

March 20, 1962

H. H. HART

3,025,909

WIRE CHANGING FOURDRINIER MACHINE

Filed March 9, 1959

8 Sheets-Sheet 1

Fig. 1.

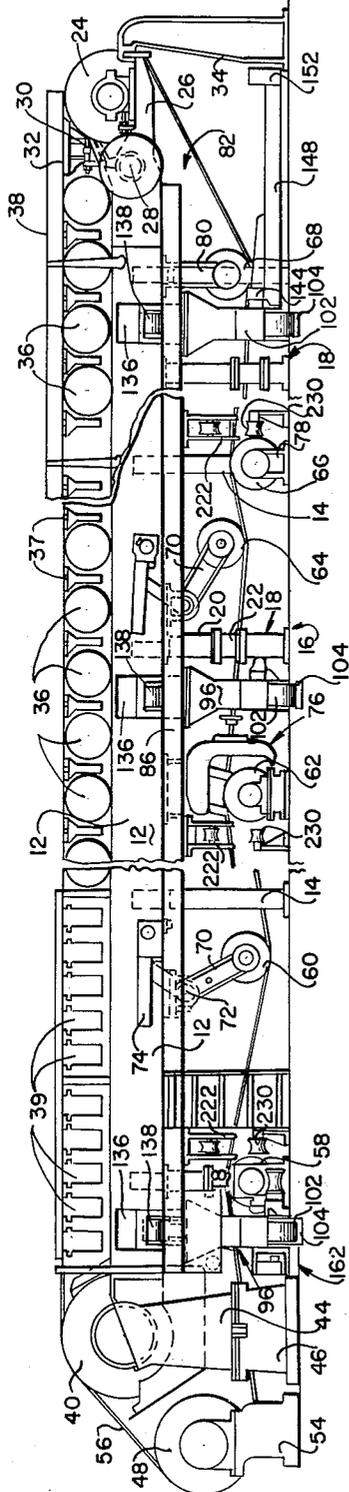
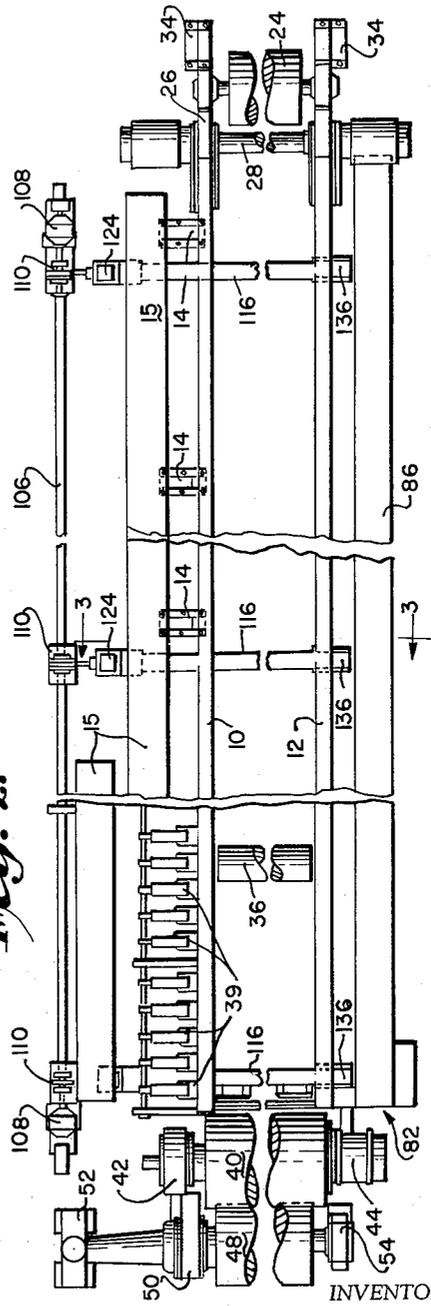


Fig. 2.



INVENTOR
HARRY H. HART

BY *Lushman, Darby & Lushman*

ATTORNEYS

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H. H. HART

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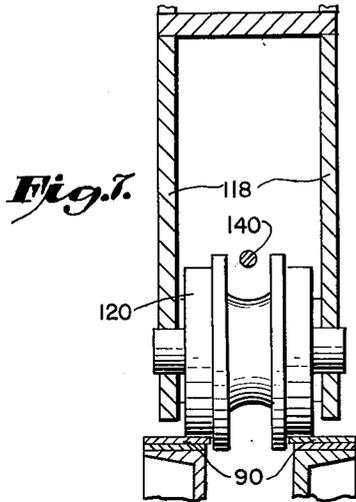


Fig. 7.

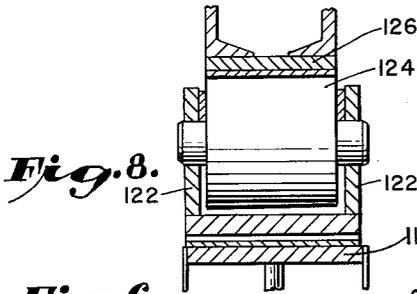
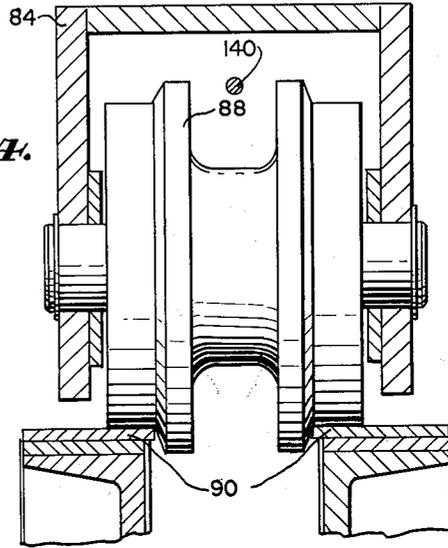


Fig. 8.

