

Sept. 8, 1964

J. T. BOYES

3,147,895

APPARATUS FOR FINISHING DRAPERY MATERIAL

Filed April 9, 1962

5 Sheets-Sheet 1

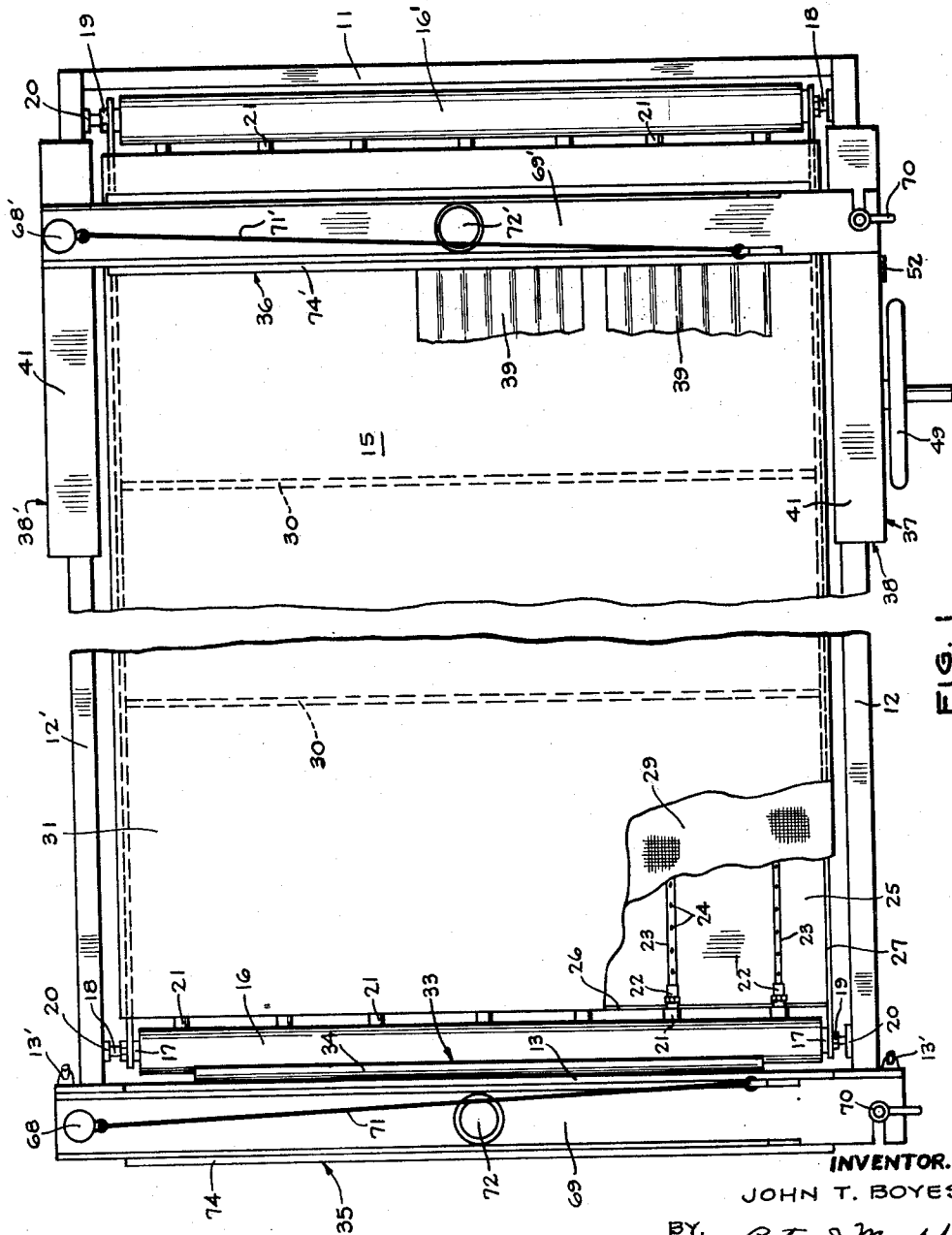


FIG. 1

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5 Sheets-Sheet 2

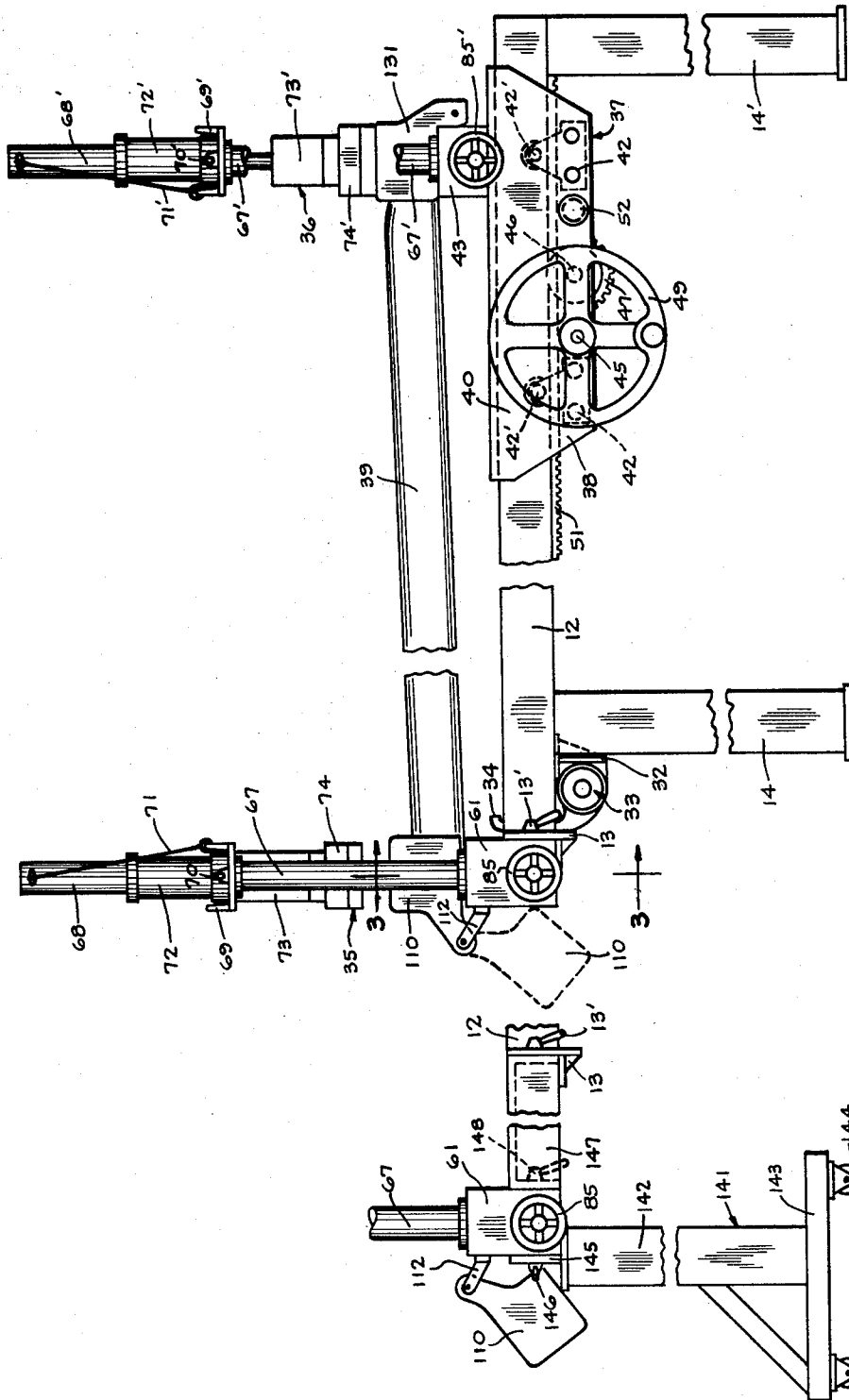


FIG. 2

FIG. 11

