United States Patent

Tuskos

[15] **3,696,515**

[45] **Oct. 10, 1972**

[54] PLEATING DEVICE

[72] Inventor: **Michael E. Tuskos,** 2507 Saratoga Drive, Louisville, Ky. 40205

[22] Filed: **July 12, 1971**

[21] Appl. No.: **161,534**

[52] **U.S. Cl.** **33/192**

[51] **Int. Cl.** **B43l 9/08**

[58] **Field of Search** 33/192

[56] **References Cited**

UNITED STATES PATENTS

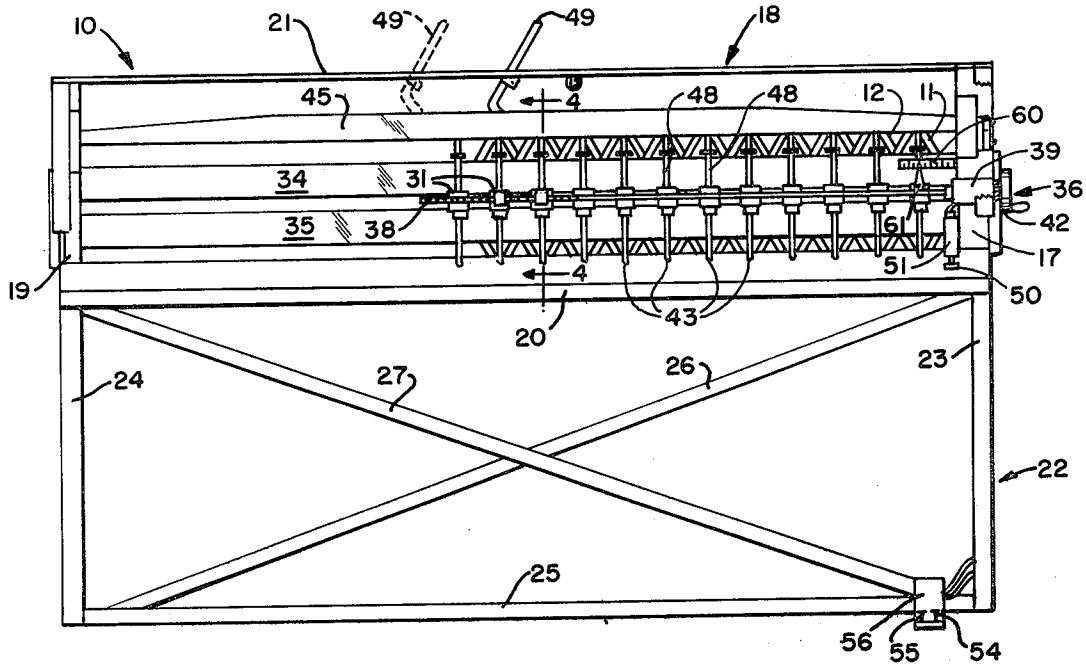
3,145,480	8/1964	Caracoes	33/192
3,166,854	1/1965	Packer et al	33/192
1,019,139	3/1912	Eberley	33/192

Primary Examiner—Harry N. Haroian
Attorney—Harry B. O'Donnell, III

[57] **ABSTRACT**

This invention provides an improved device for allotting material for pleats and spacing between those pleats in making draperies and the like. Basically, it comprises first and second lazy-tong mechanisms, each having opposite first and second ends. The first mechanism has one of its ends fixed to a base member. Adjustable means are provided for interconnecting the second mechanism to the base member and for variably spacing it apart from the first mechanism. Indicator means are carried by the two mechanisms. These indicator means are adjustably positionable with respect to a sheet of material placed adjacent to the two mechanisms by movement of the adjustable means and of the first mechanism. In the presently preferred form of the present invention, the indicated spacing between the pleats is adjusted by movement of the adjustable means, while the indicated amount of material alloted for gathering into the pleats is adjusted by movement of the first mechanism.

