This invention relates to the tentering of sheet material such as textile material and is especially useful in guiding the gripping means where it engages the fabric.

In the treating of fabrics where the fabric is to be dried after a washing or coating operation, gripping members are successively applied to the margins of the fabric for the purpose of maintaining the width of the fabric during a drying operation. Difficulty has been experienced in leading the grippers to the margins of the fabric when the fabric varies in width or has wavy margins.

The present invention has for its object to overcome this difficulty.

Another object is to provide for lateral adjustment of the grippers to follow the margins of the fabric independently at opposite margins of the fabric.

Further objects will appear from the following description and the accompanying drawings.

Of the drawings,

Fig. 1 is a side elevation of apparatus constructed in accordance with and embodying the invention, parts being broken away.

Fig. 2 is a cross-sectional view thereof, taken on line 2—2 of Fig. 1.

Fig. 3 is a plan view of a portion of the apparatus.

Fig. 4 is a sectional detail view thereof, taken on line 4—4 of Fig. 1.

Fig. 5 is a sectional detail view thereof, taken on line 5—5 of Fig. 1.

Fig. 6 is a diagrammatic view of the control mechanism and piping.

Referring to the drawings, the numeral 10 designates a treating chamber supported on a frame 11. The chamber may be provided with heating elements (not shown) for drying the fabric. A pair of endless tentering chains 14, 16 extend in substantially parallel relation with portions thereof within and portions thereof without the chamber. Within the chamber, upper and lower horizontal reaches of the chains are guided by guideways 17, 18, 19. Also within the chamber are driving sprockets 20 and guide sprockets 21 for engaging the chains. Driving sprockets 22 are fixed to a shaft 22 extending through the chamber and journaled in bearings secured to the chamber walls. A sprocket 23 is fixed to shaft 22 outside the chamber and is adapted to be driven by a chain 24 from a sprocket 25 on a speed reducer 26 which in turn is driven by a motor 26.

Guide sprockets 21 are fixed to a horizontal shaft 27 journaled in bearings 28 which may be adjusted along guideways 29, as by adjusting screws 30 for tensioning the chains 14, 15. Outside the chamber 10, portions of the chains 14, 15 are supported respectively on a pair of gate-like supports 35, 36 projecting from and hinged to the chamber, as at 37, 38. Support 35 has secured thereto, stub shafts 39, 40 for rotatably supporting a pair of sprockets 41, 42 respectively for engaging chain 14 and support 36 is similarly provided with stub shafts and sprockets for engaging chain 15.

For gripping the margins of the fabric, the chains 14, 15 have secured thereto, at intervals therealong, gripping members 45. Each gripping member has a fixed jaw 46 and a movable jaw 47 hinged thereto, as at 48. A coil spring 49 keeps the jaws closed, as in Figs. 2 and 5 except at the positions where the fabric approaches and leaves the chains.

At the position of approach of the fabric 50 in the region of sprocket 42, a cam bar 51 attached to the gate-like support 35 engages a projecting arm 52 of the movable jaw 47 and holds it open, as seen in Fig. 4 throughout the extent of the cam bar.

At the leaving position, a stationary cam bar 54 similarly engages the arm 52 of the movable jaw and opens the jaws to release the fabric which proceeds along a guide roller 55.

The invention provides for manipulating the supporting sprockets 41, 42 and through them the chains 14, 15 and then grippers 45 at the position of entry of the fabric so as to follow the margins of the fabric. For this purpose, brackets 58, 59 are fixed to the frame 11 adjacent the gate-like swinging supports 35, 36 respectively and have fluid pressure operated cylinders 62, 63 pivotally mounted thereon. Each cylinder holds a piston 64 or 65 having a piston rod 66 or 67 fixed thereto. The piston rods are pivotally secured to swinging supports 35, 36 respectively. Each cylinder contains a compression coil spring 68 or 69 between its piston and the rod end of the cylinder under compression and normally tending to force the piston rod inwardly of the cylinder, thereby swinging the adjacent support 35 or 36 away from the adjacent margin of the fabric. Pressure fluid to counterbalance the spring is supplied to the head end of the cylinder from a supply line 75. The pressure fluid, usually compressed air, enters cylinder 62 by way of a branch line 76 and a valve 77. Similarly, air enters cylinder 63 by way of a branch line 78 and a valve 79. A diaphragm operated
bleeder valve 80 is directly connected by a line 81 to the head end of cylinder 62 and a similar bleeder valve 82 is connected directly to cylinder 63.

