However, if an operator places his fingers on the bends 19 and 20 and presses upwardly, they will assume the position shown in Fig. 7.

However, the pre-pleated strip of buckram as it comes from the machine pleater assumes the appearance as shown in Fig. 2, because the springiness of the buckram tends to straighten out between the pleated sections. This pre-pleated strip is then stitched as at 39 (Fig. 8) to the upper or supported edge of the fabric 40 of the curtain or valance, referred to herein generally as drapery. That drapery material is then folded upwardly as at 41, then over the top of the pre-pleated strip 11, and downwardly as at 42, with the result that the strip is enclosed by the drapery fabric 40, as shown in Figs. 9 and 13. It is stitched at 43 in this enclosing position. Since the fabric is thus stitched in very close and intimate contact with the strip, the bends 19, 15, 18, 16 and 20, cause the fabric to conform hugingly thereto as shown in Fig. 10, so that an operator can readily see where they are. The operator then takes the composite assembly as shown in Fig. 10, in his fingers as shown in Fig. 11 and holds the pinch-pleats together whereupon they are then fed to a sewing machine as shown in Fig. 12, wherein 45 indicates the presser foot of the machine, and 46 the needle, whereby to run a stabilizing line of stitching 48 along the side of the pleats but not through them and then another stabilizing line of stitching 47 across the end of the pinch-pleats through them, as shown in Fig. 14, to hold the pleats in close and permanent contact.

In order that the line of stitching 48 can be made by the machine close to the edge of the pleats, it is helpful if the presser foot 45 is only a half-foot as shown in plan view in Fig. 12, and it has a recess 44 for guiding the needle 46.

The angularity of the grooves of the female die are important, as illustrated in Fig. 15. They should be acute enough so that the buckram does not tend to stick to the side walls thereof either of itself, or the starch thereof due to heat generated by friction when the male die presses against it. There is a tendency anyway for some starch, or other stiffening agent, to dust off the buckram so a receiving-space must be provided into which it may collect harmlessly in the bottom of the groove. To that end, the lower edge or apex of the male die is blunted such as by giving it a slight radius. This has the added advantage of minimizing the tendency of the buckram to crack or split. The angularity of the groove to minimize adherence of starch thereto must be on the order of 20°, which is more acute than would be expected, although it may vary with different kinds of buckram.

In operation, a strip 11 of the shape-retaining drapery-reinforcing material such as buckram, is pre-pleated with carefully spaced-apart groups 12 of adjacent pinch-pleats or bends 19, 18 and 20. Such pre-pleated material may be sold for home use, or it can be used in a drapery factory

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to aid in mass production. So irrespective of where the pre-pleating is done, the following steps are then carried out; the pre-pleated strip 11 has the upper supported edge of the drapery fabric 40 stitched at 39 to and along its lower edge, as shown in Fig. 8. Thereupon the fabric is folded upwardly over the top of the strip 11 by fold 41, then downwardly therealong by fold 42, so that the strip is enclosed by the fabric, as shown in Figs. 9 and 10. Next the fabric is pulled into intimate and tight-fitting contact with the strip and while in this strip-hugging position is stitched as shown at 43 in Figs. 9 and 10, through loops 41, 42 and strip 11 to assure its retention in that position.

In such position, it can be seen from Fig. 10, that the placement of the pre-formed pleats or bends 19, 15, 18, 16 and 20 clearly indicate themselves due to the natural spring-back of the buckram strip, so the drapery may then be said to be in a semi-pleated state, which requires only gathering together of the pleats and stitching to attain stabilization or permanence, no measuring of any kind being required. This gathering together is shown somewhat diagrammatically in Fig. 11 (the fabric and strip enclosed thereby being shown in single lines only and not section lined) whereupon the next step for the operator is to pass the gathered-together fabric under the presser foot 45 of a sewing machine as shown in Fig. 12 to form a line of stitching 48 closely proximate the inner edge of the pleats 18, 19 and 20, but without passing through them, in order to assure their being held in the fan-like position shown in Fig. 14. The pinch-pleats are then also stitched across themselves at their lower ends as at 47.

Returning now to the pre-pleating of the strip 11, it is preferably done in a machine pleater having the characteristics illustrated in Figs. 3, 4 and 5, wherein one of the group of pleat-forming ridges 31 on a male die 30 is independently extendable and retractable relative to the adjacent ridges 35 and 36 on the male die. This ridge 31 operates in a recess 32 in the male die's body and has a limiting shoulder 34 that is spring-pressed outwardly by spring 33, for normally extending the ridge, as shown in Figs. 3 and 4, to extend beyond its companion ridges 35 and 36. This preliminary extension of the ridge 31 grips the strip 11 so that it cannot become displaced or mis-aligned when further descent of the male die causes the companion but fixed ridges 35 and 36 to engage and pleat the strip 11, as shown in Fig. 5. In this type of machine pleater, it is a part of this invention to design the complementary grooves in the female die and the ridges of the male die so that the angle of opening of the grooves form an acute angle of substantially 20° for minimizing sticking of the buckram thereto while being pleated, and for also minimizing adherence or building up of starch from the buckram on the side walls of the grooves. In other words, at this angle, the

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grooves seem to be self-cleaning and less friction is generated as the ridges slide against the buckram in pleating it. And once again, Fig. 15 shows that it is highly desirable to blunt or round the lower edge or apex 50 of each ridge to prevent cracking of the buckram and to provide a dust-receiving space in the apex of the groove, otherwise accumulation of dusted-off starch or other stiffening agent carried by the strip, collects to such an extent as to damage the precision of the dies.

I claim:

1. Apparatus for practicing the process described herein, which comprises a female die having a plurality of V-shaped grooves therein, a male die having complementary V-shaped ridges, means for moving the dies together, and means for resiliently projecting one ridge from that die to project normally farther from the male die than any other ridge, wherein the male die is provided with a recess into which the projecting ridge is seated but from which that ridge is normally retractably extended by spring pressure.

2. Apparatus for pre-pleating a strip of stiffened shape-retaining drapery-reinforcing material, which comprises a female die having a plurality of V-shaped grooves therein, a male die having complementary V-shaped ridges with the apices thereof blunted to provide when in pleating position a place between the apices and the bottoms of the grooves for the accumulation of stiffening component of the material dusting off from the material being pleated.

3. The process of forming a pinch-pleated drapery, which comprises pre-pleating a strip of shape-retaining drapery-reinforcing material with spaced-apart groups of pinch-pleats, stitching to the bottom edge of the strip a supporting edge of drapery fabric, stitching the fabric in intimate strip-contacting position whereby the location of the pleats is indicated through the fabric, gathering the fabric and its enclosed pleats into grouped pinch-pleats, and stabilizing each group of pleats by stitching the fabric through the pleats across one end of each group and along one side thereof but without stitching through the pleats themselves.

4. The process according to claim 3, with the addition of looping the fabric around the strip to enclose it.

HARRY SHERMAN.

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