10 Claims, 7 Drawing Figures



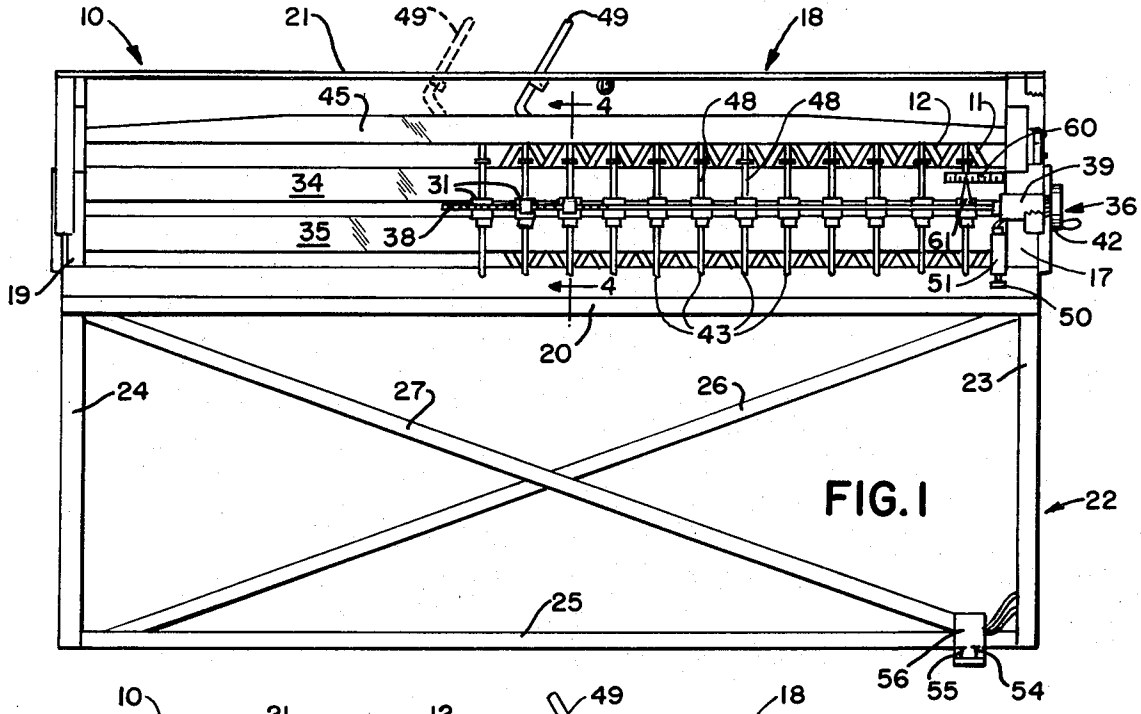


FIG. 1

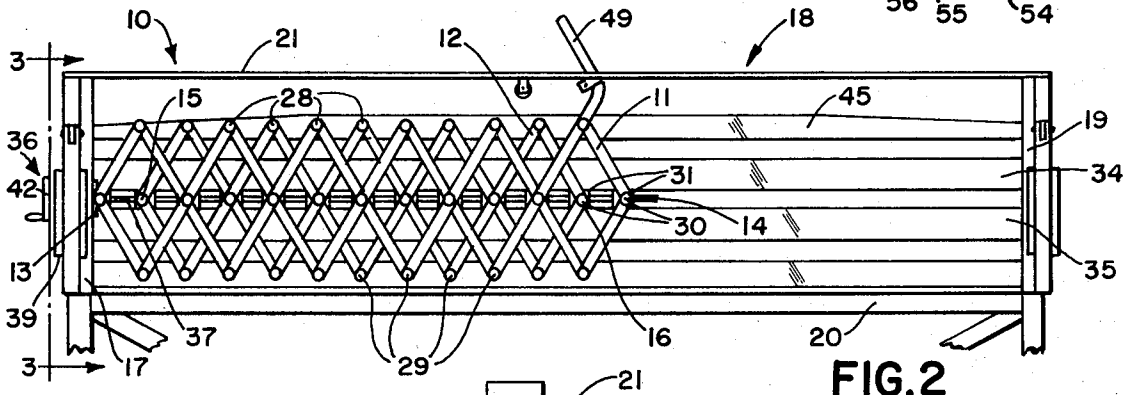


FIG. 2

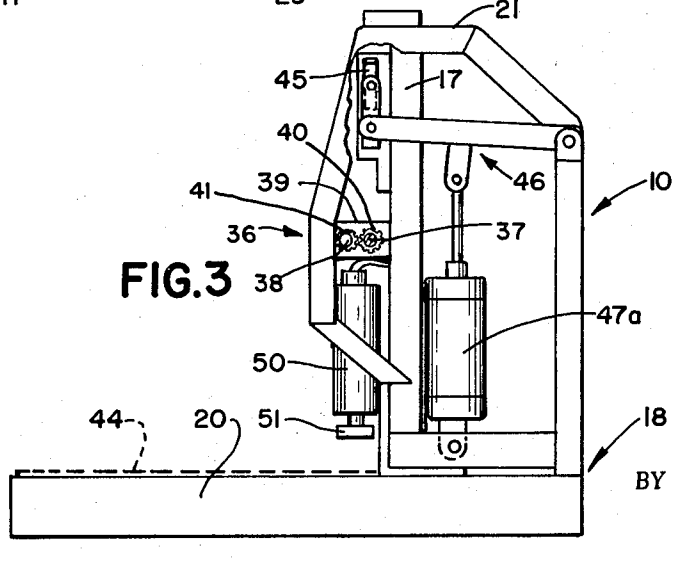


