April 28, 1970 G. LEVTCHOUK ETAL 3,508,342

THREADING APPARATUS FOR WEB DRYERS

Filed April 4, 1968 3 Sheets-Sheet 1

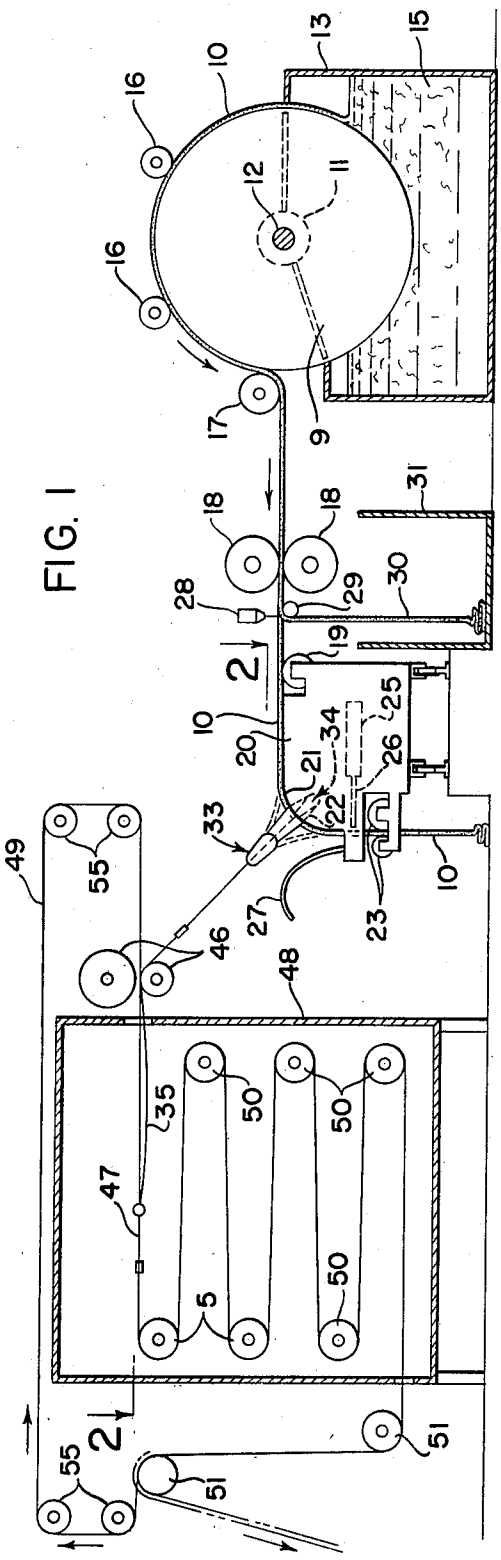

FIG. 1

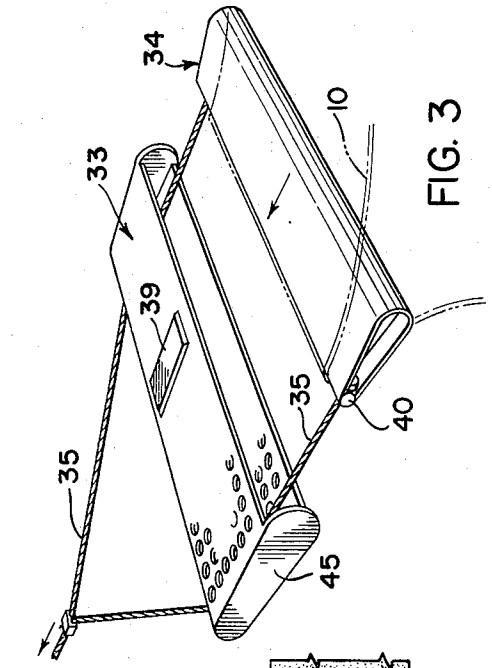