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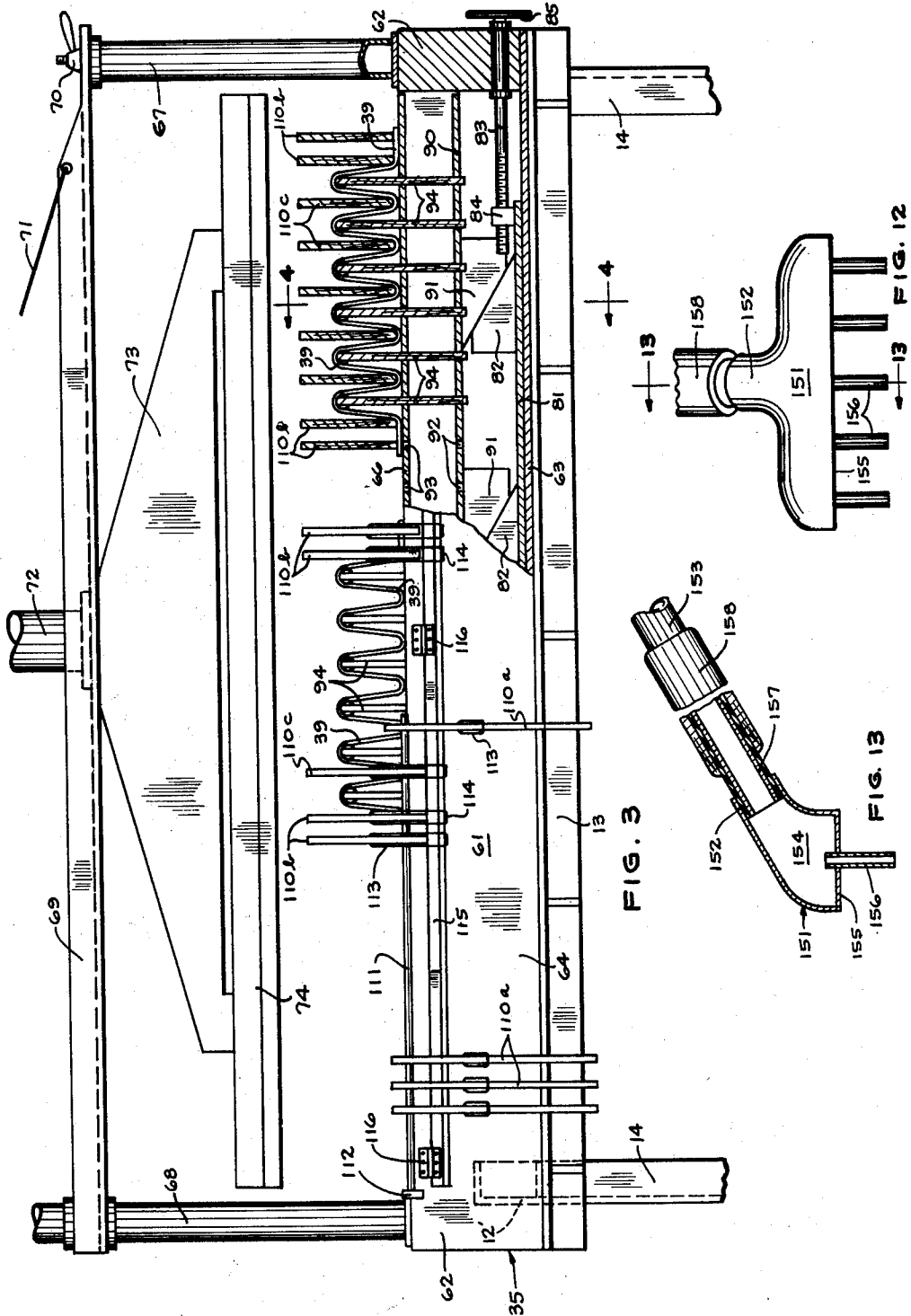
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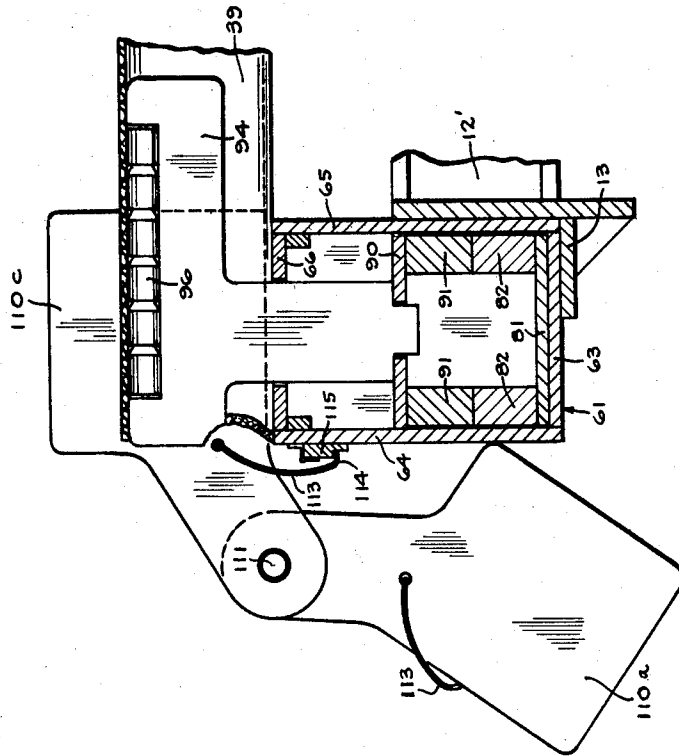


FIG. 4

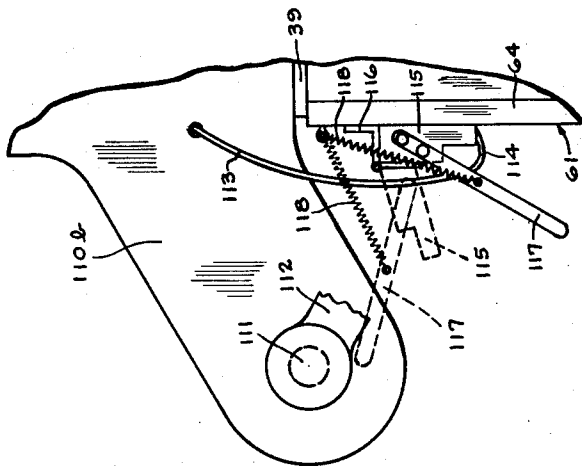


FIG. 5

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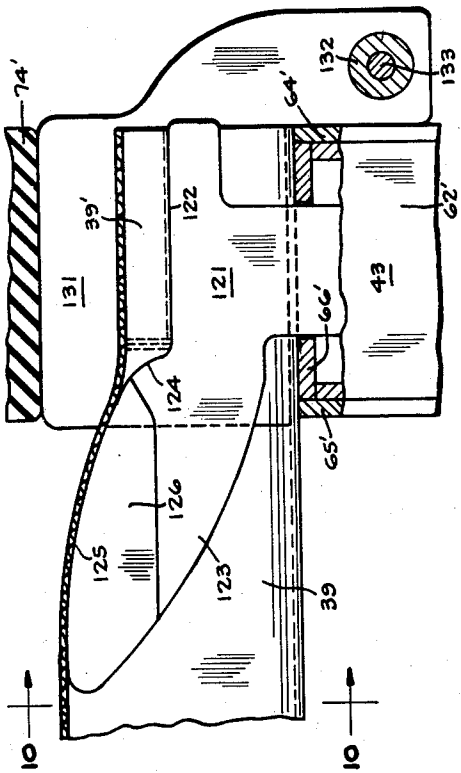


