

- [54] DRAPERY MARKING METHOD UTILIZING
-
- INVISIBLE DYES

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26/51.5, 117/33.5 T, 117/44

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- [58] **Field of Search**..... 117/37 R, 43, 44, 33.5 T;
8/2, 164; 26/51.5

- [56]
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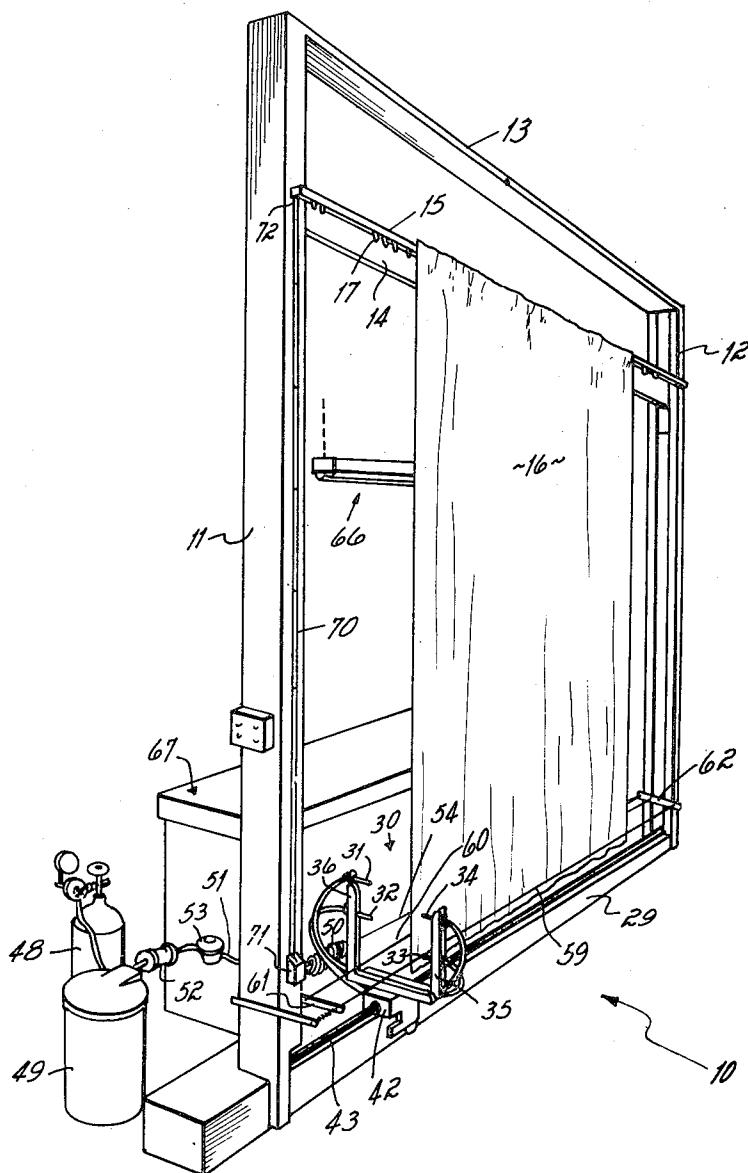
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- [57]
- ABSTRACT**

A drapery or curtain is hung from an adjustable frame so that it hangs freely in a similar manner to its intended use. One or more dye squirting orifices or nozzles traverse the width of the drapery at predetermined heights to mark cut-off or fold lines on the drapery and/or lining. The dye may be invisible as applied on the drapery and may become visible only when exposed to light of a predetermined wavelength for subsequent cutting, folding or sewing of the drapery. The orifice may be a hypodermic needle which provides a very thin continuous unbroken liquid stream or jet that marks the line on the drapery.