FIG. 3

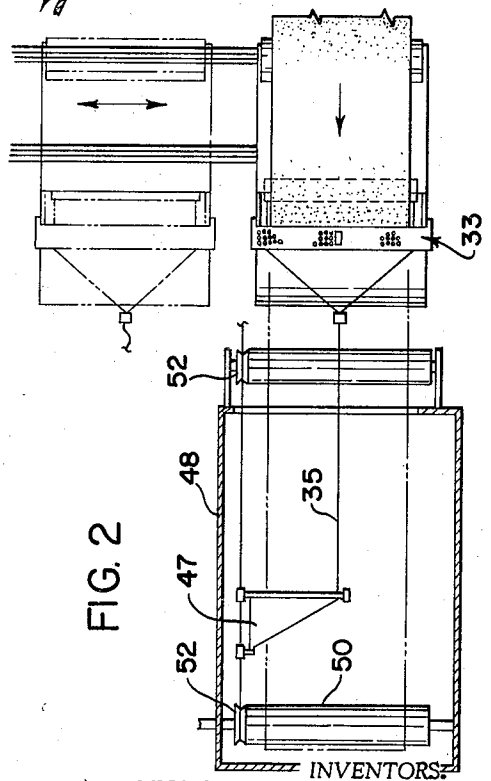

FIG. 2

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FIG. 4

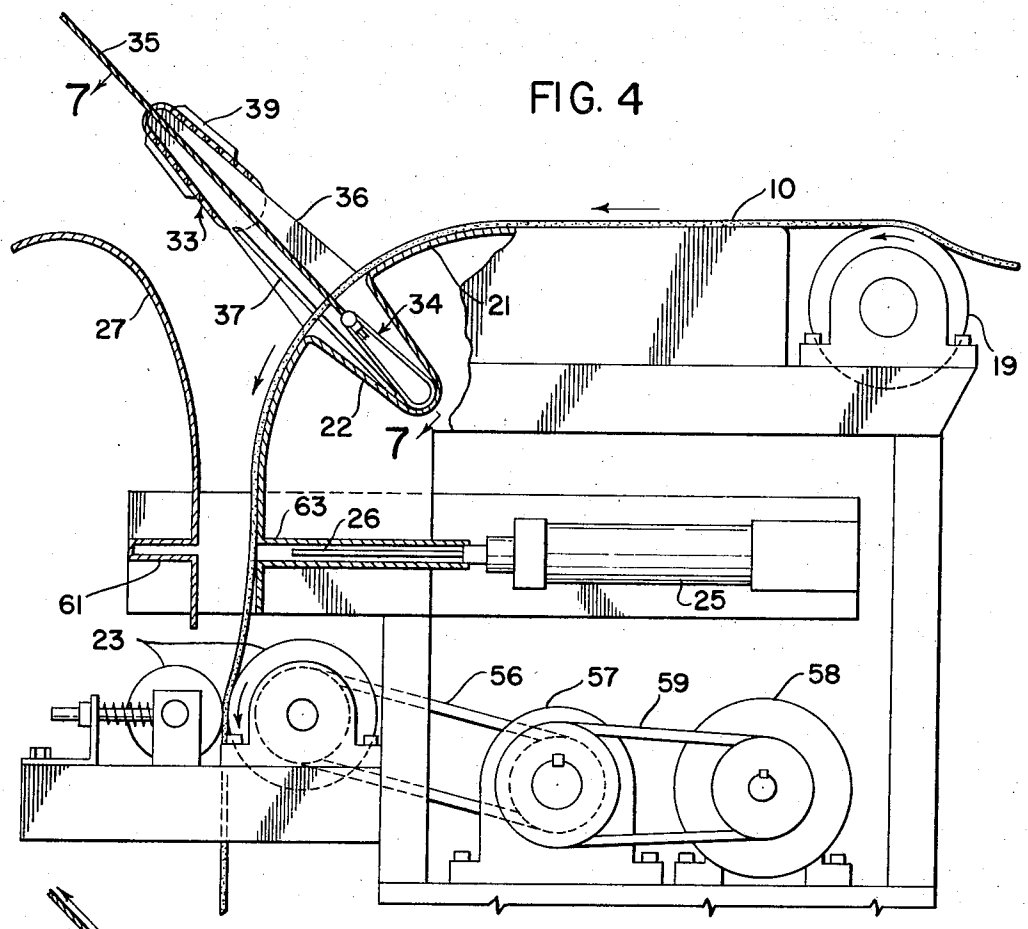
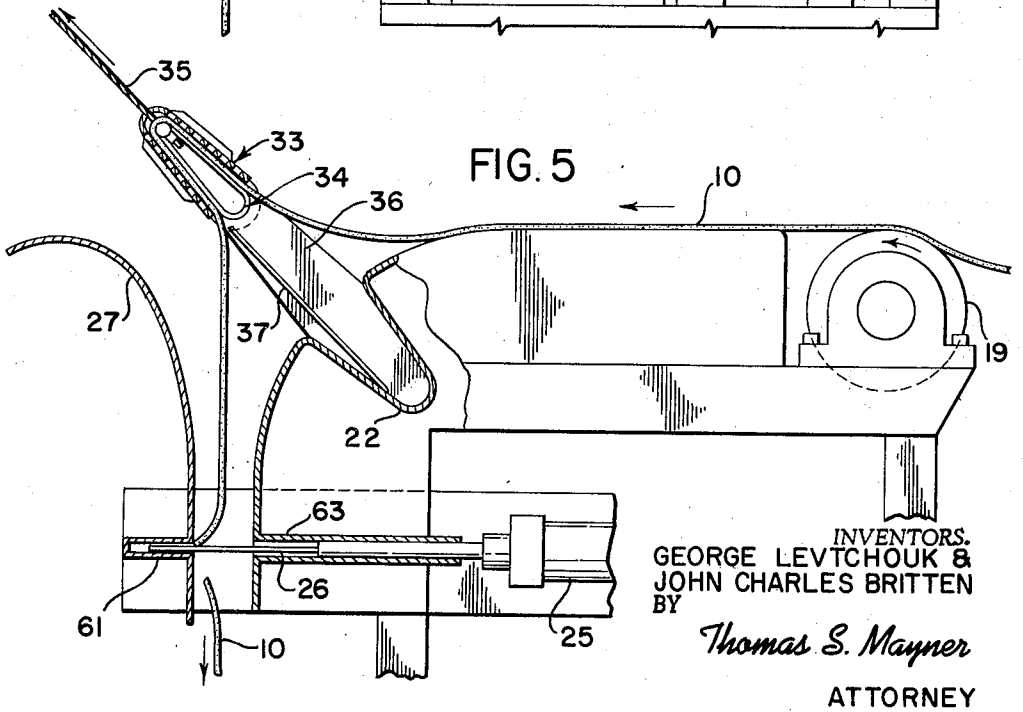