FIG. 3

INVENTOR.
MICHAEL E. TUSKOS
BY
HIS ATTORNEY

FIG.4

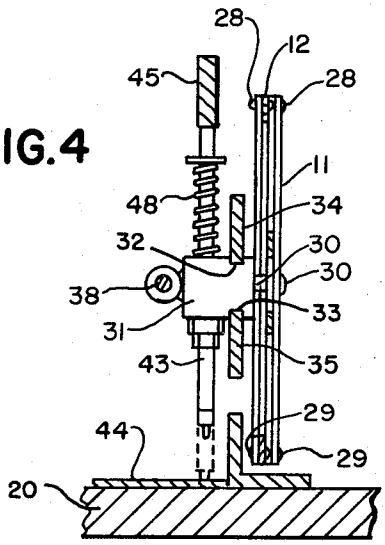
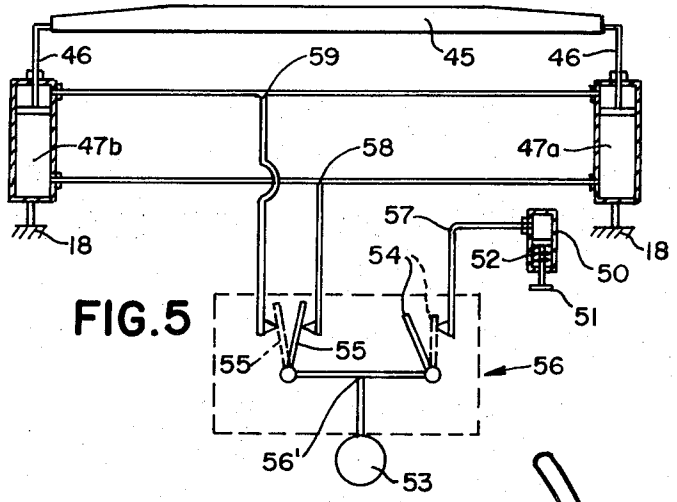