2 Claims, 4 Drawing Figures



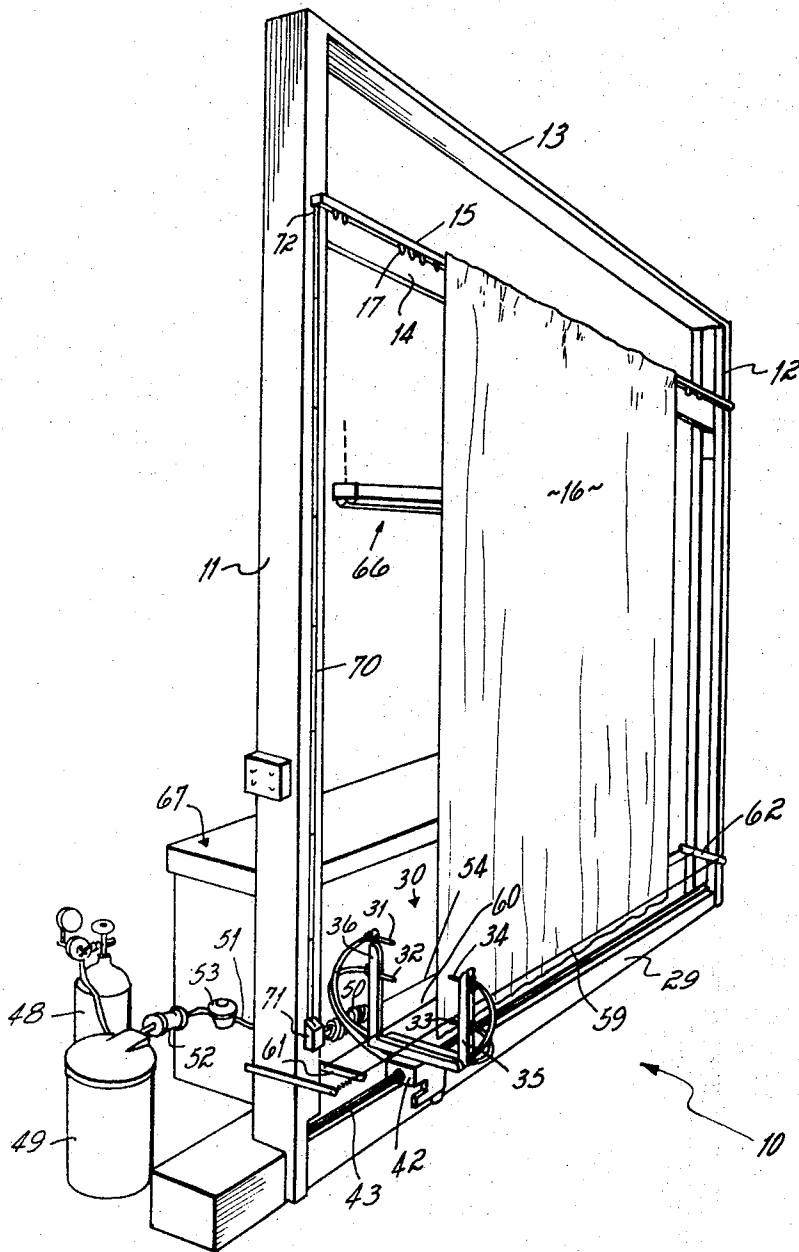


Fig. 1

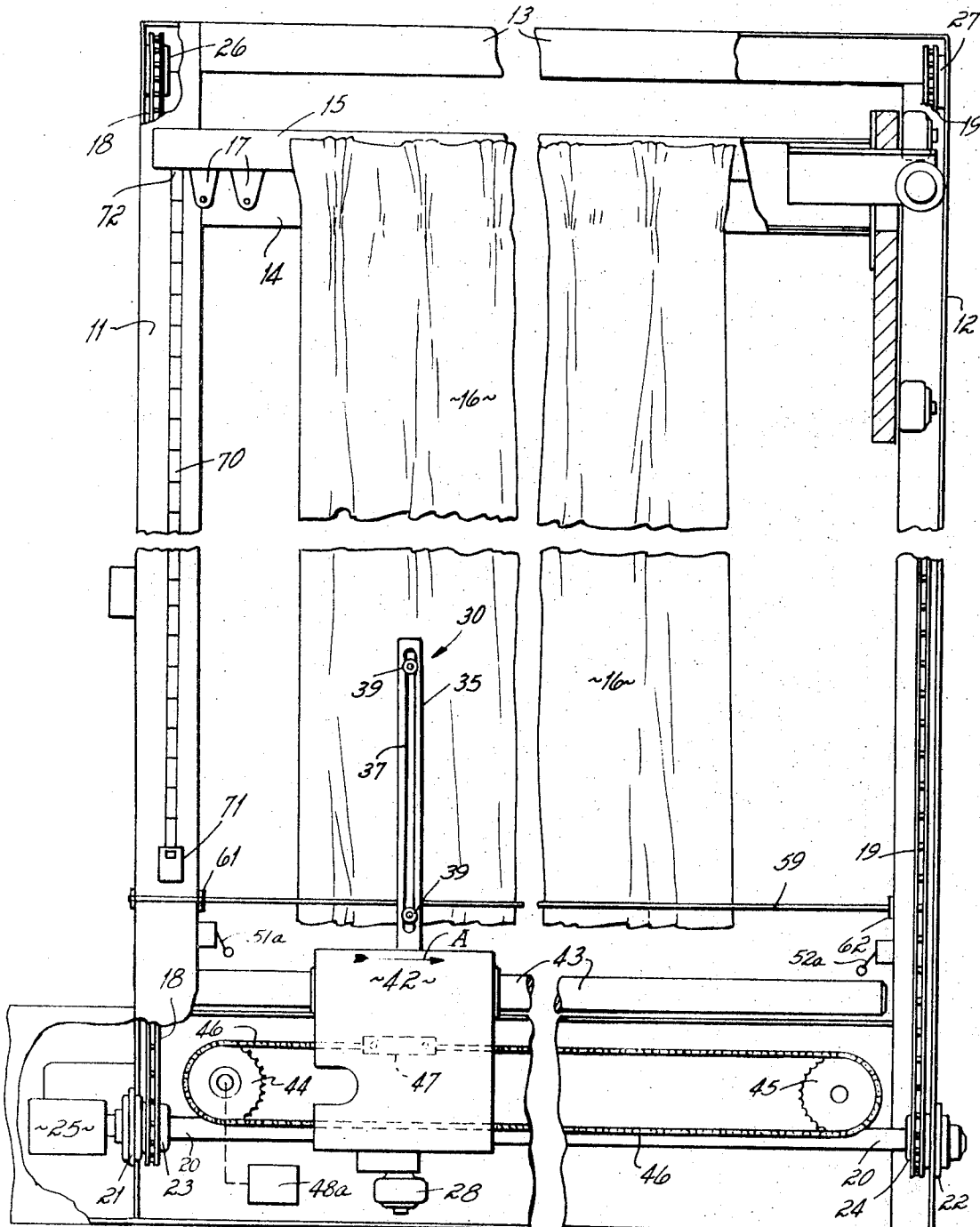


Fig. 3

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DRAPERY MARKING METHOD UTILIZING INVISIBLE DYES

This is a division, of application Ser. No. 106,975, filed Jan. 18, 1971, now U.S. Pat. No. 3,749,051, issued July 31, 1973.

BACKGROUND OF INVENTION

This invention relates to a method and apparatus for accurately marking critical lengths of drapery and curtain material, and more particularly to a method and apparatus for evenly marking the cut-off length and/or the hem or fold length thereon.

A most important and difficult problem in the custom manufacture of draperies or curtains is the need to maintain a very even or straight bottom edge or hem line. In drapery or curtain panels wherein the hem has been unevenly folded and sewn over, a "scalloped" edge with high and low areas results. An uneven edge is unattractive, and low areas may drag the floor or sill, causing wear of the dragging material and an accumulation of dirt. The high areas unevenly expose wall, floor, or other areas which should be covered, and render the whole drapery visually inappropriate. It has been observed that an uneven hem can make an otherwise well-made and expensive drapery or curtain very unappealing and apparently of poor quality.

Moreover, where a lining is used, and the drapery or curtain is of a material wherein some backlight may be seen through it, the lining too must be evenly cut, folded and sewn, or its unevenness may be visible, further rendering the visual effect of the drapery unappealing.