FIG. 5



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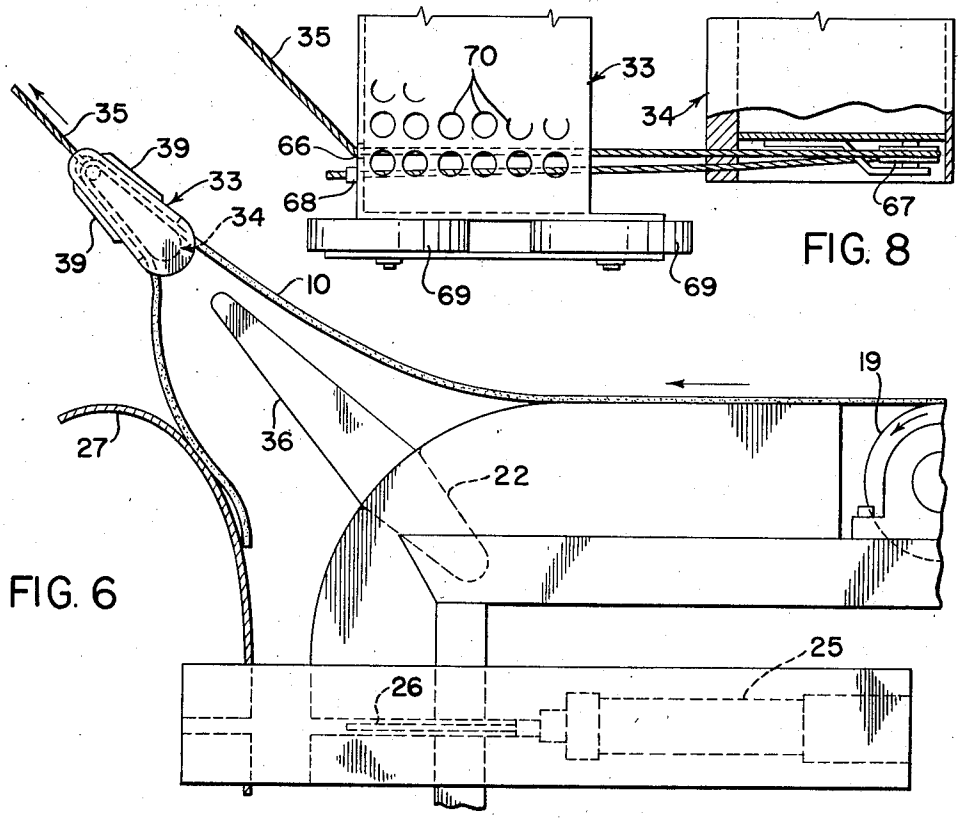