FIG.5



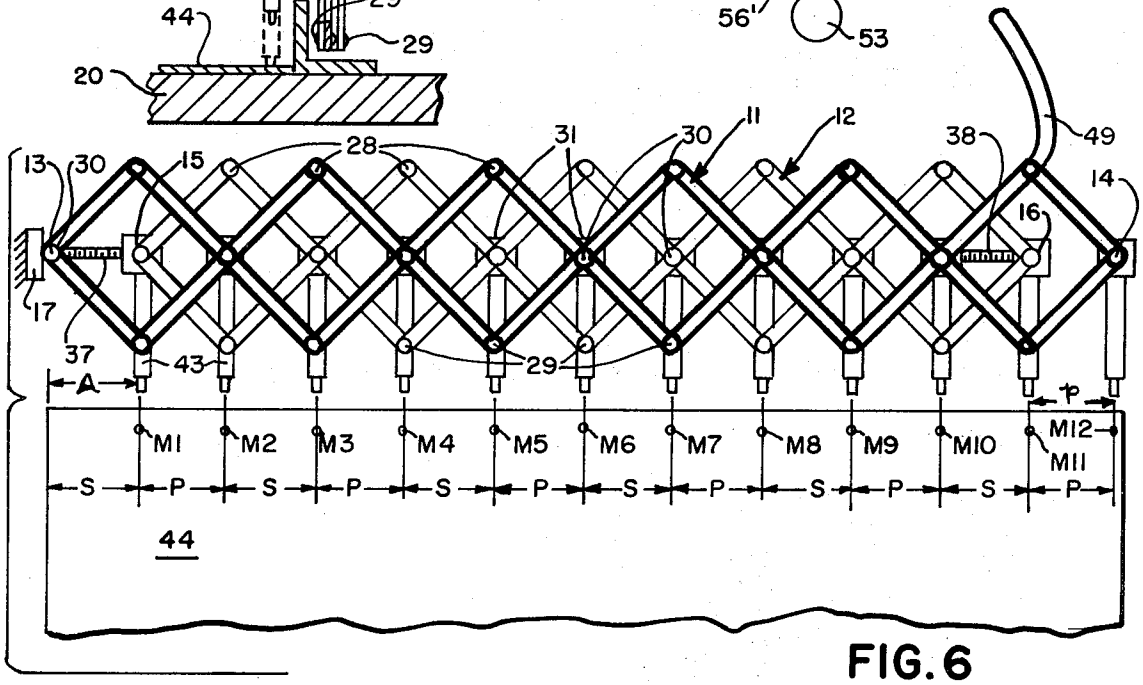


FIG.6

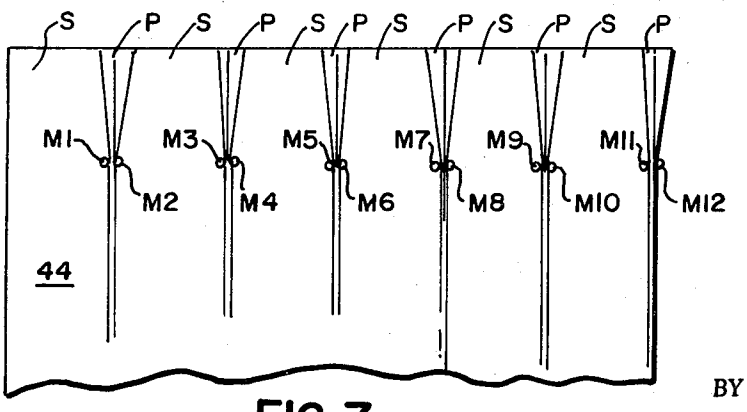


FIG.7

INVENTOR.
MICHAEL E. TUSKOS
BY
HIS ATTORNEY

PLEATING DEVICE

BACKGROUND OF THE INVENTION

This invention relates to apparatus for alloting material for pleats and the spacing between those pleats in making draperies and the like.

In measuring material for pleated draperies and the like there are two primary considerations. First, the spacing of the pleats should be uniform throughout the full width of the drapery. Second, the amount of material that is alloted for gathering into each of the several pleats should be of a uniform amount.

This desirable equalization of material alloted for the pleats and the spaces therebetween can, of course, be achieved by accurate hand measurement. However, such a procedure is tedious and requires a considerable amount of skill and time and consequently vast expense.

In the past, various devices have been provided in an attempt to mechanize the aforementioned manual procedure with an eye towards reduction in labor costs and skill requirements. U. S. Pat. Nos. 2,998,659—Yaworski; 3,166,854—Packer et al.; and 3,297,215—Soto describe typical examples of such prior-art mechanized devices. While these prior-art devices have provided an advance over the older hand-measured technique, they have been both complex and expensive in construction and maintenance.

The present invention is concerned with providing a pleating device which is improved over these aforenoted prior-art devices in economy and simplicity of construction and ease of operation.