For holding the bleeder valves 80, 82 normally closed, the diaphragm chamber of each is connected to the supply line through a branch line by way of a pressure regulating valve. For this purpose, a branch line 83 connects the diaphragm chamber of valve 80 through a pressure-regulator valve 84, a pressure gauge 85 and a cracked valve 86. A normally spring-closed bleeder valve 87 is secured to swinging arm 36 and is connected directly to the diaphragm chamber of valve 80. The bleeder valve 87 has a finger 88 normally holding the valve 87 closed by reason of its spring 89. A second bleeder valve 90, like valve 87, is mounted on swinging arm 36 and is connected to the chamber of valve 82. The fabric sheet 93 in approaching the chains 14, 15 passes between the fingers of valves 87 and 89.

The arrangement is such that line 75 supplies air under high pressure to a cylinder 62 forcing the arm 35 toward the margin of the fabric and with it the sprockets, chain and grippers, the chamber of valve 59 being supplied with air at low pressure through pressure regulator 84 and cracked valve 86. Valve 86 is held closed by spring 89 until the finger 88 contacts the margin of fabric 59. At contact with fabric 59, valve 87 opens, releasing pressure on diaphragm of valve 80, thereby opening valve 88 releasing pressure in cylinder 62, whereupon spring 89 forces arm 35 away from the margin of the fabric. As arm 35 moves laterally, it moves chain 14 and its grippers therewith. The opposite swinging arm is similarly controlled by valve 90 to follow its fabric margin.

The operation of the apparatus will be apparent from the description of the mechanism. The valves being properly adjusted to regulate the air pressures on the valves, the fabric 59 is started by clamping it between opposite grippers. The motor 26 is then started to draw the fabric into the apparatus. Thereafter the chains carrying the grippers are automatically caused to follow the adjacent margins of the fabric as it is presented thereto.

Very sensitive control of the apparatus is provided as the chains are moved laterally to follow the margins and shifting of heavy rolls of fabric is avoided.

Variations may be made without departing from the scope of the invention as it is defined by the following claims.

I claim:

1. Apparatus for treating sheet material, said

4 apparatus comprising a pair of tentering chains each having grippers for clamping the margins of the sheet material, guide means for said chains comprising a pair of generally parallel guide rails and in extension thereof a pair of arms each pivoted for lateral swinging movement at an end of a guide rail in the plane of travel of one of said chains, each arm having a free-running guide sprocket mounted thereon for engaging one of said chains in advance of said guide rails, cam means on said arms for opening said grippers in the region of approach of the sheet material to said grippers, means for swinging said arms toward and away from the margins of the sheet material, means for controlling such swinging movement, and fingers connected with the last said means for contacting margins of said fabric and controlling said arm-swinging means to maintain alignment of the chains with said margins.

2. Apparatus for treating sheet material, said apparatus comprising a pair of tentering chains each having grippers for clamping the margins of the sheet material, guide means for said chains comprising a pair of generally parallel guide rails and in extension thereof a pair of arms each pivoted for lateral swinging movement at an end of a guide rail in the plane of travel of one of said chains, each arm having a plurality of guide sprockets mounted thereon for engaging one of said chains in advance of said guide rails, cam means on said arms for opening said grippers in the region of approach of the sheet material to said grippers, fluid operated cylinders for swinging said arms toward and away from the margins of the sheet material, valves for controlling said cylinders in such swinging movement, and fingers on said valves for contacting margins of said fabric and controlling said arm-swinging means to maintain alignment of the chains with said margins.

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