FIG. 8

FIG. 6

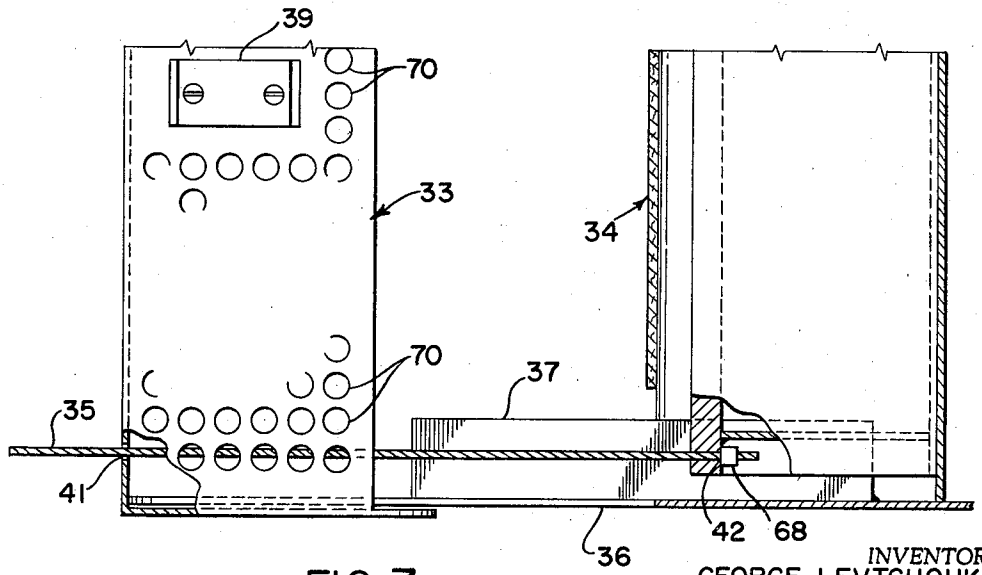

FIG. 7

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THREADING APPARATUS FOR WEB DRYERS

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Int. Cl. F26b *13/06*
U.S. Cl. 34—120 9 Claims

ABSTRACT OF THE DISCLOSURE

The web tail holding clamp is a wedge type formed of, basically, two parts, a wedge over which the paper tail or pulp leader strip is placed and an immediately receiving complementary envelope, pocket or sleeve in which it is positioned. This combination is then threaded by conventional means through a conventional dryer having single or multi-passes.

This invention relates to a threading device for pulp or paper web dryers. More particularly, it relates to a simplified pulp or paper tail holder of the wedge type, that is adapted to hold the forward end of a pulp sheet (web) and be pulled through single or multiple pass dryers to start drying operations.

With increasing speeds and the tendency to totally enclose dryers and the like pulp and paper treatment apparatus, the threading up must be quickly positively, and automatically performed. The general conventional tape or rope threading means utilized to seize a web tail or leader strip by stitching it or side seizure and subsequent threading of a multilevel cylinder dryer or a single pass unit are not fully satisfactory in that upon not infrequent occasions the tail or leader holding section exerts unequal transverse tension beyond the cohesive strength of the wet pulp to tear away, necessitating additional threading attempts. The present means, advantageously, are designed in all instances to the pulp tail width and hold the tail or leader end over its transverse width firmly and with equal tension and positively throughout the threading-up operation. Specifically, the threading-up tail holding means comprises a generally V-shaped pocket or envelope and a generally V-shaped wedge fitting the pocket. The pulp tail is held by and between the two at the start of a threading operation, clamped therebetween, and the combined unit is led by means of a rope outrigger guide through a dryer. This is a sensitive operation in that the pulp is still heavy with considerable moisture and must be pulled through one or more passes of some dryers having pass lengths varying of from about 30 to 140 feet long and may comprise as many as up to 13 or more passes.