SUMMARY OF THE INVENTION

Basically, the present invention comprises first and second lazy-tong mechanisms, each having opposite first and second ends. The first mechanism has one of its ends fixed to a base member. Adjustable means are provided for interconnecting the second mechanism to the base member and for variably spacing it apart from the first mechanism. Indicator means are carried by the two mechanisms. These indicator means are carried by the two mechanisms. These indicator means are adjustably positionable with respect to a sheet of material placed adjacent to the two mechanisms by movement of the adjustable means and of the first mechanism. In the presently preferred form of the present invention, the indicated spacing between the pleats is adjusted by movement of the adjustable means, while the indicated amount of material alloted for gathering into the pleats is adjusted by movement of the first mechanism.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated in the accompanying drawings, wherein:

FIG. 1 is a front elevational view of a presently preferred form of an improved pleating device that is provided in accordance with the present invention;

FIG. 2 is a fragmentary rear elevational view of the upper portion of the device shown in FIG. 1;

FIG. 3 is an enlarged sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is a greatly enlarged sectional view taken along line 4—4 of FIG. 1;

FIG. 5 is a schematic diagram of a presently preferred form of control circuit that can be employed with the present invention;

FIG. 6 is a fragmentary schematic diagram illustrating in detail the relationship between the two lazy-tong mechanisms employed by the present invention and the space and pleat allotment indications which can be indicated thereby on a sheet of material located adjacent thereto; and

FIG. 7 is a fragmentary front elevational view of a drapery measured by the improved device of the present invention, following stitching together of the material alloted for the pleats.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing and particularly to FIGS. 1 and 2 thereof, there is illustrated a presently preferred form of an improved device **10** that is provided in accordance with the present invention for alloting material for pleats and the space between those pleats in making draperies and the like. While it should be understood that the device **10** could obviously be utilized for other purposes, such as curtain pleating, etc., the description that follows will be confined to drapes for the sake of clarity and brevity.

Basically, the device **10** comprises a pair of generally vertical lazy-tong mechanisms **11** and **12** which are in themselves each basically of a well-known construction, being generally similar to the single lazy-tong mechanism described in detail in U. S. Pat. No. 664,759—Joy. A first of these two mechanisms **11** has opposite first **13** and second **14** ends, while the second mechanism **12** has opposite first **15** and second **16** ends.

In accordance with the present invention and as best shown in FIGS. **1-2** and **6**, the first mechanism **11** has one of its ends **13** fixed to a generally vertical base member **17**, which forms one end of base means **18** and is horizontally spaced apart from another generally vertical base member **19** that forms the opposite end of the base means **18**.

As best shown in FIG. **1**, the two generally vertical base members **17** and **19** are interconnected by and project upwardly from a generally horizontally arranged table member **20**, and have their upper portions interconnected by a generally horizontal upper frame member **21**. The base means **18** is located at the waist height of an average operator by platform means **22** including a pair of generally vertical upright standards **23** and **24** which are spaced apart from one another and interconnected at their lower ends by a horizontal member **25** and are reinforced by a pair of diagonally arranged cross struts **26** and **27**.

As best shown in FIGS. **1—4** and **6**, each of the two lazy-tong mechanisms **11** and **12** comprises a plurality of interlinked equilateral parallelograms, with each of the parallelograms being provided with pivot links at its top **28** and bottom **29** and with other pivot links **30** being provided along the horizontal center lines of each of the two mechanisms **11** and **12**. In the illustrated form of the present invention, the first mechanism **11** (shown in heavy lines in FIG. **6**) comprises six pivotally linked parallelograms, while the second mechanism (shown in light lines in FIG. **6**) includes only five such pivotally linked parallelograms.

In particular accordance with the present invention, each of the horizontal center line links **30** of the two mechanisms **11** and **12**, except the one at the end **13** of the first mechanism **11** which is fixed to the frame member **17**, has a generally vertically arranged block **31** mounted to it. Each of these blocks **31** is provided with grooves **32** and **33** at its upper and lower ends which are slidably trapped and guided by a pair of vertically spaced apart upper **34** and lower **35** guide rails that are mounted to and extend generally horizontally between the two vertical end members **17** and **19** of the base means **18**.