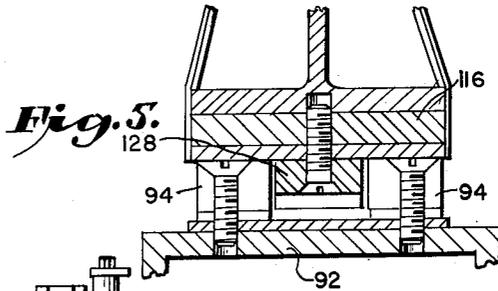


Fig. 5.

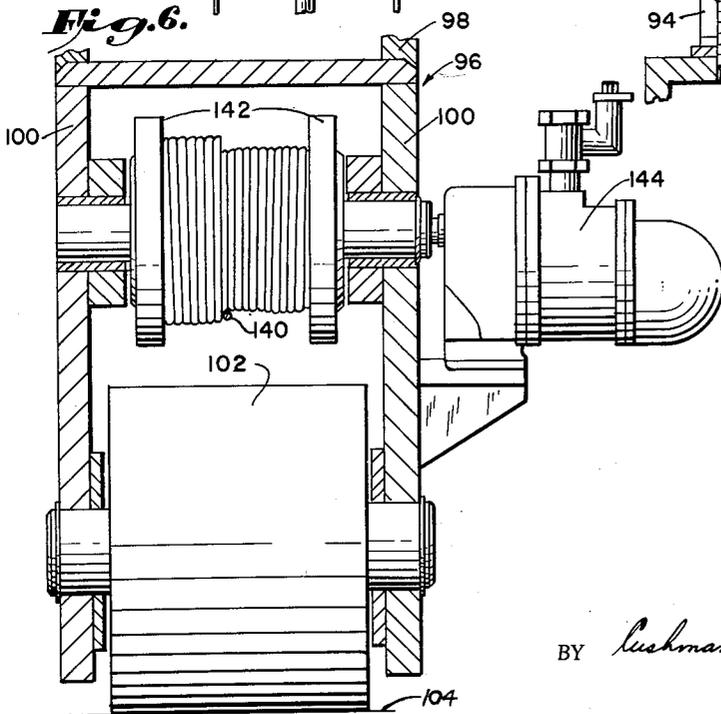
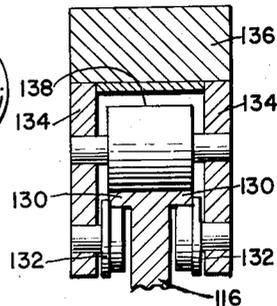


Fig. 6.

Fig. 9.



INVENTOR

HARRY H. HART

BY *Lushman, Darby & Lushman*

ATTORNEYS

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H. H. HART

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Fig. 10.

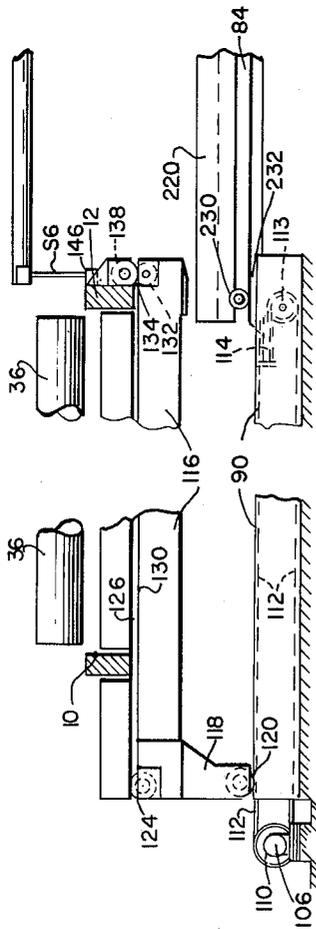


Fig. 13.

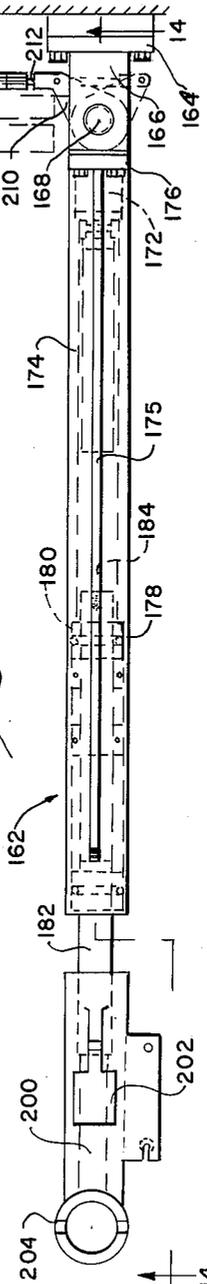
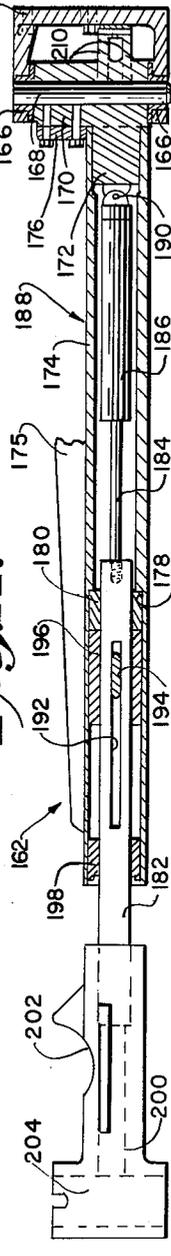


Fig. 14.



INVENTOR
HARRY H. HART

BY *Cushman, Darby & Cushman*

ATTORNEYS

March 20, 1962

H. H. HART

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Fig. 11.