Several attempts have been made at providing apparatus which will "size" or provide means to evenly hem a drapery. In one such device, the drapery is laid out on a horizontal table and a tabling machine is movable over the table to the desired length of the drapery. The tabling machine includes grips which hold the edge of the drapery while it is marked or cut. One disadvantage to that device is that it may and usually does stretch the drapery unevenly during marking, and upon release this leads to unevenness of the final product. Another disadvantage is that considerable operator's time is required to grip and stretch the drapery as uniformly as possible, and to hold it as uniformly as possible during marking. Each line must be drawn separately as by chalk. It is thus difficult, with such a device, to quickly or consistently achieve a set predetermined length of the drapery and to achieve an even hem. Where the drapery is held only at intermittent points, the uneven stretching effect is even greater and the resulting hem generally varies more significantly from the desired even fold.

In another device, the drapery is hung from a frame and an operator marks thereon with a hand held and operated marking device. This too has several disadvantages. It is difficult for the operator to evenly mark the drapery as it hangs in folds. For instance, when a fold is straightened for marking, or when the usual chalk line is drawn across the material, this may result in stretching of the material and the edge, though straight when drawn, may scallop when tension is released. The resulting hem may be rendered uneven. Each line on the drapery and on the lining must be separately drawn. Another disadvantage to such apparatus is that the marking device leaves a visible mark on the

material and care must be taken to assure that it is removed, or at least that it is not visible on the finished product.

The present invention provides a method and apparatus for very accurately marking a hem fold line and/or a cut-off line on the drapery and simultaneously on any lining if one is used. Briefly, the invention includes a frame from which the drapery is hung. The frame is raised so that the drapery hangs at its desired length relative to a marking carriage. The carriage, which may be reciprocable across the bottom of the frame, is movably mounted so that it can traverse a desired straight path across (but spaced from) the width of the drapery. The carriage preferably includes two upstanding arms, each fitted with two dye squirting orifices or nozzles, which are independently adjustable in a vertical direction. One arm is positioned on one side or surface (i.e., the front) of the hanging drapery and another arm is positioned on the other or back side. Each nozzle is actuable to discharge a fine or needle-like liquid stream or jet of dye marking material. As used herein, the term "dye" is used broadly to mean liquid materials capable of permanently or temporarily marking the particular drapery material in use. The dye may be a true textile dye, or it may be an ink or colored fluid or a fluorescing material. The dye is preferably of the type which as applied to the drapery is invisible to the human eye under ordinary lighting conditions, and which fluoresces when exposed to light of a predetermined wavelength such as an ultraviolet light. Formulations of such marking fluids are well known and do not form this invention.

In operation, each nozzle is positioned at a predetermined position relative to the drapery, corresponding to a desired drapery length or hem position. The drapery preferably has its upper hanging attachments or clips in place, and hangs therefrom as it will hang in use. A lower nozzle in front of the drapery is positioned at proper height for marking a cut-off line on the drapery, and a higher nozzle is positioned to mark a hem fold line. If a lining is used, two nozzles on a rear upstanding arm may be adjusted in like manner to mark desired cut-off and hem fold lines on the lining. The carriage member on which the nozzles and arms are mounted is then moved across the width of the drapery, and the nozzles squirt very narrow high velocity streams of dye onto the drapery at the desired heights. The carriage may be motorized, rapidly driven, and may traverse the entire width of a ten foot wide drapery panel, for example, in less than about 3 seconds. Since all four (or even more) lines are made simultaneously it can be seen that this method is far faster than previous hand line drawing operations, and is more accurate as well in eliminating improper marking as a cause of scalloping. Since the drapery is hanging in folds, the stream may hit only certain exposed areas, leaving a broken or interrupted line, but which line is nonetheless accurate and sufficient for folding and cutting purposes. When the drapery is removed from the frame and placed on a table surface for cutting, folding or sewing, an ultraviolet light may be directed on the dye marked areas to render the marked lines visible. The markings are continuous or broken but are sufficiently frequent to give a cutter a good line to work to as he cuts the drapery off and then folds the material in along the hem or fold line to be sewn.

It has thus been one object of the present invention to provide an improved apparatus and method for evenly and rapidly marking lines on draperies or curtains.

Another object of the invention has been to provide apparatus for marking lines on draperies or curtains which are invisible to the eye under ordinary lighting conditions, yet which become visible under light of a predetermined wavelength.