In further accordance with the present invention, adjustable means **36** are provided for interconnecting the second mechanism **12** to the base member **17** and for visibly spacing it apart from the first mechanism **11**. More specifically, these adjustable means **36** comprise a pair of similarly threaded, generally horizontal jack screws **37** and **38** which are rotatably journalled in a bearing block **39** that is connected to and projects forwardly from the base member **17**. Preferably, the two jack screws **37** and **38** are aligned with the pivot links **30** along the horizontal center lines of the two lazy-tong mechanisms **11** and **12**, with a shorter first one of the two jack screws **37** being threaded into the block **31** located at one end **15** of the second mechanism **12** and a considerably longer second one of the two jack screws **38** being threaded into the block **31** located at the opposite end **16** of the second mechanism **12**. As best shown in FIGS. **2** and **3**, the two jack screws **37** and **38** are interconnected by a pair of gears **40** and **41** such that the two jack screws **37** and **38** can be operated in tandem by common means such as operating wheel **42**.

In the illustrated form of the present invention, as best shown in FIGS. **1** and **4**, the blocks **31** comprise a plurality of indicator members, with each of the blocks **31** carrying a marking means comprising a pen **43**. As shown in detail in FIGS. **1** and **4**, each of the pens **43** is generally vertically arranged within a bore provided in each of the blocks **31** for simultaneously temporary engagement with the upper end of a sheet of material **44** located on the table member **20** by a downward movement of an operating bar **45**.

As more specifically shown in FIGS. **1** and **3—5**, the pen-operating bar **45** extends between the two vertical members **17** and **18** and is mounted for reciprocable up and down movement relative to the upper ends of the pens **43** by a pivoted linkage means **46** that includes and is driven by a pair of fluid cylinders **47***a* and **47***b* mounted adjacent the opposite ends of the base means **18**. As further shown in detail in FIG. **4**, the pens **43** are retractable, each being provided with a coiled spring **48** that is trapped between the pen upper end and the upper end of the block **31** such that the pens **43** are biased upwardly away from engagement with the table member **20** by the springs **48**.

In particular accordance with the present invention, the pens **43** utilize a marking fluid which is invisible to the naked eye and the marks made by the pens **43** can only be seen when the material marked thereby is viewed under an ultraviolet lamp or "black light".

Preferably, as best shown in FIG. **6**, the indicated spacing between the pleats S is adjusted by movement of the adjustable means **36**, through rotation of the operating wheel **42** (FIGS. **1** and **2**), and the indicated amount of material alloted for gathering into pleats P is adjusted by movement of the first lazy-tong mechanism **11**, by moving it away from or toward the base member **17**, as by pulling or pushing it relative thereto by means such as a handle **49** that is connected to it and extends upwardly through an elongate slit (not shown in detail) provided in the upper frame member **21**. With this arrangement, the equal amount of the sheet of material **44** that is alloted for each of the several spaces S is determined by the distance *s* that the pen **43** carried by the block **31** at the first end **15** of the second mechanism **12** is spaced apart from the fixed first end **13** of the first mechanism **11** by operation of the two jack screws **37** and **38**. And, the equal amount of the sheet of material **44** that is alloted for each of the several pleats P is determined by the distance p that the pen **43** carried by the block **31** at the second end **14** of the first mechanism **11** is spaced apart from the pen **43** carried by the block **31** at the second end **16** of the second mechanism **12**.

As further shown in FIGS. **1**, **3** and **5**, the present invention further includes a retractable gripper means in the form of a third fluid cylinder **50** for engaging one corner of the sheet of material **44** to the table means **20** at the point adjacent to the point of connection of the first end **13** of the first lazy-tong mechanism **11** to the base member **17**. As illustrated, the third or gripper cylinder **50** is mounted at the right front end of the base means **18** and contains a piston that has a gripper plate **51** attached to the lower end of its rod which is adapted to engage one corner of the sheet of material **44** to the table means **20** when pressurized fluid is supplied to the top of its piston. As best shown in FIG. **5**, the retractable gripper plate **51** is biased upwardly away from engagement with the table means **20** by another coil spring **52** that is trapped between the bottom of its piston and the bottom interior wall of the cylinder **50**.