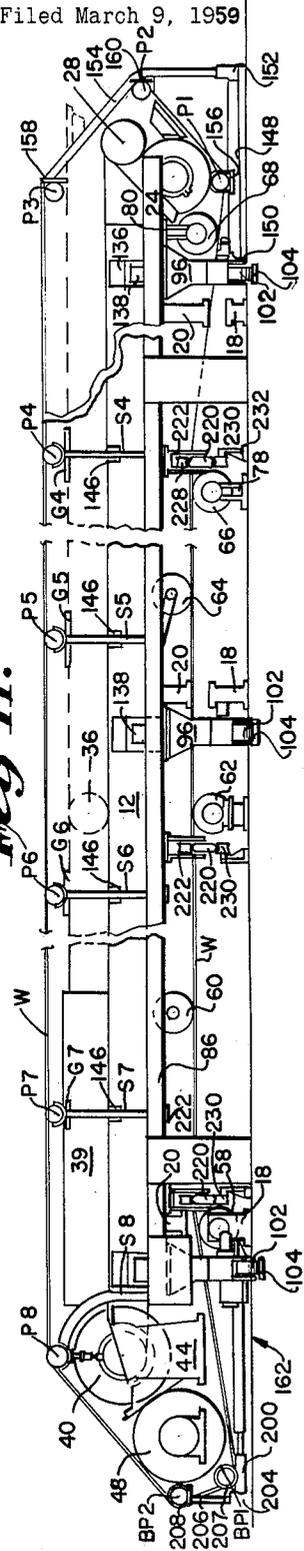
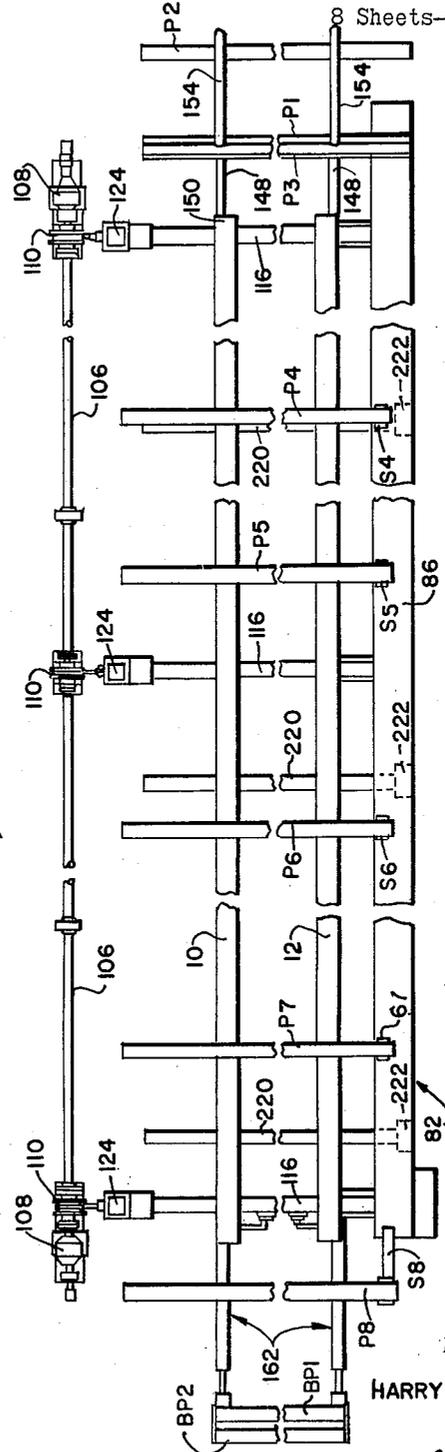


Fig. 12.



INVENTOR
HARRY H. HART

BY *Lushman, Darby & Lushman*

ATTORNEYS

March 20, 1962

H. H. HART

3,025,909

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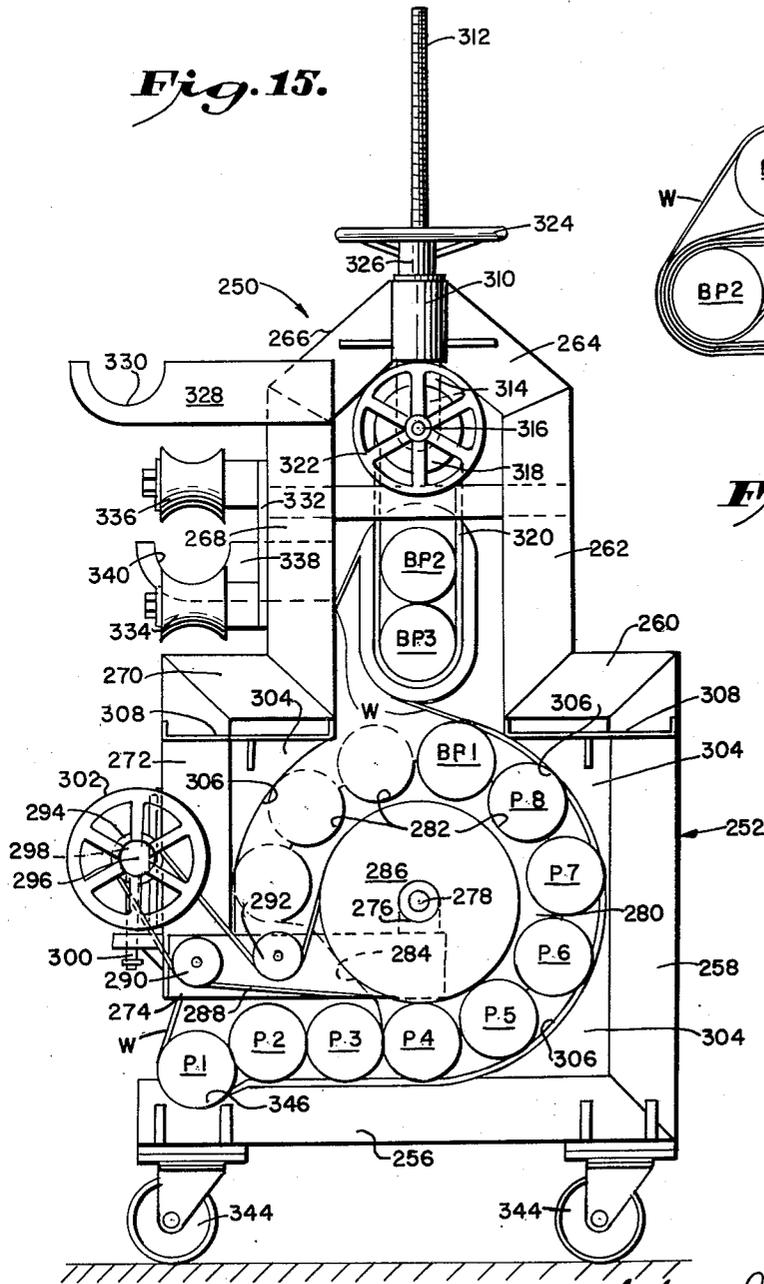


Fig. 15.