Another object of the invention has been to provide a "sizing" or marking apparatus which evenly marks lines on a drapery or curtain while the latter hangs freely without any unnatural stretching.

Another and highly important object of the invention has been to provide a method for evenly marking lines on a drapery or curtain while the latter is positioned as it will be later hung and used.

These and other objects and advantages of the invention will become more readily apparent from the following detailed description of the invention and the drawings in which:

FIG. 1 is a perspective view of a preferred form of apparatus in accordance with the invention,

FIG. 2 is a perspective view of the marking apparatus and carriage,

FIG. 3 is a front elevation, partially broken away, of the apparatus shown in FIG. 1, and

FIG. 4 is a sectional view of the dye squirting orifice or nozzle.

Referring to FIG. 1 of the drawings, the sizing or marking apparatus of the present invention is shown generally at 10. The apparatus includes a frame-like structure with two upstanding ways 11 and 12 and a top cross piece 13. A movable hanger bar 14 is mounted for vertical movement between ways 11 and 12. Hanger bar 14 is provided with rod 15 for hanging the drapery or curtain material 16 thereon by means of conventional hangers 17. Rod 15 may be a conventional traverse or drapery rod. The material 16 may be partially made up, and may include a lining.

Referring to FIG. 3, bar 14 is mounted with its ends received in the U or C shaped ways 11 and 12 with each end carried on endless chains 18 and 19 respectively. A hanger bar elevating drive shaft 20 is journaled at 21 and 22 and chain drive sprockets 23 and 24 are mounted on shaft 20. A reversible motor means 25 is provided for rotating shaft 20, thereby turning sprockets 23 and 24. Chains 18 and 19 pass around upper idler sprockets 26 and 27 respectively. Bar 14 is connected to chains 18 and 19 at its ends, and is elevated or lowered depending upon the direction of rotation of motor 25. It is to be understood that motor means 25 may be provided with controls, well known to those of ordinary skill in the art, so that chains 18 and 19 and the bar 14 can be moved through any desired increment in a vertical direction. This raising or lowering of bar 14 permits drapery 16 to be held according to its desired length. Driving both ends of bar 14 is preferable because it negates any binding, cocking, or height variation of one end of bar 14 with respect to the other so that the top of drapery 16 is held in an even, horizontal position at all times as it is raised or lowered.

Referring to FIGS. 1 and 2, the dye marking apparatus is shown generally at 30. The stream projecting nozzles 31-34 are mounted on upstanding support arms 35 and 36 as best seen in FIG. 2. The nozzles may be adjusted vertically to a desired height by movement in

slots 37 and 38, respectively. Such adjustment may be made by loosening nuts 39. Nozzle 31 may be mounted upon plate 40, which is adjustably mounted in slot 38 in a known manner so as to enable it to be positioned above nozzle 34 when nozzle 34 is in its highest position, as will later be explained.

Upstanding arms 35 and 36 are mounted perpendicularly to a crosspiece 41 which in turn is mounted on a movable or linearly reciprocating carriage member 42. Carriage member 42 is mounted so that it can traverse the width of a hanging drapery along a straight guide 43.

Traverse motion of member 42 and dye marking apparatus 30 across drapery 16 is achieved by a chain drive. Sprockets 44 and 45 are mounted for rotation to drive chain 46. A link 47 is connected between chain 46 and to member 42. A motor means, conventional to the art and not shown, is provided to drive one of the sprockets 44, 45. The driver sprocket drives the chain 46 and member 42 moves with the chain due to link 47. As member 42 moves, for instance in a direction of arrow A in FIG. 3, it approaches sprocket 45. Limit switches may be provided in a motor control circuit for stopping the motor or for reversing its direction, so that member 42 is stopped or reversed to return to its starting position, when it nears sprocket 45, and to deenergize the motor when the carriage is at starting position. Ordinarily, one traverse of the dye projecting nozzles across the drapery 16 is sufficient to mark it, however, a number of passes may be used if desired. Roller 28 and another roller (not shown) may be provided on carriage member 42 to contact support beam 29 in order to prevent any canting of member 42.