The invention now will be described in greater detail with reference to the accompanying drawings, where:

FIGURE 1 is an elevation of a pulp drying apparatus, parts of it being in section, a plup web former, the threader, and this initial position of the envelope and wedge pulp tail holder;

FIGURE 2 is a plan view of a part of the apparatus of FIGURE 1 ahead of the pulp feed;

FIGURE 3 is a perspective of the separate sections of the web or pulp tail holder;

FIGURE 4 is an elevation of the apparatus adapted to mount the pulp tail holder of FIGURE 3 in an operation position;

FIGURE 5 is a sectional detail of FIGURE 4 showing the simultaneous severing and seizing of a leader end or pulp tail;

FIGURE 6 is a further detail of FIGURE 5 showing the tab or leader holder unit being drawn away and into the dryer apparatus;

FIGURE 7 is a sectional detail of one manner of attachment of the separate components forming the pulp end holder, and their relative resting positions prior to the one nesting in the other taken on line 7—7 of FIGURE 4; and

FIGURE 8 is a further modification of FIGURE 7.

Referring to the drawing and to the general showing of a pulp drying apparatus in FIGURE 1 a web forming cylinder **9** under vacuum is adapted to mould and form a pulp web **10**. The cylinder is positioned or immersed in a dilute solution of pulp stock **15** which adheres to the cylinder surface being drawn thereto by the vacuum applied to it from within (not shown) thus collecting thereon, as a fiber mat, a pulp web **10**. The vat **13** is, of course, continuously replenished with a pulp solution. Expressed liquid continues to drop back into the main vat **13** as the pulp web **10** is compressed and consolidated in its advance about the cylinder by the rolls **16** pressing against its surface. The cylinder **9** rotates on its shaft **12** positioned in receiving bearings **11** located in the vat sides (not shown). The pressed pulp web **10** is then manually led away from the forming cylinder **9** placed under a couch roll **17** to and through press rolls **18** and on through the intervening threader apparatus of this invention. The aforesaid pulp web forming apparatus **9** is but one example of a pulp supply since, obviously, a pulp web also can be formed on and delivered by a Fourdrinier wire.

The wet pulp sheet **10** is initially hand manipulated being forwarded under the press rolls **16**, then to and over an idler roll **29** where it is adjusted to a width receivable by the threader apparatus. As it is forwarded over the idler rolls **29, 19** and thence over a table or apparatus **20** (holding the threader unit) it is cut along its sides by water jet **28** and led downwardly over a curved front section **21** of the table **20** between a further pair of complementary driven rolls **23** to waste. Since this invention is directed to a threading-up apparatus of a single or multi-pass dryer **48** the initial waste of the pulp sheet **10** end is of minimal account inasmuch as the forward portion is severed by a transverse positioned device **26** located within the table **20** and being actuated by a pneumatic or electrically powered motive means **25**. The table **20** itself is portable and can be removed from its location once the dryer apparatus is threaded with the pulp supply.

The web **10**, once started, is led onwardly through the press rolls **18** past the side trimming water jets **28**, whose action narrows the web by side sections **30** dropping as waste into bin **31** while it is supported by idler roll **29** to a width acceptable by the threader, at a rate that is coordinated with the dryer and the threader mechanism associated with it. The threader mechanism generally consists of an outrigger **47** (broadly shown in FIGURES 1 and 2) which is attached through the connecting line or rope **35** to a pulp web holding wedge **34** of the threader unit of FIGURE 3, the line or rope passing through side openings of the nesting envelope **33**. A side trimmed pulp end **10** is then passed over the wedge **34** which upon being pulled subsequently nestles in the receiving cavity of the envelope **33**, forming a tight web holding unit.