As diagrammatically further shown in FIG. **5**, the two drive cylinders **47***a* and **47***b* for the pen-operating bar **45** and the gripper means cylinder **50** are preferably all connected to a common source of pressurized fluid **53**, such as an air compressor or the like, through conduit means which are located in a common switch box **56** that can be located beneath the platform means **22** (FIG. **1**). As specifically shown in FIG. **5**, the fluid source **53** is connected to both of the switch valves **54** and **55** by a T-shaped conduit **56'**.

One of the two foot switch valves **54** is operable between a normal first position (shown in solid lines in FIG. **5**) in which it disconnects the fluid source **53** from the third or gripper cylinder **50** and the gripper plate **51** is held retracted from the table means **20** by the spring **52**, and a second position (shown in shadow lines in FIG. **5**) wherein it connects the fluid source **53** via a conduit **57** to the top of the cylinder **50** to apply sufficient fluid pressure to the top of the cylinder **50** to apply sufficient fluid pressure to the top of its piston to overcome the resistance of the spring **52** and thus cause the gripper plate **51** to engage the corner of the sheet of material **44** to the table means **20**.

The other of the foot switch valves **55** is operable between a normal first position (shown in solid lines in FIG. **5**) and a second position (shown in shadow lines in FIG. **5**). In the first position, this second foot switch valve **55** connects the fluid source **53** via another T-

shaped conduit **58** to the bottoms of the two pen bar-operating cylinders **48***a* and **47***b* to apply a sufficient amount of fluid pressure to the bottoms of their pistons to retract the reciprocable bar **45** upwardly and away from the tops of the pens **43**. However, when in its second position, this second foot switch valve **55** connects the fluid source **53** via yet another T-shaped conduit **59** to the tops of the two cylinders **47***a* and **47** *b* to apply a sufficient amount of fluid pressure to the tops of their two pistons to cause the linkage **46** to move the bar **45** downwardly against the upward force of the pen springs **48** until the bottoms or points of the pens **43** are substantially simultaneously engaged with the sheet of material **44** on the table means **20** to thus make marks M_1 through M_{12} thereon which indicate the desired allotment of the sheet of material **44** for the pleats P and the spaces S between the pleats P.

Of course, upon return of the two switch valves **54** and **55** to their first positions (as shown in solid lines in FIG. 5), the gripper plate **51** and the pens **43** will be respectively retracted upwardly out of engagement with the sheet of material **44** by the springs **52** and **48**.

To operate the improved pleating device **10** of the present invention, an operator need perform only five simple steps.

First, the operator sets the desired several spacings S that are to be provided between the several pleats P by rotating the operating wheel **42** of the adjustable means **36** to set this same distance *s* between the fixed first end **13** of the first lazy-tong mechanism **11** and the first end **15** of the second lazy-tong mechanism **12**. Preferably the device **10** is provided with a scale **60** fastened to the base member **17** and a pointer **61** carried by the block **31** at the first end **15** of the second mechanism **12** to facilitate this setting by the operator.

Second, the operator procures a sheet of material **44** that is to be pleated and fastens its upper right corner to the right front corner of the table means **20** adjacent the point of connection of the first end **13** of the first lazy-tong mechanism **11** to the base member **17** by stepping on the first foot switch valve pedal **54**.

Third, the operator moves the handle **49** to align the pen **43** carried by the indicator block **31** at the second end **14** of the first lazy-tong mechanism **11** into alignment with the upper left hand corner edge of the sheet of material **44**.

Fourth, the operator applies the marks M_1–M_{12} to the material by stepping on the second foot switch valve **55**.

Fifth, the operator returns the two foot switch valves **54** and **55** to their first or normal positions, causing all of the pens **43** and the gripper plate **51** to be retracted from engagement with the sheet of material **44**.