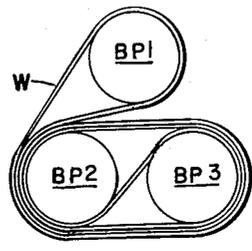


Fig. 17.

INVENTOR
HARRY H. HART

BY *Lushman, Darby & Lushman*

ATTORNEYS

March 20, 1962

H. H. HART

3,025,909

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Fig. 19.

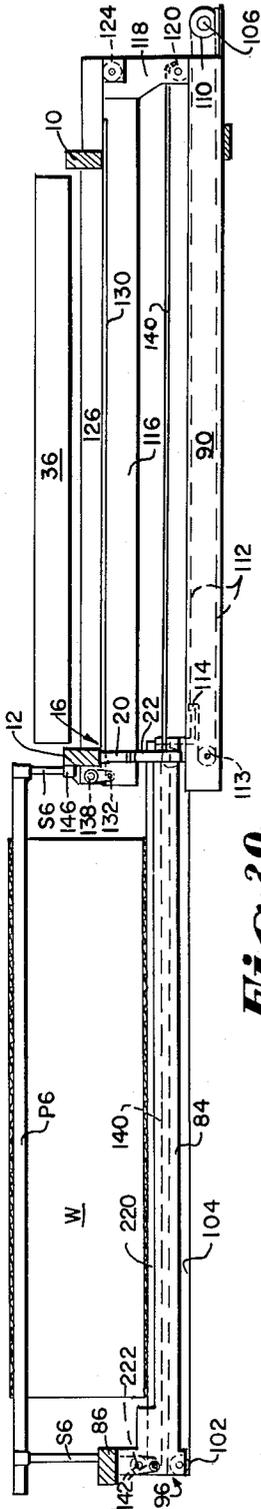


Fig. 20.

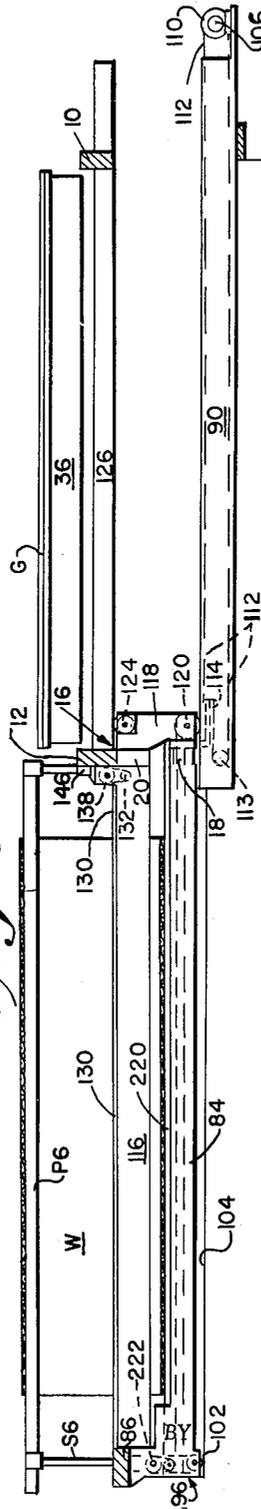
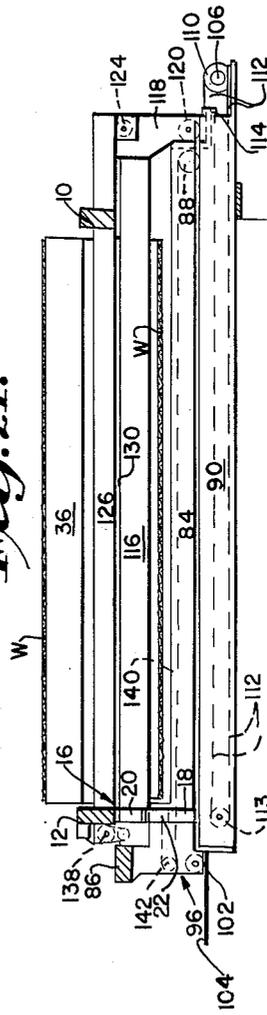


Fig. 21.



INVENTOR
HARRY H. HART

Lushman, Darby & Lushman
ATTORNEYS

1

3,025,909

WIRE CHANGING FOURDRINIER MACHINE

Harry H. Hart, Centerville, Del., assignor to John Inglis Co. Limited, Toronto, Ontario, Canada, a corporation of Canada

Filed Mar. 9, 1959, Ser. No. 798,283

21 Claims. (Cl. 162-273)

This invention relates to a Fourdrinier machine, and more particularly to apparatus associated with that type of machine for replacing the endless Fourdrinier wire screen which passes around the table structure, breast roll, couch roll, etc.

Present Fourdrinier machines are quite large and have a very high running capacity. The Fourdrinier wire used on such machines can be larger than 270 inches wide and 118 feet long. It will be understood that the changing of Fourdrinier wire of such size is a difficult and time-consuming job. There have been many arrangements proposed heretofore to effect the changing of the Fourdrinier wire but each of these proposals has suffered from one disadvantage or another. For example, in my prior Patent No. 2,299,746 issued October 27, 1952, there is disclosed an arrangement in which the Fourdrinier machine is first shut down and then a carriage is run into the tending aisle and the wire is draped on the carriage then moved therewith on the machine. The wire carriage is an integral part of the machine which does not have to be put together or taken apart after each wire change. The Fourdrinier proper is always in operating position without necessitating the removal or disconnecting of any of the driven means or other operating connections.