FIG. 9

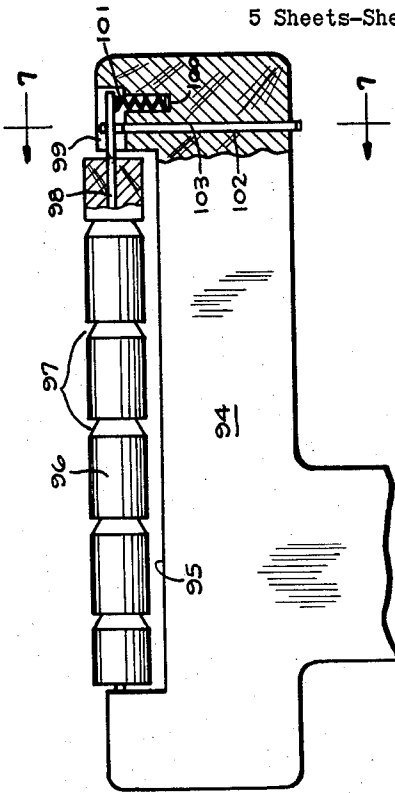


FIG. 6

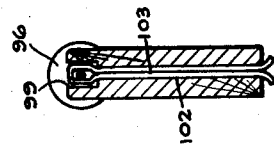


FIG. 7

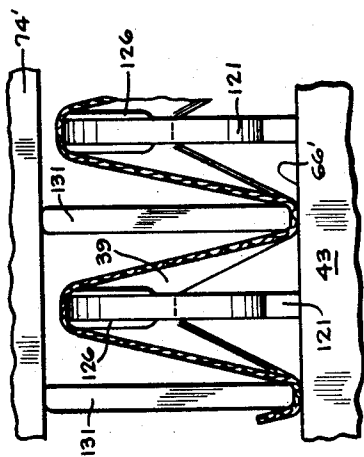


FIG. 10

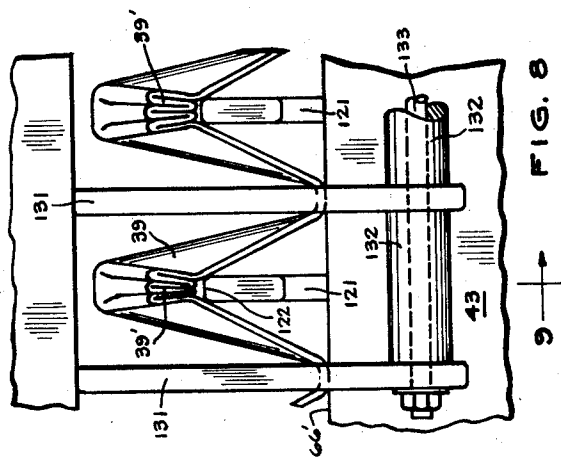


FIG. 8

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APPARATUS FOR FINISHING DRAPERY MATERIAL

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 Filed Apr. 9, 1962, Ser. No. 186,000
 19 Claims. (Cl. 223-51)

The present invention relates in general to the conditioning of draperies, and the like, after dry-cleaning to restore the original size and shape thereof and to revive the original sheen or finish thereof; more particularly, the invention relates to conditioning apparatus wherein the draperies are supported in a manner to form permanent soft folds in the drapery material corresponding to the pleats in the material.

Drapery materials usually lose their original size, shape, and finish or sheen when subjected to dry-cleaning proceedings; and an important object of the present invention is to provide for the restoration of drapery materials to desired size and shape and the revival of the original finish thereof after dry-cleaning. A further object is to provide suitable apparatus operable to so recondition drapery materials. A still further object of the invention is to provide improved apparatus in which drapery materials may be mounted and stretched to desired size and shape while being exposed to the action of live steam, and including means to dry the stretched material after the same has been steamed.

An important object of the invention is to provide improved means for supporting drapery materials in conditioning apparatus of the character mentioned wherein the material is suspended in a manner to form soft folds extending the length of the material. Another object is to provide a novel mechanism for forming the above-mentioned folds and for supporting the material in said folded condition. A further object is to provide a forming and supporting mechanism wherein the drapery material is easily loaded by an operator; and a still further object is to provide a supporting and forming mechanism which is readily adjustable to the desired fold depth as determined by the sewn pleats in the material.

Another object is to provide a pair of spaced-apart clamping mechanisms suitably supported on a frame and adapted to clampingly support the opposite ends of the drapery material, including means for moving one of the clamping mechanisms toward or away from the other, and power operated means for so moving said one clamping mechanism. A further object of the invention is to provide an auxiliary supporting means for the stationary clamping mechanism whereby the stationary clamping mechanism may be readily separated from the frame and moved relative to the frame to permit the use of an extension table for the handling of longer drapery panels.

The above objects are accomplished by apparatus comprising an elongated, preferably rectangular frame, a stationary clamping mechanism mounted on one end of the frame, a movable clamping mechanism mounted on the frame for movement toward and away from the stationary clamping mechanism, the clamping mechanisms having means for forming folds in the material clamped, steam emitting means disposed in said frame in position to apply steam upon material panels suspended between said clamping mechanisms; said stationary clamping mechanism being removably attached to said frame; and a

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portable, auxiliary supporting device adapted to support said stationary clamping mechanism whereby it may be spaced from said frame and secured thereto by means of an extension table.

5 The novel features of the invention, as well as additional objects and advantages thereof, will be understood more fully from the following description when read in connection with the accompanying drawings in which:

FIG. 1 is a top view, partially broken away, of drapery conditioning apparatus embodying the present invention, showing drapery panels supported thereon;

FIG. 2 is a side view of the apparatus of FIG. 1;

FIG. 3 is an end view of the apparatus in FIG. 1 showing the stationary clamping mechanism, partially broken away and shown in section as viewed along the line 3-3 of FIG. 2 looking in the direction of the appended arrows;

FIG. 4 is a sectional view taken along the line 4-4 of FIG. 3;

FIG. 5 is an enlarged fragmentary view of a portion of the structure shown in FIG. 4;

FIG. 6 is a detail view of a pleat form for the stationary clamping mechanism;

FIG. 7 is a sectional view taken along the line 7-7 of FIG. 6;

FIG. 8 is a fragmentary end view of the movable clamping mechanism;

FIG. 9 is a sectional view of the moving clamping mechanism taken along the line 9-9 of FIG. 8;

FIG. 10 is a fragmentary view taken along the line 10-10 of FIG. 9 looking in the direction of the appended arrows;

FIG. 11 is a side view of means for supporting the stationary clamping mechanism, separated from the frame, and a table extension connecting the clamping mechanism to the frame;

FIG. 12 is an elevation view of a steaming attachment for the apparatus; and,

FIG. 13 is a sectional view taken along the line 13-13 of FIG. 12, looking in the direction of the appended arrows.

The drawings illustrate a preferred embodiment of apparatus for conditioning woven fabric and the like, especially pleated drapery panels, by forming, steaming, stretching, and drying the fabric in stretched condition; said apparatus comprising an elongated frame of preferably rectangular configuration having spaced apart longitudinally extending side members 12 and 12', and transversely extending end members 11 and 13 respectively forming the ends of the frame. While these members may have any suitable form, the members 11, 12 and 12' comprise longitudinally extending metal channels, and the member 13 comprises a fabricated angle member. The frame is preferably supported in a horizontal position by legs 14 and 14'; the legs 14 extending downward from the side members 12 and 12', spaced inward from the end member 13; and the legs 14' extending downward from the side members 12 and 12' adjacent to the end member 11. The frame members and legs may be secured together in any suitable manner. For purposes of reference the side of the apparatus, defined by the side member 12, may be referred to hereafter as the "front" or "front side" of the apparatus.