Subsequently, the marked sheet of material **44** (FIG. 6) can then be taken to a sewing machine (not shown) that is provided with a "black light" and sewn as indicated by the then visible marks M_1—M_{12} to form the spaced pleated drapery section as shown in FIG. 7. As illustrated, the Marks M_1 and M_2, M_3 and M_4, M_5 and M_6, M_7 and M_8, M_9 and M_{10}, M_{11} and M_{12} are respectively sewn together to form six equally sized pleats P. And, the six equal spacings S will be respectively indicated by the distance between: (1) one end of the sheet of material **44** and the mark M_1; (2) marks M_2 and M_3; (3) the marks M_4 and M_5; (4) the marks M_6 and M_7; (5) the marks M_8 and M_9; and (6) the marks M_{10} and M_{11}.

Assuming, for example, that the pleat spacing distance S desired and set by turning the hand wheel **42** of the adjustable means **36** is 3½-inches and the total width of the sheet of material **44** is 48-inches, the aforenoted operation of the improved device **10** of the present invention will quickly and easily provide a drapery section that is marked for six equally dimensioned pleats P of 4½-inches each and six equally dimensioned spaces S of 3½-inches.

Obviously a wide variety of other sizes of material sheets **44**, pleat sizes P and pleat spacings S can be employed and provided by following the aforenoted five simple operational steps. Preferably the operator of the improved device **10** of the present invention will be provided with a chart setting forth typical desired pleat space settings *s* that are to be set by movement of the operating wheel **42** during the first operating step for various assorted widths of material sheets **44**, total drapery widths, desired pleat size P and numbers of pleats.

It should be apparent to those skilled in the art that while there has been described what presently is considered to be a presently preferred embodiment of this invention in accordance with the Patent Statutes, changes may be made in the disclosed apparatus without actually departing from the true spirit and scope of this invention. It is therefore intended that the appended claims shall cover such modifications and applications that may not depart from the true spirit and scope of the present invention.

What is claimed is:

1. An improved device for alloting material for pleats and spacing between said pleats in making draperies and the like, comprising:

a. first and second lazy-tong mechanisms, each having opposite first and second ends;

b. said first mechanism having one of its ends fixed to a base member;

c. adjustable means for interconnecting said second mechanism to said base member and for variably spacing it apart from said first mechanism; and

d. indicator means carried by said mechanisms and being adjustably positionable with respect to a sheet of material placed adjacent to said mechanisms by movement of said adjustable means and of said first mechanism.

2. The invention of claim **1**, wherein the indicated spacing between said pleats is adjusted by movement of said adjustable means and the indicated amount of material alloted for gathering into said pleats is adjusted by movement of said first mechanism.

3. The invention of claim **2**, further including marking means carried by said indicator means.

4. The invention of claim **3**, wherein marks made by said marking means are invisible to the naked eye.

5. The invention of claim **1**, wherein said adjustable means comprises:

a. a first adjustable member for interconnecting one end of said second mechanism to said base member and for variably spacing it apart from said one end of said first mechanism; and

b. a second adjustable member for interconnecting the other end of said second mechanism to said

first mechanism and for variably spacing it apart therefrom by substantially the same distance as said one end of said second mechanism is spaced apart from said one end of said first mechanism by said first adjustable member.

6. The invention of claim 5, wherein said first and second adjustable members comprise a pair of jack screws mounted on said base member and interconnected to one another such that they can be operated in tandem by a common means.

7. The invention of claim 6, wherein said lazy-tong mechanisms are arranged generally vertically for movement relative to table means on which a sheet of material to be alloted into pleats and spaces can be arranged generally horizontally.

8. The invention of claim 7, wherein said indicator means comprises a plurality of indicator members that are arranged generally vertically adjacent the horizontal center lines of said first and second lazy-tong mechanisms.

9. The invention of claim 8, further including:

a. marking means comprising a plurality of generally vertically arranged retractable pens carried by said indicator members; and

b. reciprocable means for simultaneously, temporarily engaging said marking means with said sheet of material located on said table means.

10. The invention of claim 9 further including retractable gripper means for engaging one end of said sheet of material to said table means at a point adjacent to the point of connection of said one end of said first lazy-tong mechanism to said base member.

* * * * *