An object of the present invention is the provision of a wire-changing arrangement for a Fourdrinier machine which retains the advantages of the known arrangements and to a large extent eliminates the disadvantages thereof. More specifically, the present invention embodies improved carriage means for moving the new wire onto the machine, which carriage means forms a part of the machine support in a manner similar to the arrangement disclosed in my prior patent referred to above and which, in addition, enables the draping procedure to be carried out while the machine is in operation with the wire to be changed.

Another object of the present invention is the provision of a wire-changing arrangement for a Fourdrinier machine in which the new Fourdrinier wire can be initially draped in a position to be moved laterally onto the Fourdrinier machine while the machine with the old wire thereon is still in operation.

Still another object of the present invention is the provision of a Fourdrinier machine having improved carriage means arranged to be moved laterally from the main frame of the machine into the tending aisle while the machine is in operation to receive pole-supporting means utilized to initially drape a new Fourdrinier wire thereon, the carriage means serving to support the tending side of the machine during such lateral movement.

Still another object of the present invention is the provision of a Fourdrinier machine of the type described having improved means for effecting the lateral movement of the initially draped new Fourdrinier wire back into operative position on the machine after the old Fourdrinier wire has been removed.

Still another object of the present invention is the provision of a wire-changing arrangement of the type described having improved means for moving one end of the wire loop about the couch drive roll and the suction couch roll of the Fourdrinier machine.

Still another object of the present invention is the pro-

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vision of a wire-changing arrangement of the type described having improved carriage and wire pole-supporting means for effecting the lateral movement of the draped wire from a position in the tending aisle to an operating position on the machine, the carriage serving to support the tending side of the machine during such lateral movement.

These and other objects of the present invention will become more apparent during the course of the following detailed description and appended claims.

The invention can best be understood with reference to the accompanying drawings, wherein an illustrative embodiment is shown.

FIGURE 1 is an elevational view of a Fourdrinier machine embodying the principles of the present invention looking toward the tending side thereof;

FIGURE 2 is a top plan view of the machine with certain parts removed for purposes of clearer illustration;

FIGURE 3 is an enlarged, fragmentary, cross-sectional view taken along the line 3-3 of FIGURE 2;

FIGURE 4 is an enlarged, fragmentary, cross-sectional view taken along the line 4-4 of FIGURE 3;

FIGURE 5 is an enlarged, fragmentary, cross-sectional view taken along the line 5-5 of FIGURE 3;

FIGURE 6 is an enlarged, fragmentary, cross-sectional view taken along the line 6-6 of FIGURE 3;

FIGURE 7 is an enlarged, fragmentary, cross-sectional view taken along the line 7-7 of FIGURE 3;

FIGURE 8 is an enlarged, fragmentary, cross-sectional view taken along the line 8-8 of FIGURE 3;

FIGURE 9 is an enlarged, fragmentary, cross-sectional view taken along the line 9-9 of FIGURE 3;

FIGURE 10 is a reduced view similar to FIGURE 3 showing the lower carriage in its draping position in the tending aisle;

FIGURE 11 is a side elevational view of the machine with certain parts removed showing the new wire draped on the carriage and moved into operative position on the machine;

FIGURE 12 is a top plan view of the machine as shown in FIGURE 11;

FIGURE 13 is an enlarged top plan view showing one of the couch roll end pole supporting arm assemblies;

FIGURE 14 is a cross-sectional view taken along the line 14-14 of FIGURE 13;

FIGURE 15 is a side elevational view of a Fourdrinier wire buggy used in draping the new Fourdrinier wire;

FIGURE 16 is a front elevational view of the buggy, with parts broken away;

FIGURE 17 is an end view of a conventional Fourdrinier wire bundle;

FIGURE 18 is a schematic side elevational view showing the manner in which the buggy is used in draping the new wire;

FIGURE 19 is a schematic, vertical, sectional view of the Fourdrinier machine showing the position of the parts after the new Fourdrinier wire has been draped;

FIGURE 20 is a view similar to FIGURE 19 showing the position of the parts just prior to the movement to the draped wire into operative position on the machine;

FIGURE 21 is a view similar to FIGURE 19 showing the position of the parts after the draped wire has been moved into operative position;

FIGURE 22 is an enlarged front elevational view of one of the checking stands, showing the same in operative position;

FIGURE 23 is a side elevational view of the stand shown in FIGURE 22; and

FIGURE 24 is a view similar to FIGURE 22 showing the position of the parts when the wire is being changed.

Referring now more particularly to FIGURE 1 of the drawings, there is shown a Fourdrinier machine which

includes a longitudinally extending frame 10 disposed on the drive side of the machine and a parallel longitudinally extending frame 12 disposed on the tending side of the machine. The drive side frame 10 is supported by a plurality of longitudinally spaced locking stands 14 supported at their lower ends on the floor and secured to the drive side frame at their upper ends. Drive side footboards 15 are supported by extensions on the upper ends of the stands 14, as shown in FIGURE 2. The main frame on the tending side of the machine is supported, in operative position, by a plurality of longitudinally spaced checking stands 16. Each checking stand 16 includes a lower support 18 arranged to seat on the floor, an upper support 20 secured beneath the frame 12 and an intermediate support 22 removably mounted between the upper and lower supports.

It will be understood that the usual component elements of a Fourdrinier machine are suitably mounted on the main frames. As shown in FIGURES 1 and 2, the machine includes a breast roll 24 journaled on the outer ends of a pair of arms 26 pivoted to the adjacent ends of the main frames, as at 28, for movement about a transverse horizontal axis. The usual doctor blade 30 is mounted in engagement with the breast roll and, in addition, the arms carry a conventional forming board arrangement 32 for movement therewith. The breast roll is maintained in operative position by securing the outer ends of the arms to the upper ends of suitable vertical stands 34 mounted on the floor.