Within the confines of the frame, a steam emitting table structure 15 is mounted in position to emit steam upwardly within the frame; the table structure comprising a

pair of preferably hollow metal castings forming elongated steam headers 16 and 16', extending transversely substantially entirely across the frame between the longitudinal frame members 12 and 12'. The header 16 is preferably disposed inwardly of and closely adjacent the frame end member 13, while the header 16' may be disposed inwardly of the frame end member 11. The ends of the headers 16 and 16' may be provided with embossments 17 carrying threaded stems 18 fitted with nuts 19. Means 20 is provided for securing the stems 18 on the side members 12. The facing sides of the headers 16 and 16' may be provided with a plurality of spaced apart bosses 21, threaded for the reception of pipe couplings 22, whereby steam pipes 23 may be secured between the headers 16 and 16'.

The pipes 23, accordingly, will extend longitudinally of the frame in spaced apart preferably parallel side-by-side relationship. Each of the steam pipes 23, at intervals therein, may be formed with perforations 24 providing nozzles through which steam may be emitted upwardly of the pipes. A steam condensate collecting pan 25, preferably of generally rectangular shape and sized to extend substantially between the headers 16 and 16' and between the side members 12 and 12' of the frame, may be secured at its opposite ends upon the headers 16 and 16' in position extending beneath the pipes 23. In this connection, the pan 25 may be provided with upstanding end walls 26 formed with perforations for receiving the couplings 22 whereby the end walls 26 may be secured to the headers 16 and 16' at the bosses 21 by the couplings 22. The pan 25 may also be formed with upstanding side walls 27 having extensions at the opposite ends thereof disposed in alignment with the end embossments 17 of the headers 16 and 16', said extensions of the walls 27 being perforated for the accommodation of the stems 18 whereby the opposite ends of the walls 27 may be clampingly secured to the headers 16 and 16' by and between the embossments 17 and the nuts 19.

The bottom of the pan 25 may be and preferably is slightly inclined downwardly toward a condensate drain formed therein at any convenient location. The headers 16 and 16' may also be provided with bottoms downwardly inclined toward one side of the frame, the header bottoms being provided with condensate drains.

The upper edges of the side walls 26 and 27 of the condensate pan 25 may lie substantially in a common plane with the tops of the headers 16 and 16', and a sheet 29 of foraminous material may be applied in position covering the open top of the condensate pan, such sheet extending above and in position overlying the pipes 23. In order to strengthen and rigidify the pan 25, the same may be provided with transversely extending rods 30, disposed in parallel spaced-apart relationship, and secured at the opposite ends thereof to the opposite side walls 27 of the pan. The rods 30 may be secured to the upper edges of the pan side walls 27 in position extending above and resting upon the pipes 23, the medial portions of the foraminous sheet 29 being supported on the transverse rods 30. The sheet 29 may comprise any suitable foraminous material, such as copper wire mesh or screen material. A top cover of woven cotton fabric or sheeting 31 may be applied in position covering the foraminous sheet 29. The cover sheet 31, if desired, may be extended to overlie and enclose the headers 16 and 16'.

A transversely extending dependent bracket 32 may be mounted on the frame, as on the longitudinal side members 12 and 12' thereof, adjacent to the end member 13, in position to support an air blower 33 beneath the medial portions of the header 16, the air blower having a fanlike discharge nozzle 34 extending between the frame member 13 and the header 16. The nozzle 34 may open immediately above the header 16 in a direction facing in the longitudinal direction of the frame and away from the end member 13. If desired, the intake side of the blower 33 may be connected with means for supplying heated

air to the blower, in order to deliver warm air through the nozzle 34.

Suitable means are provided for mounting panels of material, particularly pleated drapery panels 39, upon the frame in position extending above the steam structure 15 and above the air delivery nozzle 34, so that the so mounted material may be exposed to the action of steam and also to the action of air delivered through the nozzle 34. In that connection, the mounting means provide for clamping the opposite ends of the panels 39 and for stretching the panels on the frame above the steaming table 15.

To these ends the mounting means comprise a stationary clamping mechanism 35, mounted on the frame adjacent to the header 16, and a movable clamping mechanism 36, mounted upon a shiftable carriage 37 supported on the frame and movable longitudinally of the frame members 12 and 12'. The carriage 37 may comprise a pair of brackets 38 and 38', respectively mounted upon the front and rear side members 12 and 12' of the frame. Each bracket may comprise a side plate portion 40, adapted to overlie the outwardly facing side of the longitudinal frame member 12 or 12' on which it is mounted, and a top plate portion 41 adapted to overlie the upwardly facing side of such longitudinal frame member. The side plate portion 40 of each bracket 38 may have attached, to opposite ends thereof, a pair of spaced apart brackets 42; the brackets 42 carrying wheels 42' in position to rollingly engage track forming means on the frame member, whereby to support the brackets 38 and 38' each for movement longitudinally of its corresponding frame members 12 and 12'. The track forming means conveniently comprises the lowermost flanges of the channels forming the longitudinal frame members 12.

The side plate portions 40 of the brackets 38 and 38' extend downwardly of the members 12 and 12' on which the brackets are mounted; and the brackets may be rigidly interconnected by means of transverse members extending therebetween, and secured thereto above as well as below the members 12 and 12', so that the brackets 38 and 38' and the transverse members secured thereto may form a rigid frame structure comprising the carriage 37 longitudinally movable on the frame. To this end, an elongated box 43 is secured, at its opposite ends, upon the top plate portions 41 of the brackets 38 and 38', in a position extending transversely of the frame above the steaming table 15. The box 43 comprises a portion of the movable clamping mechanism 36, which will be described in detail subsequently.

The carriage 37, however, may also include a pair of driving shafts 45 and 46 extending transversely of and beneath the frame, said shafts being secured at their opposite ends in suitable journals formed on the plate portions 40 of the brackets 38 and 38'. The shaft 46 may carry a pair of gears 47 drivingly secured thereon, at the opposite ends thereof, in position to engage driving pinions secured on the shaft 45 in registration with the gears 47. One end of the shaft 45 may extend outwardly of the bracket 38, at the front side of the frame, and may carry a manually operable hand wheel 49, accessible from the front side of the frame, for the purpose of turning the shaft 45 and thus turn the shaft 46 through the pinions and gears 47. The shaft 46 may carry a pair of pinions thereon; each disposed beneath one of the frame members 12 and 12' and being drivingly connected with a corresponding rack 51, mounted on the underside of the associated frame members. It will be seen that the shafts 45 and 46 comprise transverse frame members interconnecting the brackets 38 and 38' beneath the frame and steam table structure 15, whereby to strengthen and rigidify the carriage structure 37. If desired, additional transverse members may be mounted between and interconnected with the plate portions 40 of the brackets 38 and 38'.

It will be seen from the foregoing that, by manipulating

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the driving wheel 49, the carriage 37 may be moved longitudinally of the frame by the powerful driving action of the gears, pinions and racks. Accordingly, the space-
 between the stationary clamping mechanism 35 and the carriage mounted clamping mechanism 36 may be
 adjusted at will. As a consequence, panels 39 of drapery
 or curtain material, secured at the opposite ends thereof
 in the clamping mechanisms 35 and 36, may be stretched
 to any desired extent by adjusting the spacement of the
 mechanism by operation of the driving wheel 49.

Manually operable carriage latching means may also
 be provided for securing the carriage in any desired ad-
 justed position longitudinally of the frame. To this end,
 a stub shaft 52 may be mounted in a suitable bearing
 formed in the side plate portion 40 of the bracket 38 ad-
 jacent the driving wheel 49; the stub shaft being movable
 longitudinally in its bearing and carrying an operating
 knob in position exposed outwardly of the plate portion
 40 at the front side of the frame. Inwardly of the plate
 portion 40, the stub shaft 52 may be formed for selective
 interlocking engagement with the teeth of the rack 51
 so that, by operating the shaft mounted handle outwardly
 of the plate portion 40, the carriage structure 37 may be
 either anchored in longitudinally adjusted position on the
 frame, or may be released for movement longitudinally
 of the frame.