The wedge **34** is initially positioned in a recess **22** provided therefor in the portable table **20**. At the proper time both the threader unit and the trimming knife **26** and the side trimming jets **28** are actuated and the outrigger **47** pulls the wedge **34** with the pulp web passing over it into the waiting sleeve **33**, securely clamping the pulp tail in between and hauling it toward the dryer **48**. The wedge assembly is then pulled into the dryer complex **48** over the initial entry roll **46** (separated at the moment from its

companion pressure roll) over the several interior dryer rolls **50** and thence out over exterior rolls **51** onto a subsequent collecting arbor or cutter and layboy (not shown). The threader rope **49**, a steel tape in this instance but it could easily be a rope, moves over sheaves **52** mounted on bearings (not shown) located on one end of the dryer rolls **50**, **51**, and external rolls **55** in an endless fashion, being circuitously mounted through the dryer as is generally known. Upon threading of the dryer apparatus **48** the web width trimmer jets **28** are stopped and moved aside and the threader apparatus is disengaged, the pressure drum of draw unit **46** at the entry end of the dryer is adjusted and the operation is restricted solely to that of feeding and the drying of the full width of the web roll **10** from the take-off point of the press rolls **18**.

FIGURES 4–6 show in detail the nestled position of the pulp sheet holding wedge **34** in the indenture **22** in which the wedge **34** is positioned by being pulled by the companion pressure drive rolls **18** and **23**. Of the latter rolls, one is driven by an endless belt **56** through a variable speed gear reduction unit **57** which, in turn, is driven by a power unit **58** through an endless belt **59**. As stated hereinbefore, the speed of pulp web feed is correlated to that of the dryer **48** and to its threader apparatus. The table **20** is also provided with an apron **27** which deflects any moving pulp sheet into a guideway toward the pick-up and waste forwarding rolls **23**. Further, advantageously there is provided an opposing recess **61** at about the foot of the apron **27**, which serves as a receiving recess for the cut-off pulp trimming blade **26**. The trimmer **26** is preferably covered, being provided with a shield **63**. Upon a severing of the web **10** the blade **26** is at once retracted to its original position.

On either side of the wedge containing recess **22** and transversely opposing each other are substantially identical tapered side members or guides **36** over whose extending ends the sleeve or envelope **33** is initially positioned. It rests there until it is picked up by the wedge **34** when pulled out of its cavity. As particularly shown in FIGURES 5 and 6, upon a starting signal, the web **10** is forwarded to the threading-up unit being pull-pushed to the tensioning and take-up rolls **23**. Immediately thereafter, while being held firm to the table surface **21**, the knife **26** is actuated, severing the web **10** free of the rolls **23**. The wedge **34** is immediately lifted from its resting position in the indenture **22** of the table raising the web **10** with it to wedge itself in the pocket or sleeve **33** which is then lifted or raised off the side guiding members **36**; the pulling tape **35** moving through sleeve openings **41** then forms of the parts a unit which is pulled into and through the dryer apparatus **48**. FIGURE 6 shows full engagement of the wedge **34** and its complementary receiving pocket or sleeve with the web **10** therebetween.

The wedging section **34** is jammed into the envelope **33** by means of the pulling strand **35** moving through transversely spaced sleeve openings **41** joining with the wedge at **42**. Or, as in FIGURE 8, the end or returning section of the strand **35** can be passed about end positioned sheave **67** and tied into the sleeve as at **68**. Upon a pull of the strand **35** the wedge **34** will be brought into the sleeve, the strand **35** moving through the openings **41** or **66** effecting a tight wedging of the pulp sheet. A continued pull on the strand **35** with the wedge in place in the sleeve will pull the unit off the side members **36** and through the dryer.

The wedge **34** itself further can be provided with a base support upon which it slides to be positively directly on its way into the supported envelope **33**. The base support or bottom guide **37** is shown in FIGURES 4 and 5 and can be a base plate of metal or rigid plastic secured to side plates **36**. It is of such length only to prevent the wedge section **34** from not entering the sleeve section **33** and permit pressure of the pulp web tail or leader strip between wedge **34** and envelope **33**.