The main frame has table rolls 36 and flat top deflectors 37 mounted thereon in any suitable manner such that if desirable, they may be shaken independently of the breast roll. Suitably mounted above the table rolls adjacent the breast roll end of the machine is a deckle board arrangement 38. The usual suction boxes 39 are supported from the main frame in any well-known manner adjacent the opposite end of the machine. A couch suction roll 40 is mounted outwardly of the end of the main frames adjacent the suction boxes preferably by means of a cantilever-type supporting means including a drive side bearing 42 supported on the floor and a tending side bearing 44 rigidly secured in cantilever fashion to the end of the frame 12 and supported from the floor by a removable stand 46. Finally, a couch drive roll 48 is mounted adjacent the couch suction roll and it likewise is mounted in cantilever fashion by any suitable means such as a bearing stand 50 mounted on the floor at the drive side and providing a transverse horizontal pivot for the couch roll shaft, a vertically adjustable stand 52 mounted on the floor in laterally spaced relation to receive the cantilevered end of the couch roll shaft and a removable stand 54 on the floor at the tending side.

It will be understood that the upper operative flight of a conventional Fourdrinier wire 56 is supported on the table rolls 36 and extends between the couch drive roll 48 and couch suction roll 40 and the breast roll 24. The lower flight of the Fourdrinier wire is supported by a plurality of longitudinally spaced rollers 58, 60, 62, 64, 66 and 68. Preferably, the roller 58 is journaled between the locking stand 14 and the lower stand support 18 adjacent the couch roll end of the machine. The take up roller 60 adjacent thereto is mounted on the outer ends of a pair of bell crank arms 70 the central portion of which are pivotally mounted, as at 72, on the main frames for movement about a transverse horizontal axis. The other ends of the arms 70 are connected to be moved by any suitable means such as hydraulic piston and cylinder units 74, which, of course, serve to control the up and down pivotal movement of the take up roller 60.

The roller 62 is of the usual automatic and/or hand guide roll type having a conventional mounting means 76 providing for transverse adjustment. The roller 64, 75

like the take up roller 60, is mounted for pivotal movement about a transverse axis, and serves as a tension roll during the operation of the machine. The rollers 66 and 68 are mounted on rigid bearings 78 and 80 supported respectively on the floor and from the frames.

The present invention is more particularly concerned with an arrangement for effecting a convenient change of the Fourdrinier wire 56. To this end, a lower carriage, generally indicated at 82, is mounted beneath the main frames for movement from a position thereunder laterally into a position in the tending aisle adjacent the tending side of the machine. The lower carriage 82 includes a plurality of transversely extending, longitudinally spaced, beams 84 having their ends adjacent the tending side of the machine rigidly interconnected to a longitudinally extending tending side footboard 86. As best shown in FIGURES 3 and 4, the opposite end of the beams have flanged rollers 88 suitably journaled therein which are arranged to ride on the upper surfaces of a corresponding series of transversely extending, longitudinally spaced pairs of tracks 90 supported on the floor.

The longitudinally extending footboard 86 on the tending side end of the beams is connected therewith by any suitable construction and, as shown in FIGURES 3 and 5, the end of each beam is connected with a rigid member 92 having spaced wedge-shaped guide bars 94 mounted on the upper surface thereof in spaced relation to the upper surface of the beam, see FIGURE 3. The outer end of each member 92 has a rigid vertical structure 96 secured thereto, as by welding or the like, such structure including upper plates 98 welded together to define a stand upon which the footboard is mounted and a pair of lower plates 100 between which a roller 102 is suitably journaled, as shown in detail in FIGURE 6. The rollers 102 are arranged to ride on suitable tracks 104 formed in the tending aisle adjacent the machine.

Any suitable means may be provided for effecting the lateral movement of the lower carriage from a position beneath the main frame to a position within the tending aisle adjacent thereto. As best shown in FIGURE 2, a drive shaft 106 is suitably mounted adjacent the machine on the drive side thereof. The shaft 106 may be suitably driven by reversible motors 108 or the like. Adjacent each of the beams, a pulley 110 is mounted on the shaft and a cable 112 is trained about each pulley and a second pulley 113 mounted between the adjacent pair of roller tracks 90 adjacent the opposite end thereof. The ends of each cable 112 are secured in vertically spaced relation to an arm 114 fixedly mounted on the adjacent end of the associated lower carriage beam in depending relation thereto. If desired stop plates 115 may be provided between the lower carriage beams 84 and the tracks 90 as shown in FIGURE 3.

Disposed above each beam of the lower carriage is an upper carriage beam 116 which is mounted for movement laterally from a position beneath the main frames to a position in the tending aisle independent of the associated lower carriage beam. As best shown in FIGURES 3 and 7, the end of each upper carriage beam 116 adjacent the drive side of the machine has a pair of transversely spaced depending plates 118 rigidly secured thereto. A flanged roller 120 is suitably journaled between the plates of each beam adjacent the lower ends thereof and each roller is arranged to ride on the associated pair of tracks 90, as shown in detail in FIGURE 7. In addition, the upper portion of the drive side end of each beam includes rigid opposed plates 122 having an upper roller 124 suitably journaled therebetween for engaging the lower surface of an associated transversely extending upper track 126 rigidly secured beneath the frames 10 and 12, as shown in FIGURES 3 and 8. The opposite end of each upper carriage beam has its lower surface arranged to seat on the wedge-shaped guide bars 94 of the lower carriage and includes a central guide bar

128 arranged to enter between the bars 94, as shown in FIGURE 5.

As best shown in FIGURES 3 and 9, each of the upper carriage beams 116 includes an upper portion providing flanges 130 extending outwardly from the beam on opposite sides thereof. Engaging the undersurface of the flanges 130 of each beam is a pair of flanged rollers 132 suitably journaled between a pair of plates 134 rigidly carried by the frame 12, as by a support block 136 fixed to the outer surface thereof. In addition, an upper roller 138 is mounted between the upper portion of each pair of plates 134 for engagement with the upper surface of the associated beam 116.