The stationary clamping mechanism 35, as best shown
 in FIGS. 2, 3, and 4, comprises a base member in the
 form of an elongated box 61 which is supported on and
 secured to the frame end member 13. The box consists
 of end blocks 62, a bottom plate 63, side plates 64 and
 65, all fabricated into a rigid structure, and a removable
 top plate 66. The box may be secured to the end member
 13 by clamping means 13', preferably in the form of a
 quick release clamp, in a manner such that the box is
 readily removable from the frame.

Vertical tubular columns 67 and 68, mounted respec-
 tively on the front and rear blocks 62, extend upwardly
 from the box 61, for supporting a clamping bar assembly.
 The column 68 is longer than the column 67, and a hori-
 zontal support bar 69, in the form of a metal channel,
 is supported at one end on the column 68 for lateral swing-
 ing movement relative thereto. The other end of the sup-
 port bar is supported on the top of the column 67 and
 a quick release clamp 70 is provided for securely locking
 the support bar to the column 67. A cable 71 is secured
 between the top of the column 68 and the front end of
 the support bar 69, whereby the bar may be swung laterally
 from the clamped position relative to the column 68
 being supported by the cable. An air cylinder 72 is
 mounted on the support bar, intermediate its ends, and
 extends upwardly therefrom in a manner such that the
 piston rod or plunger extends downwardly through the
 support bar. A bracket 73 is fixed to the piston plunger,
 and, in turn, supports a clamping bar 74 comprising a rigid
 longitudinal member having a resilient pad fixed to its
 lower surface. When in operative position, the clamping
 bar extends between the columns 67 and 68 and overlies
 the box 61, whereby the top plate 66 of the box defines
 a clamping plate which opposes the clamping bar. It is
 seen from the foregoing, however, that the clamping bar
 assembly (69, 73, 74) may be swung inwardly over the
 table 15, if desired, to facilitate the loading of drapery
 panels 39. In the drawings, the clamping bar 74 is shown
 in the raised or nonclamping position.

Referring now to the interior structure of the box 61,
 best shown in FIGS. 3 and 4, a driving plate 81 com-
 prises an elongated metal plate member supported on the
 bottom plate 63 of the box for longitudinal movement
 within the box. The width of the driving plate 81 is
 substantially that of the box interior so that lateral move-
 ment is limited. Pairs of upwardly extending wedges 82
 are mounted at the edges of the driving plate and spaced
 longitudinally. These wedges define inclined surfaces
 which are inclined upwardly from the forward end of the

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plate toward the rearward end. A screw shaft 83 is dis-
 posed longitudinally in the box 61 and is rotatably sup-
 ported in the front end block 62 in a manner to prevent
 longitudinal movement, and extends from the forward
 end of the box. The screw 83 is engaged with a nut 84,
 which is fixed to the front end of the driving plate 81.
 A handwheel 85 is fixed to the forward end of the screw,
 whereby the screw may be rotated manually to longi-
 tudinally shift the driving plate. While a handwheel is
 shown for this adjustment, it may be preferable to drive
 the screw by means of an electric motor, for example,
 through suitable reduction gearing.

A riser plate 90 comprises a horizontally disposed,
 longitudinal metal plate member which is confined within
 the box 61 for vertical movement. Pairs of wedges 91
 are mounted on the bottom face of the riser plate and
 extend downwardly therefrom. These wedges are mounted
 on the edges of the riser plate and are spaced longitudinally
 in generally vertical alignment with the wedges 82 of the
 driving plate 81, in a manner such that longitudinal
 movement of the driving plate 81 produces vertical move-
 ment of the riser plate 90 through an inclined plane effect.
 The riser plate 90 is provided with a plurality of longi-
 tudinally spaced transverse slots 92. The top plate 66
 is similarly provided with a plurality of longitudinally
 spaced transverse slots 93 which are vertically aligned
 with the slots 92, but which are longer than the slots 92.

The slots 92 and 93 are provided for the supporting and
 guiding of "pleat forms" 94, best shown in FIGS. 4 and 6.
 These pleat forms 94 are preferably made of plywood and
 are generally in the form of a T, the stem of which is
 notched at the base to define a tab and shoulders. The
 stem is dimensioned to be received and guided for free
 vertical movement within a slot 93 of the top plate, and
 the tab is received within a slot 92 of the riser plate, so
 that the pleat form is supported in a vertical plane for
 vertical movement with the riser plate. The upper edge
 of the pleat form 94 is provided with a notch 95 within
 which is mounted a horizontally disposed roller 96 having
 a plurality of annular grooves 97. The roller is rotation-
 ally supported by means of stub shafts 98, which extend
 from the ends of the roller and are disposed in slots
 99 in the upper edges of the pleat form. The slots are
 provided so that the roller may move vertically, relative
 to the form; and to this end, bores 100 extend downwardly
 from the lower surfaces of the slots 99 and have disposed
 therein compression springs 101 which bias the roller
 shafts, and therefore the roller, upwardly. To limit up-
 ward movement of the roller, vertical bores 102 extend
 through the form communicating with the slots 99; and
 wires 103 are disposed within these bores, defining loops
 within the slots 99 to confine the stub shafts 98, and being
 secured at the lower surface of the form. The roller 96
 has a diameter which is greater than the width of the pleat
 form body and which corresponds to the depth of the
 notch 95, so that the roller will be supported by the base
 of the notch when it is moved downward under pressure.
 The annular grooves 97 define serrations for the pleat
 form, which serve to prevent slippage of the drapery ma-
 terial as will be seen.

Other elements of the clamping mechanism are pleat
 fills 110 which, in use, are supported between the pleat
 forms on the box 61. The pleat fills are preferably made
 of plywood and are generally rectangular in shape, each
 having an integral arm extending therefrom and provided
 with a transverse hole having a suitable bushing. The
 pleat fills are supported upon a rod 111, which extends
 parallel to the box 61 substantially the length thereof;
 the ends of the rod being supported in suitable brackets 112
 secured adjacent to the ends of the box 61. The pleat
 fill bushings are dimensioned, relative to the rod, in a
 manner such that the fills may be pivoted or swung in
 generally vertical planes and are slidable along the rods
 so that they may be positioned as desired or stored out
 of the way toward one side of the apparatus. In FIG. 4,

the pleat fill 110a is shown in a stored position and the pleat fill 110c is shown in clamping position. In the clamping position the lower edge of the fill is parallel with the top plate 66 of the box 61 and the upper edge of the fill is parallel to the lower edge and parallel to the lower face of the clamping bar 74. The drapery material 39 is clamped between the lower edge of the pleat fill and the top plate 66.

Each of the pleat fills is provided with a wire spring 113, best shown in FIGS. 3, 4 and 5, which is generally U-shaped, as viewed from the end of the pleat form, being pivotally supported at one end in the pleat fill and the free end having a hook 114 which is adapted to engage a latch bar 115. The latch bar 115 is an elongated member mounted on the side plate 64 of box 61, and is stepped to define upper and lower, downward facing latching surfaces. The latch bar is substantially coextensive with the box 61; and is mounted on the side plate 64 thereof by means of hinges 116, which define a horizontal swinging axis along the top of the latch bar and spaced from the side plate. Levers 117 are mounted at the ends of the bar so that the operator may readily swing the latch bar outwardly from the side plate.