Other elements of the dye spraying apparatus 30 are also seen in FIG. 1. A cylinder 48 of pressurized gas (which may be a standard compressed air unit developing 40 PSI pressure) is provided for pressurizing a dye containing tank 49. Dye is thus urged under pressure into tube coil 50 through tube 51. The filters 52 and 53 are provided as will be later explained. Dye is urged under pressure through coil 50 into a manifold located on member 42. This manifold contains valve means, well known in the art which may selectively control the dye flow to the nozzles. It can be seen that as carriage member 42 is driven along guide 43, coil 50 is free to expand or contract and thus dye may be continuously supplied to nozzles 31-34. Coil 50 may ride on a supporting line 54. Lines 55-58 supply dye from the manifold to nozzles 31-34 respectively. It is to be noted that cylinder 48 and tank 49, and the filters 52 and 53, remain in a generally stationary position, however the whole dye supply system can be mounted on the carriage for movement therewith if desired.

Preferably a solenoid actuated valve responsive to the position of the carriage on guide 43 starts projection of the dye stream just before carriage member 42 begins its traverse of the curtain and end projections of the stream after the carriage completes its traverse. This insures that an even line will be made on the material with no streaking as might happen if the stream were commenced when a nozzle was operatively adjacent the material or in traverse across it.

Guide lines 59 and 60 are strung tautly between arms 61 and 62 which are mounted on ways 11 and 12 respectively. These lines are positioned so as to confine the drapery 16 in order to keep it hanging straight down from rod 15, and to prevent it from actually con-

tacting a nozzle 31-34. The guides tend to maintain the material in a predetermined distance range from the nozzles. This provides greater line marking accuracy.

The actual dye projecting nozzle is shown in FIG. 4, it being understood that each nozzle may be similar. It is very desirable to maintain a very thin needle-like unbroken stream or jet of dye in order to make a narrow line on drapery 16 along which a cut or fold is to be made. A fine line—less than about three-sixteenths inch width—permits better cutting and folding accuracy. Furthermore, a smaller amount of dye is used in a thinner stream.

To accomplish the squirting or spraying of a very thin stream of dye, a hypodermic type needle 63 is provided. This needle may be of conventional type, but is preferably of the smallest bore diameter commercially available (e.g., a No. 30 needle). I have discovered that the liquid stream squirted from such a needle displays remarkably little tendency to spread or widen between the needle and the drapery in comparison to an atomized or droplet type stream. Dye is provided through lines 55-58, under pressure, to this needle which projects a very fine stream of dye, to the cloth without any physical contact (other than by the dye stream) of the drapery. Since the stream is very fine due to the small bore diameter of the needle, progressively finer filters 52 and 53 are provided in line 51 to remove any object which may tend to clog the bore of the needles. The final filter is preferably a one micron pore size filter, e.g., of "Micro-Klean" type.

A shroud or housing 64 is provided around the hypodermic needle 63 in order to protect it and to give it stability. The needle 63 may be connected to its respective supply line by connector 65 in a conventional manner and the whole nozzle apparatus is connected to its respective upstanding arm 35 or 36 as previously mentioned.

It will be appreciated that the controls of the drive for vertically moving the bar 14, for horizontally moving the carriage member 42 and dye marking apparatus 30, and the valves for controlling the selective projection of the dye as well as its starting and stopping are all known to those of ordinary skill in the art and any control or valve which may be found suitable can be used. It is desirable to provide a speed control to adjust the rate of traverse of carriage 42. This is useful because a given quantity of dye will tend to spread laterally on some drapery materials than on others. By increasing carriage speed, the quality of dye per unit line length is reduced, and a sharper more precise line is obtained. The vertical movement of bar 14 should be controllable to permit "inching" and the movement of carriage 42 should be controlled for automatic spray shut off on return carriage motion.

The actual dye used may be any fluid known to those of skill in the art which is not harmful to the drapery or curtain material. It should preferably be invisible to the eye under ordinary lighting circumstances, but which become visible upon application of a light of a predetermined wavelength, such as an ultraviolet light, generally shown at 66. Of course, a visible dye may be used, however it would generally require concealment or removal as regards the finished product.