Any suitable means may be provided for effecting the lateral movement of the upper carriage beams 116. As shown, the plates 118 on the drive side end of each beam 116 has the free end of a cable 140 rigidly secured thereto, as at 141. Each cable 140 extends horizontally through the associated lower carriage beam 84 and is trained about a drum 142 suitably mounted between the plates 100 of the beam 84, as shown in FIGURE 6. Any suitable means may be provided for selectively turning each drum to effect movement of each upper carriage beam as, for example, a reversible motor unit 144.

In the normal operation of the Fourdrinier machine, the upper and lower carriages are maintained in a position beneath the main frames 10 and 12 as shown in FIGURES 1-3. When it is desired to change the Fourdrinier wire on the machine, the lower carriage 82 is moved laterally outwardly into the tending aisle by actuating the motors 108. In this regard, it will be noted that the lower carriage 82 can be readily moved into its position within the tending aisle without effecting the operation of the Fourdrinier machine since the frame 12 thereof is supported by the stands 16. When the bars 94 move out from under the associated ends of the upper carriage beams, the weight of the latter are supported by the rollers 132 engaging flanges 130.

With the lower carriage in the tending aisle, as shown in FIGURE 10, the same can be readily adapted to have a new Fourdrinier wire initially draped thereon. To this end, there is provided a series of removable vertical supports S which are arranged to be fixedly secured to the footboard 86 and to brackets 146 on the frame 12 longitudinally spaced positions thereon as shown in FIGURES 11 and 12, to receive wire poles P which support the upper flight of the new Fourdrinier wire.

At the breast roll end of the machine the lower carriage beam 84 has rigidly secured thereto a pair of transversely spaced, longitudinally extending supports 148. Each support is secured at its inner end to the associated beam 84 by any suitable means, such as brackets 150 or the like. The outer end of each support has a vertically extending socket 152 rigidly secured thereto which is arranged to detachably receive the lower end of an angular support 154 in a position extending upwardly and inwardly therefrom. The horizontal supports 148 have pole clamps 156 secured thereto intermediate their ends and the angular supports have pole clamps 158 on their upper ends and clamps 160 at the central portions thereof. The clamps 156, 158 and 160 serve to receive wire poles P which retain the breast roll end of the new Fourdrinier wire in proper position to pass over the breast roll 24.

The lower carriage beam 84 adjacent the couch roll end of the machine has a pair of transversely spaced pivotal supporting arm assemblies 162 mounted thereon. Since both assemblies 162 are identical except that they pivot in opposite directions, a description of one will suffice to give an understanding of both.

Referring now to FIGURES 13 and 14, the left hand supporting arm assembly includes a bracket 164 rigidly secured to the couch roll end beam 84 and having a pair of vertically spaced, centrally apertured arms 166. A pivot pin 168 extends through the apertured arms and a

hub member 170 mounted between the arms 166. Extending transversely from the hub member is a stub shaft element 172 arranged to seat within one end of a tubular casing 174 which also may be rigidly secured to the hub member as by a rigidly mounted triangular web 175 and a bolted plate 176.

The opposite end of the tubular casing is counterbored, as indicated at 178 for receiving a sleeve 180. A bar 182 of circular cross-section has one of its ends disposed within the sleeve 180 and rigidly connected with a piston rod 184 extending outwardly from a cylinder 186 of a ram 188 pivoted to the stub shaft 172, as indicated at 190. The bar 182 is provided with a horizontally extending slot 192 within which a horizontally elongated pin 194 extends. The pin 194 is carried by a sleeve 196 surrounding the rod and disposed within the counterbore 178 of the tubular casing. The outer extremity of the tubular casing is closed by a sleeve 198.

It will be noted that the pin 194 disposed within the slot 192 and the sleeve 196 connected therewith serve to provide a stop means which is operable to limit the extent of movement of the bar 182 with respect to the tubular casing, by the hydraulic ram 188. Secured to the outer end of the bar 182 is saddle fitting 200 having an upwardly facing pole clamp 202 thereon. The outer end of the fitting 200 includes a vertical tubular portion 204 within which the lower end of a vertical support 206 is received as shown in FIGURE 11. The upper end of the support is provided with a suitable pole clamp 208. The clamps 202 and 208 serve to receive wire poles P which support the couch roll end of the new Fourdrinier wire in proper position to pass around the couch drive roll 48.

The tubular casing 174, bar 182 and fitting 200 are pivotally actuated about the shaft 168 by any suitable means, and, as shown, the hub member 170 includes a pair of arms 210 extending transversely outwardly therefrom. Pivotaly mounted between the outer ends of the arms 210 is one end of a piston rod 212 which forms a part of a hydraulic ram unit, generally indicated at 214. The ram unit includes a piston receiving a cylinder 216 having one end thereof suitably pivoted to a bracket 218 secured to the adjacent lower carriage beam 84.

The lower flight of the new Fourdrinier wire is arranged to be supported by three transversely extending, longitudinally spaced poles 220, each of which is carried at one end by a bracket 222 rigidly secured to the undersurface of the footboard 86 of the lower carriage. Each bracket includes a pair of horizontally spaced arms 224 the lower ends of which are apertured to receive a removable pin 226 which also extends through registering apertures in the associated pole to support the same, as shown in FIGURE 10. In addition, a roller 228 is suitably journaled between each pair of arms to engage the upper surface of the associate pole. The opposite end of each pole is supported by a roller 230 journaled on the upper end of a stand 232 mounted on the floor in a position below the main frame on the tending side of the machine.