In FIG. 5, the latch bar is shown, in full, in position against the side plate 64, wherein the wire springs 113 may be latched in the desired manner. The latch bar is held in this position by means of tension springs 118 which are connected between the levers 117 and the plate 64 at a point above the latch bar. These springs maintain the latch bar at the indicated position by the over-center arrangement of the springs 118 in relation to the hinge axis of the latch bar. In this position, the pleat form springs 113 may be engaged or latched with the lower latching surface as shown in FIG. 5, or with the upper latching surface, as shown in FIG. 4. The function of the two latching positions will be described subsequently in connection with the operation of the apparatus. For the present, it may be said that the operator must individually latch each of the springs 113 for the pleat fills 110. In order to disengage the springs 113 from the latch bar, it is only necessary for the operator to swing the latch bar outwardly, by means of one of the levers 117, and the latch bar will then assume and maintain the position shown by the dotted lines in FIG. 5, again by the over-center action of the springs 118 in relation to the hinge axis of the latch bar. With the latch bar in this position, the springs 113 readily disengage from the latch bar when the pleat fills are pivoted from the clamping position to the stored position.

The movable clamping mechanism 36 is generally similar to the clamping mechanism 35 and comprises the box 43, mounted on the top plate members 41 of the carriage 37; columns 67' and 68'; support bar 69' and clamp 70'; cable 71'; an air cylinder 72' mounted on the support bar 69'; and a bracket 73' secured to the air cylinder plunger and supporting clamping bar 74' which overlies the box 43. The box 43 is identical in structure to the box 61 except that it is more shallow since the range of adjustment of the riser plate need not be so great.

Pleat forms 121 for the box 43, best shown in FIGS. 8, 9, and 10, are substantially different in form from the pleat forms 94 since they are designed for the loading of the pleated ends of drapery panels 39. The pleat forms 121 are preferably made of plywood; and are again in the general shape of a T, the stem formed to be supported and guided in the slots of the riser plate and top plate of the box 43 in the same manner as the pleat forms 94. These forms are provided with a horizontal upper edge 122, disposed at the outer end of the form, and a contoured arm 123, which extends inwardly toward the stationary clamping mechanism. This arm defines an upper contoured edge surface which rises rather abruptly from the edge 122, defining a shoulder 124, then merges into a gradually rising surface 125 which terminates at the inward end of the arm. The upper portion of the pleat

form arm is provided with embossments 126, which serve to thicken the form in the area of the contoured surface 125 and, in cross-section, to provide a smooth rounded surface, as best shown in FIG. 10.

This form 121 is provided for supporting the sewn pleats 39' which may be provided at the upper hem of a drapery panel. The pleats are supported directly over the upper edge 122, as best shown in FIGS. 8 and 9, and the contoured arm provides a billowing effect from the pleat to form a soft fold in the panel merging with the pleat. It has been observed that, for most residential draperies having sewn pleats, the depth of the folds at the unpleated end (or at any point removed from the pleated end) is in the range of 1½ inches to 2½ inches greater than the depth of the folds at the pleats. The pleat form 121 is dimensioned so that the rise between the edge 122 and the surface 125 is about 1⅞". It has been found that this rise in the pleat form will provide a smooth flowing contour, between the folds and the sewn pleats, for a great majority of pleated drapery panels which are processed in a dry-cleaning plant.

Pleat fills 131 for the box 43, best shown in FIGS. 8 and 9, are preferably made of plywood and are generally rectangular in shape having an integral downwardly extending arm which engages the outward face of the box 43 to locate the pleat fills relative to the box. The pleat fills are assembled in groups of four or five, for example, by means of tubular spacers 132, positioned between adjacent pleat fills at the lower extremity of the arms, the assemblies being held together by a nut-bolt assembly 133. The spacers 132 serve to space the pleat fills 131 at intervals corresponding to the spacing of the pleat forms 121, so that the pleat fills may be placed on the box 43 between the pleat forms. Also, through this manner of assembly, the pleat fills are maintained in vertical planes.

Though not described, it will be apparent that the apparatus is provided with suitable conduits for connection with sources of steam, compressed air, and electric power, and suitable valves and controls for operation of the apparatus.

The operation of the apparatus will now be described in connection with the finishing of a pair of drapery panels 39 having sewn pleats 39'; each panel having six pleats, as best shown in FIG. 3. The pleated ends of the panels are loaded first, in the movable clamping mechanism 36. The clamping bar 74' is swung out of the way, two groups of six pleat forms 121 are inserted in the box 43, and the riser plate is adjusted in accordance with the distance between pleats in the panels. The panels are then laid on the table 15 and the sewn pleats are placed over the edges 122 of the pleat forms 121 in the manner best shown in FIGS. 8 and 9. The pleats are placed in a manner such that the lower or inner edges of the sewn pleats lie against the shoulders 124 of the pleat forms. The pleat fills 131 are then placed over the pleated hem and between the pleat forms so that portions of the hem are confined between the lower edges of the pleat fills and the top plate 66' of the box 43. The clamping bar 74' is then swung into position over the box 43 and locked to the column 67'; and the air cylinder 71' is then actuated to move the clamping bar 74' downward against the upper edges of the pleat fills 131. The pleated end of the drape is now tightly clamped so that it will be maintained in place when the panels are stretched. The shoulders 124, of the pleat forms, assist in preventing slippage of the panel under tension.

The unpleated or lower ends of the panels 39 are then loaded in the fixed clamping mechanism 35, as best shown in FIGS. 3 and 4. The clamping bar 74 is swung out of the way and two groups of six pleat forms 94 are inserted into the box 61, in alignment with the pleat forms 121. The riser plate 99 is adjusted to set the height of the pleat forms in accordance with the distance between pleats. The edges of the panel are first clamped against the top plate 66 of the box 61 by means of one or more pleat

fills 110b which are swung from the stored position to the clamping position. These pleat fills 110b are latched by engaging the respective springs 113 with the lower latching surface of the latch bar 115, as best shown in FIG. 5, wherein sufficient clamping force is provided to maintain the panels in place during the balance of the loading. The six folds, for each panel, are then formed over the pleat forms 94; and the forming of the folds is facilitated by the rollers 96 which permit the material to be easily positioned over and between pleat forms. During this process, the pleat fills 110c may be swung to clamping position and latched by engaging the respective springs 113 with the upper latching surface of the latching bar 115. In this manner, the pleat fills 110c are secured in place, but some slight sliding movement of the material may be permitted. Unused pleat fills 110a are stored, out of the way, at one end of the box 61. When both panels have been loaded in this manner, the riser plate 90 may be finally adjusted, if necessary, to take up slack in the formed folds and even out the folds. During this adjustment, some slight movement of the material may occur relative to the rollers 96 of the pleat forms and relative to the pleat fills 110c. The clamping bar 74 is then positioned over the box 61 and clamped to the column 67; and the air cylinder 72 is actuated to engage the clamping bar 74 with the upper edges of the pleat fills 110 whereby the lower hems of the panels are securely clamped against the box 61. The serrated grooves in the pleat form rollers 96 assist in preventing slippage of the material.

An appropriate valve is then actuated to direct live steam to the drapery panels; and, during steaming, the carriage 37 is adjusted by means of the handwheel 49 to stretch the panels to the desired length. Due to the mounting of the panels in the two clamping mechanisms 35 and 36, soft folds are formed along the entire length of the panels merging with the sewn pleats. After the panels are thoroughly steamed, the steam is shut off and the blower 33 is actuated to dry the panels. Through this steaming and drying process, the soft folds formed in the panels tend to remain permanent until the panels are again subjected to a dry-cleaning process.

The finishing process is now completed. The pleated ends of the panels are readily released from the clamping mechanism 36 by releasing the clamping bar 74' and removing the pleat fills 131. The panels are released from the clamping mechanism 35 by releasing the clamping bar 74, and by lifting the latching bar 115 to the release position, as best shown in FIG. 5, whereby the pleat fills 110 are readily flipped to the stored position.