A table 67 may be provided upon which to position the drapery under light 66 after marking so that the marked lines may be seen and the appropriate cuts or folds may be made by an operation.

The operation of the invention may best be followed by reference to FIG. 1. Bar 14 is lowered and drapery material 16 to be cut and hemmed, is attached to rod 15 by hangers 17. A control is actuated and motor 25 turns shaft 20 which drives sprockets 23 and 24, chains 18 and 19 and thus bar 14 in an upward direction. Bar 14 is raised until drapery 16 hangs freely, and its lower end is positioned between guide lines 59 and 60.

The nozzles then are set to mark the desired length. Normally this is standard for a 4 inch hem line. Bar 14 is raised to a height corresponding to the desired finished length of the drapery above the line to be drawn by nozzle 34. Nozzle 33 may be adjusted to mark the desired cut-off line. It will be noted that the drapery will be folded along the line which is marked by nozzle 34 and will be cut off along the line marked by nozzle 33. Since the distance between nozzles 34 and 33 is usually a standard dimension, once those nozzles have initially been adjusted with respect to each other to set the hem width, bar 14 may be raised or lowered to adjust the length to which the drapery will be hemmed. For the most efficient operation, draperies are precut to a length which will allow them to hang freely between guides 59, 60 from bar 14 when the bar is at a position corresponding to the proper drapery length. If the draperies are too long, they can be precut to a length slightly over the desired cut-off length so that they can hang freely.

To facilitate the proper positioning of drapery 16 by movement of bar 14, a tape measure 70 may be mounted on either of the upstanding ways 11, 12. The steel tape is a common retractable tape measure with a housing 71. End 72 of tape 70 is connected to the drapery supporting rod 15 at a point even with the top of a drapery 16. As bar 14 and thus supporting rod 15 move in an upwardly direction, the tape 70 is pulled from its housing and the length of the drape can be read directly from the tape. Tape housing 71 is advantageously located below nozzle 34 in order to measure the length of the drapery 16 from its top to its hemline.

If a lining is to be used, nozzles 31 and 32 are adjusted accordingly. Nozzle 31 is set to mark the hemmed length and nozzle 32 to mark the cut-off line of the lining. It will be noted that the drawings depict nozzle 31 to be generally higher than nozzle 34, thus rendering the hemline of the lining above the hemline of the drapery as will generally be desired. If no lining is used in the drapery being marked, nozzles 31 and 32 may be selectively cut off by conventional valve means as described above.

When the bar 14 and the nozzles are properly adjusted, dye projecting apparatus 30 is actuated to traverse the hanging drapery and to squirt a very thin stream of dye onto the drapery. This thin stream defines an interrupted line across the material due to the folds which were not exposed to nozzles. The lines which are made on the exposed areas of the material are long enough and frequent enough to provide a line to work to, however, for cutting, folding or other operation. The lower or working edge of the drapery can be placed on a surface such as table 67, while the drapery remains hanging on rod 15. An ultraviolet light, such as the light 66, is positioned to cast its light onto the marked areas of the drapery so as to make the line visible to an operator who cuts along the cut-off line and

folds along the hem line so the hem can be sewn in a conventional manner.

It will be readily appreciated that while the invention has been described herein in preferred detail, variations and modifications will become readily apparent to those of ordinary skill in the art without departing from the scope of this invention.

Having described the invention, we claim:

1. A method of marking a line on drapery or curtain material comprising the steps of:

hanging the material from a frame so that the material hangs freely in folds such as it will display in use,

traversing the width of the material with dye stream projecting means and projecting a stream of invisible dye therefrom onto the material at predetermined position,

the said means being moved along a straight line path

while the drapery material remains stationary, the distance between the path and the material varying along the path by reason of the folds in which the material hangs,

the said material being marked as it hangs in folds and without flattening and smoothing the folds, there being no contact between the said dye stream projecting means and said material other than the stream of dye itself, and

exposing the dye mark on the material to light of a predetermined wavelength to make the dye visible.

2. A method as in claim 1 including the steps of: adjusting the frame vertically so as to adjust the material and thereby the position of the dye mark on the material.

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