The receiving envelope **33** as shown in FIGURE 3 is of a generally V-shaped construction. The envelope **33** has end closures **45** to fully cover the prepared tail section. It is adapted to quickly receive the complementary wedge member **34**, whose narrow or forward end is strengthened by means of a rod **40**, already having a pulp tail about it. Since the pulp tail is as wet as the remainder of the web it must be dried also. The envelope **33** is desirably perforated as indicated in this figure and in FIGURES 7 and 8 as at **70** of the drawings. Being perforated the drying medium can reach the wet pulp end in the sleeve to dry it and thus strengthen the forward end of the web. The inner wedge itself can be perforated but it has been the experience that the perforated sleeve will suffice. Where the dryer is being threaded by the described apparatus and where it is of aluminum, or of other soft lightweight metal, and where vibration or slack in the threading rope may cause the sleeve to come to rest on the surface of an air bed or on a dryer roll then to prevent scratching or in some manner damaging such surface, the sleeve **33** is provided with at least one plastic plate **39** on FIGURES 7, 4, 3 which serves as a runner or rubbing strip. Such a plate is provided on each side, in opposition. If necessary, more can be provided to assure greater safety from marring during passage. Of course, some plastics can be used for both the sleeve envelope and the wedge too. One such material can be "Teflon," a marketed polymer of carbon tetrafluoride, since it can stand the high temperatures encountered in pulp drying. Another plastic could be a polyurethane polymer. It is necessary, however, to choose one that is tolerant to the high drying temperature to which the running pulp sheet is subjected. Further, for side support the envelope **33** also can be furnished with plastic wheels **69** as shown in FIGURE 8 to safeguard the surface of the rolls over which it will travel.

What is claimed is:

1. Apparatus for threading web treating apparatus wherein said treating apparatus is provided with guide means for mechanically threading a web therethrough, said guide means traveling in a path parallel to the normal path of said web from the entry to the exit of said treating apparatus, said web threading apparatus comprising, in combination: means for conveying the web through said web threading apparatus; means for trimming at least one longitudinal edge of said web to thereby form a tail of controlled width; a web holding device operatively associated with said guide means and having complementary parts through which the leading end of said tail is passed; means for actuating said guide means to pull said web holding means toward said treating apparatus and thereby actuate said holding means to wedge the leading end of said tail between the complementary parts thereof.

2. Apparatus according to claim **1** wherein said guide means comprises an endless rope disposed on one side of the normal web travel path during its passage through said web treating apparatus, and outrigger means affixed to said rope and said web holding means.

3. Apparatus according to claim **2** wherein said endless rope comprises a steel tape which travels over sheaves located adjacent to the edge of each internal web treating roll.

4. Apparatus according to claim **1** wherein said trimming means comprises at least one water jet positioned along the moving web for shearing off a predetermined portion from the side of said web, and further comprising means for severing the excess leading edge of said tail upon actuation of said web holding means.

5. Apparatus for threading web treating apparatus wherein said treating apparatus is provided with guide means for mechanically threading a web therethrough, said guide means traveling in a path parallel to the normal path of said web from the entry to the exit of said treating apparatus, said web threading apparatus comprising, in combination: means for conveying the web through said web threading apparatus; means for trimming at least one longitudinal edge of said web to thereby form a tail of controlled width, a web holding device operatively

associated with said guide means and comprising a V-shaped envelope and a generally conforming wedge adapted to be positioned in said envelope, the leading end of said tail being adapted to be placed over the wedge; means for actuating said guide means to draw said wedge into said envelope to thereby clamp the leading end of said tail therein.

6. Apparatus according to claim 5 wherein said guide means is operatively associated with said web holding device by passing over a pulley within said wedge and being firmly anchored at its extremity to said envelope.

7. A method for threading a web treating apparatus wherein the web is fed from a source of supply, through a threading machine and into treating apparatus and wherein the work is mechanically threaded through the treating apparatus comprising the steps of trimming at least one longitudinal edge of said web to thereby form a tail of controlled width; passing the leading end of said tail between complementary parts of a web holding device adapted to engage said tail by wedging action between said complementary parts; actuating a guiding and pulling means which is operatively associated with said web treating apparatus and said web holding device to thereby actuate the complementary parts of said holding

device to engage said tail and to advance the web to and through said treating device.

8. A method of threading according to claim 7 further comprising the step of severing the excess leading edge of said tail upon actuation of said web holding device.

9. A method of threading according to claim 7 wherein said trimming step is discontinued following actuation of said holding device.

References Cited

UNITED STATES PATENTS

201,431	3/1878	Logue	24—25
2,944,345	7/1960	Faber	34—120
2,946,619	7/1960	Wahl	24—126
3,085,346	4/1963	Allander	34—120

FOREIGN PATENTS

1,016,301	8/1952	France.

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U.S. Cl. X.R.

24—196; 162—255; 226—12