As has been described, the stationary clamping mechanism 35 is attached to the frame, by clamps 13', in a manner such that it may be readily removed. FIG. 11 shows an auxiliary supporting carriage 141, for the clamping mechanism 35, which may comprise a framework including upright members 142, base members 143 including wheels 144, a transverse member 145 in the form of a fabricated angle, and suitable braces for providing a rigid structure. This carriage may be moved directly against the end of the apparatus to engage the box 61 of the stationary clamping mechanism. The clamping mechanism may then be attached to the transverse member 145 by means of quick release clamps 146, and detached from the frame member 13. The clamping mechanism 35 may then be spaced from the frame a desired distance, and may be rigidly connected to the frame by means of a table extension 147 which may be readily secured between the box 61, by means of quick release clamps 148, and the frame member 13 by means of the clamps 13'. This arrangement is desirable since a practical commercial apparatus of this type must be of a size to handle the majority of sizes of drapes handled by a dry-cleaning plant, for example, and yet occupy minimum floor space. A carriage 141 and associated table extension 147 readily adapt

the machine to accommodate longer drapes when occasion requires it.

The apparatus may be provided with manual steaming and drying attachments which may be readily connected to the apparatus for steaming and drying the portion of the panels which lie over the table extension 147. One such attachment, for steaming the folds of a panel, is shown in FIGS. 12 and 13. This steaming attachment comprises a head 151 having a boss 152, for attachment to a flexible hose 153, and defining a chamber 154. The head defines an elongated flat wall 155 having fixed therein a plurality of spaced transverse nozzles 156. The nozzles 156 are in the form of tubes which extend outwardly from the wall 155, and which extend into the chamber 154 for a distance of about 1/2 inch, for example. The nozzles are mounted to extend into the chamber so that steam condensate will collect within the chamber and not be discharged through the nozzles in normal operation. Periodically, the head may be elevated to permit the condensate to return through the steam hose. The nozzles 156 are spaced to correspond with the spacing of the folds formed by the apparatus.

The hose 153 may be attached to the head 151 by cementing the hose within the boss 152. In order to provide rigidity of the hose adjacent to the head, a tubular nipple 157 may be disposed within the hose extending into the boss 152. A tubular wooden handle 158 may enclose the hose adjacent to the head 151, for the purpose of providing convenient means for the manipulating of the head by an operator. The handle 158 is substantially coextensive with the nipple 157 to provide for rigidity of the attachment structure. The opposite end of the hose 153 may be attached to a convenient outlet on the apparatus; and a suitable valve may be provided adjacent to the outlet.

There has been described apparatus for the finishing of drapery panels, and particularly for the forming of semi-permanent soft folds in the panels which extend from the sewn pleats throughout the length of the panels.

One important feature of the invention is the design of the pleat forms, for the pleated end clamping mechanism, which provides for the billowing effect of the folds merging with the pleats, which provides for soft folds merging with the pleats, and which assists in anchoring the panel for stretching to the proper length.

Another important feature of the invention is the design of the pleat forms, for the unpleated end clamping mechanism, which includes the spring biased rollers to provide for ease of loading the drapery panel, which provides for evening the folds over the width of the panel, and which assists in anchoring the panel for stretching to the proper length.

A further important feature of the invention is the latch bar mechanism for the unpleated end clamping mechanism, which acts in conjunction with the pleat fill springs, to provide for alternative firm clamping or relatively loose clamping of the material by the pleat fills during loading, and which provides for quick release of the pleat fills to release the panels from the clamping mechanism.

A still further important feature of the invention is the provision of a mounting for the stationary clamping mechanism, whereby the mechanism may be readily detached from the apparatus and supported on an auxiliary carriage for the handling of excessively long drapery panels; and the provision of a steaming attachment for steaming the portions of the panels extending beyond the frame steam emitting means.

What is claimed is:

1. In apparatus for finishing drapes: a frame; first and second clamping mechanisms mounted on said frame for relative movement, for clamping the opposite ends of a drape suspended between said mechanisms; each of said clamping mechanisms including opposed elongated clamping members, a plurality of longitudinally spaced drape supporting forms supported

on one of said clamping members and extending therefrom toward the other of said clamping members, and a plurality of longitudinally spaced drape engaging fills mounted for disposition between said forms for engagement by said clamping members; 5
 said forms being disposed to support the end of a drape, accommodating folds therebetween; said fills being disposed to engage said folds and to effect the clamping of the drape between said clamping members; 10
 each of said forms, for said first clamping mechanism, having a drape engaging surface defined by a roller; and each of said forms, for said second clamping mechanism, having a drape engaging surface defined by a straight edge portion for supporting a sewn pleat of a drape, and a projecting contoured portion for supporting the drape material merging with the sewn pleat. 15

2. In apparatus for finishing drapes: a frame; first and second clamping mechanisms mounted on said frame for relative movement, for clamping the opposite ends of a drape suspended between said mechanisms; 20
 each of said clamping mechanisms including opposed elongated clamping members, a plurality of longitudinally spaced drape supporting forms supported on one of said clamping members and extending therefrom toward the other of said clamping members, and a plurality of longitudinally spaced drape engaging fills mounted for disposition between said forms for engagement by said clamping members; means for selectively extending and retracting said forms relative to said one clamping member; 25
 said forms being disposed to support the end of a drape, accommodating folds therebetween; said fills being disposed to engage said folds and to effect the clamping of the drape between said clamping members; 30
 each of said forms, for said first clamping mechanism, having a drape engaging surface defined by a roller; and each of said forms, for said second clamping mechanism, having a drape engaging surface defined by a straight edge portion for supporting a sewn pleat of a drape, and a projecting contoured portion for supporting the drape material merging with the sewn pleat. 35

3. In apparatus for finishing drapes: a frame; first and second clamping mechanisms mounted on said frame for relative movement; 40
 each of said clamping mechanisms including: a lower elongated clamping member, and an upper elongated clamping bar mounted in opposed relation to said clamping member; a plurality of plate-like drape supporting forms mounted on said clamping member, extending upwardly therefrom in spaced transverse planes; a plurality of plate-like drape engaging fills mounted to be positioned on said clamping member between said forms, and extending upwardly beyond said forms for engagement by said clamping bar; 45
 said forms being disposed to support the ends of a drape, accommodating downwardly extending folds therebetween; said fills being disposed to engage and clamp said folds against said clamping members; 50
 each of said forms, for said first clamping mechanism, having an upper drape engaging surface defined by a roller; and each of said forms, for said second clamping mechanism, having an upper drape engaging surface defined by a horizontal portion, for supporting a sewn pleat of said drape, and an upwardly and laterally extending contoured portion, for supporting the drape material merging with the sewn pleat. 55

4. In apparatus for finishing drapes, a clamping mechanism for supporting one end of a drape comprising: 70
 opposed elongated clamping members; 75
 a plurality of drape supporting forms supported in spaced relation along one of said clamping members, and extending therefrom toward the other of

said clamping members; a plurality of drape engaging fills mounted for disposition between said forms for engagement by said clamping members; said forms being disposed to support one end of a drape, accommodating folds therebetween; said fills being disposed to engage said folds and to effect the clamping of the drape between said clamping members; 5
 each of said forms having a straight edge surface for supporting the fold of a drape; and an elongated roller, rotatably mounted on said form, defining a portion of said edge surface. 10

5. In apparatus for finishing drapes, a clamping mechanism for supporting one end of a drape, comprising: an elongated, horizontally disposed, lower clamping member; an elongated, horizontally disposed, upper clamping bar; means mounting said clamping bar for movement toward and away from said clamping member; 15
 a plurality of plate-like drape supporting forms mounted on said clamping member, extending upwardly therefrom in spaced transverse planes; a plurality of plate-like drape engaging fills mounted to be positioned on said clamping member between said forms, and extending upwardly beyond said forms for engagement by said clamping bar; said forms being disposed to support one end of a drape, accommodating downwardly extending folds therebetween; said fills being disposed to engage and clamp said folds against said clamping member; 20
 each of said forms having an upper edge surface for supporting the drape; and an elongated roller, rotatably mounted in said form, defining a portion of said upper edge surface. 25

6. The invention set forth in claim 4 wherein said one clamping member includes means for selectively raising and lowering said forms relative thereto; each of said forms being provided with an elongated notch at its upper edge; said roller having a diameter greater than the width of said form and being rotatably supported within said notch to extend above the upper edge of said form; and said roller providing for free movement of the drape material over said forms. 30

7. The invention set forth in claim 6 wherein said roller includes axial shafts extending from the ends thereof; said shafts being supported in said form for limited vertical movement; means biasing said shafts to an upper limiting position wherein the upper surface of said roller lies above the upper surface of said form; and the depth of said notch corresponding to the diameter of said roller, to provide support for said roller along its length when said roller is urged downwardly into said notch. 35

8. The invention set forth in claim 4 wherein said one clamping member includes an upper clamping surface; an elongated rod mounted on said member substantially coextensive therewith; a stepped latching bar mounted on said member substantially coextensive therewith; 40
 said fills being pivotally supported on said rod for swinging movement in vertical planes between a suspended position and a clamping position, said fills resting on said clamping surface in said clamping position; each of said fills being provided with a latching spring, said springs being engageable with said stepped latching bar, when said fills are in said clamping position, to effect a greater or lesser hold-down force to said fills; and said fills permitting movement of the drape material when said lesser hold-down force is effected. 45

9. The invention set forth in claim 4 wherein said one clamping member comprises a box-like member having an upper clamping surface; 50
 an elongated, stepped latching bar, substantially coextensive with said member, pivotally mounted on one side of said member to swing about a longitudinal axis spaced laterally from said member; an

elongated rod supported in spaced relation to said member and substantially coextensive therewith; said fills being pivotally supported on said rod to swing in vertical planes between suspended positions and clamping positions, said fills resting on said clamping member surface between said forms in said clamping position; each of said fills having a latching spring for engagement with one or the other of the steps of said latching bar, when said fills are in said clamping position, to apply a greater or lesser hold-down force to said fills; and said fills permitting movement of the drape material when said lesser force is applied.

10. The invention set forth in claim 4 including: an elongated latching bar mounted on said clamping member; each of said fills having a latching spring pivotally mounted thereon; said latching bar having spaced latch engaging surfaces; and said latching springs disposed to be engaged with one or the other of said latching surfaces to effect a greater or lesser hold-down force to said fills relative to said clamping member.

11. The invention set forth in claim 10 wherein said latching bar is pivotally mounted on a side of said clamping member; means biasing said latching bar to a first position, adjacent to said side of said clamping member, wherein said latching springs are engaged therewith in latching relation; means for swinging said latching bar to a second position, wherein said bar extends outwardly from said side of said clamping member; and said biasing means maintaining said latching bar in said second position wherein said latching springs are disengaged from latching relation with said latching bar.

12. In apparatus for finishing drapes, a clamping mechanism for supporting the pleated end of a drape comprising:

opposed elongated clamping members;
a plurality of drape supporting forms supported in spaced relation along one of said clamping members, and extending therefrom toward the other of said clamping members; a plurality of drape engaging fills mounted for disposition between said forms for engagement by said clamping members; said forms being disposed to support sewn pleats of the pleated end of a drape, accommodating folds therebetween; said fills being disposed to engage said folds and to effect the clamping of the drape between said clamping members;

each of said forms having a drape engaging surface defined by a straight edge portion for supporting the sewn pleat of a drape, and a projecting contoured portion for supporting the drape material merging with the sewn pleat.

13. In apparatus for finishing drapes, a clamping mechanism for supporting the pleated end of a drape, comprising:

an elongated, horizontally disposed, lower clamping member; an elongated, horizontally disposed, upper clamping bar; means mounting said clamping bar for movement toward and away from said clamping member;

a plurality of plate-like drape supporting forms mounted on said clamping member, extending upwardly therefrom in spaced transverse planes; a plurality of plate-like drape engaging fills mounted to be positioned on said clamping member between said forms, and extending upwardly beyond said forms for engagement by said clamping bar; said forms being disposed to support the pleated end of a drape, accommodating downwardly extending folds therebetween; said fills being disposed to engage and clamp said folds against said clamping member;

each of said forms having an upper drapery engaging edge surface defined by a horizontal portion, for supporting the sewn pleats of said drapes, and an upwardly and laterally extending contoured portion,

for supporting the drape material merging with the sewn pleat.

14. The invention set forth in claim 12 wherein said contoured portion of said form includes a shoulder portion adjacent to and generally perpendicular to said straight edge portion; said shoulder portion serving to locate the sewn pleat of a drape and to restrain the drape from movement relative to said form.

15. The invention set forth in claim 12 wherein said form is provided with embossments along said contoured portion to provide a thickened and smoothly rounded edge surface along said contoured portion.

16. The invention set forth in claim 12 wherein the maximum projection of said contoured portion of said form from said straight edge portion is in the range of 1.5 to 2.5 inches.

17. In apparatus for finishing drapes: a frame; first and second clamping mechanisms mounted on said frame for relative movement, for clamping the opposite ends of a drape suspended between said mechanisms;

each of said clamping mechanisms including opposed elongated clamping members; a plurality of longitudinally spaced drape supporting forms supported on one of said clamping members and extending therefrom toward the other of said clamping members; a plurality of longitudinally spaced drape engaging fills mounted for disposition between said forms for engagement by said clamping members;

said forms being disposed to support the end of a drape, accommodating folds therebetween; said fills being disposed to engage said folds and to effect the clamping of the drape between said clamping members;

mounting means on said frame for detachably mounting one of said clamping mechanisms; the other of said clamping mechanisms being movable relative to said mounting means;

a portable supporting carriage including mounting means for detachably mounting said one clamping mechanism; said one clamping mechanism being attached to said portable carriage for movement away from said frame;

and a frame extension detachably connected between said frame mounting means and said one clamping mechanism, to rigidly connect said frame and said one clamping mechanism and to define a predetermined space relation between said frame and said one clamping mechanism.

18. In apparatus for finishing drapes: a frame; first and second clamping mechanisms mounted on said frame for relative movement, for clamping the opposite ends of a drape suspended between said mechanisms;

each of said clamping mechanisms including opposed elongated clamping members; a plurality of longitudinally spaced drape supporting forms supported on one of said clamping members and extending therefrom toward the other of said clamping members; a plurality of longitudinally spaced drape engaging fills mounted for disposition between said forms for engagement by said clamping members;

said forms being disposed to support the end of a drape, accommodating folds therebetween; said fills being disposed to engage said folds and to effect the clamping of the drape between said clamping members;

mounting means at one end of said frame for detachably connecting said first clamping mechanism; a carriage means mounted on said frame for rectilinear movement relative to said mounting means; said second clamping mechanism being mounted on said carriage means;

an auxiliary support for said first clamping mechanism; mounting means on said support for detachably connecting said first clamping mechanism;

and a frame extension for attachment between said frame mounting means and said first clamping mechanism when the latter is mounted on said auxiliary

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support; said frame extension defining a continuation of said frame, rigidly connecting said frame and said first clamping mechanism.

19. The invention set forth in claim 17 including: steam emitting means disposed within said frame; a steaming attachment for connection to said steam emitting means through a flexible conduit; said attachment comprising a head, defining a chamber, including a plurality of spaced nozzles projecting

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from said head; and said nozzles extending into said head chamber to prevent the discharge of condensate from said nozzles.

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