Fourdrinier Wire Buggy

In order to assist in the draping of the new Fourdrinier wire on the lower carriage when the latter is disposed in the tending aisle, there is provided a wire buggy, generally indicated at 250. The buggy is herein described in order to give a complete understanding of the operation of the present machine. The buggy is claimed in a separate application Serial No. 798,074, filed March 9, 1959. As shown in FIGURES 15 and 16, the buggy includes a main frame comprising a pair of end frames 252 interconnected by a single elongated frame member 254 extending transversely between the uppermost portions of the end frames. Each end frame 252 includes a lower horizontal member 256 having the lower end

of a vertical member 253 secured to the rear end thereof. The upper end of the vertical member has a short horizontal member 260 secured thereto which extends inwardly. A plurality of members 262, 264, 266, and 268 are rigidly secured together to form an inverted U-shaped frame section in which the lower end of the member 262, forming one of its legs, is secured to the inner end of the short horizontal member 260. The lower end of the member 268 forming the opposite leg of the section has a corresponding short horizontal member 270 rigidly secured thereto and extending outwardly therefrom. A vertical member 272 is secured at its upper end to the outwardly extending end of the short horizontal member 270 and has its lower end terminating in spaced relation to the forward end of the horizontal member 256. Finally, each end frame is completed by the securing of a horizontal member 274 to the lower end of the vertical member 272.

The horizontal member 274 extends inwardly and has a bearing 276 fixed on the upper surface thereof. A shaft 278 is journalled in each bearing 276 for rotation about a transverse horizontal axis. Mounted on the inner end of each shaft 278 inwardly of the associated end frame is a dial 280 having a plurality of circumferentially spaced circular pockets 282 formed in the peripheries thereof and one pocket 284 of elliptical configuration having a width substantially twice the width of the circular pockets.

The dials are rotated by any suitable means and, as shown, a sprocket wheel or pulley 286 is mounted on the outer end of each shaft 278 outwardly of the associated end frames and each sprocket wheel has a chain or belt 288 trained thereabout and about a pair of idler sprocket wheels or pulleys 290 and 292 suitably journalled on the horizontal frame member 274 in horizontally spaced relation. Each chain 288 is also trained about a chain tensioning sprocket wheel or pulley 294 mounted on a shaft 296 journalled in a bearing 298 secured to the associated vertical member 272 for vertical adjustment, as by an adjusting bolt 300. The outer end of each shaft 296 has a hand wheel 302 fixed thereto for effecting movement of the chain 288 and hence movement of the associated dial 280.

In order to retain the wire poles P within the pockets, corner plates 304 are secured adjacent the inner corners of each end frame, the plates 304 including inner edges 306 arcuate about the axis of rotation of the shaft and dial. If desired, steps 308 may be provided which extend outwardly from the plates 304.

Mounted on the upper bight portion of each of the inverted U-shaped frame sections is a bearing housing 310 having a threaded shaft 312 extending vertically therethrough. The lower end of the shaft has a supporting bar 314 connected thereto which is transversely apertured at its lower end to rotatably receive a shaft 316. Fixed to the shaft 316 on opposite sides of the supporting bar 314 is a pair of pulleys 318 each having an endless V belt 320 supported thereby. A hand wheel 322 is secured to each shaft 316 outwardly of the outer pulley 318 for turning both pulleys and hence moving the V belts supported thereby.

Each shaft 312 is mounted for vertical movement within the associated housing 310 by means of a hand wheel 324 having an interiorly threaded hub member 326 arranged to engage exterior threads of the shaft. It will be understood that by turning the wheels 324 the vertical position of the shafts 316 on the lower end of the supporting bars 314 can be readily adjusted.

Mounted on the upper portion of the inverted U-shaped section of each end frame of the buggy is a horizontally extending arm 328 having a U-shaped pole supporting notch 330 formed in the outer end thereof. Rigidly secured to the vertical frame member 268 of one of the end frames is a bracket 332 having a lower roller 334 suitably journalled thereon and an upper roller 336

suitably journalled thereon in vertically and horizontally spaced relation to the roller 334. Each of the rollers is provided with a concave periphery for engaging the convex periphery of a wire supporting pole. The opposite end frame has a fixed bracket 338 rigidly secured thereto and, in horizontal alignment with the lower roller, an upwardly facing semicircular notch 340 is formed therein.

The transverse frame member 254 of the buggy has a pair of transversely spaced, apertured brackets 342 extending upwardly therefrom for engagement by a pair of hooks H depending from a crane carriage C mounted for movement along tracks T suspended in a position above the longitudinal center line of the tending aisle in a well-known manner, see FIGURE 18.

When the buggy is being used to facilitate the draping of the Fourdrinier wire on the lower carriage of the machine, the buggy is supported from the carriage C riding on the ceiling tracks T. In order to handle the buggy during loading and at other times, the same is provided with four caster wheels 344 suitably secured to the horizontal frame members 256. The casters may be of any suitable construction.

Loading the Buggy

In normal operation, the new Fourdrinier wire is obtained from the supplier in a bundle, as shown in FIGURE 17. Usually, the bundle includes three bundle poles BP each having a longitudinal extent greater than the width of the Fourdrinier wire W. A first bundle pole BP1 is mounted inside the loop at one end of the wire and a second bundle pole BP2 is mounted on the inside of the loop at the end of the wire opposite the bundle pole BP1. The wire is then wrapped around the bundle pole BP2 and a third bundle pole BP3 mounted outside of the wire loop. Preferably, the poles BP used in the Fourdrinier wire bundle have a longitudinal extent somewhat less than the longitudinal extent of the poles P utilized to drape the wire on the lower carriage.

In order to load the buggy, the bundle pole BP1 is placed in the notches 330 of arms 328 and the wire is unwound from the bundle poles BP2 and BP3 to a slight extent. The bundle poles BP2 and BP3 are then moved onto the horizontal base frame members 256 and into engagement with the elliptical pockets 284 of the dials 280. The hand wheels 302 are then actuated to turn the dials 280 and thus move the bundle poles BP2 and BP3 into an upwardly disposed position at the top of the dials. Next, the hand wheels 324 are actuated to lower the belts 320 so that they can be moved around the ends of the bundle poles, and the hand wheels 324 are then turned in the opposite direction to raise the belts and hence the bundle poles carried thereby into their uppermost position, as shown in FIGURE 15.

Since the bundle pole BP1 is utilized adjacent the couch end of the machine and draping of the wire proceeds from the breast roll end to the couch roll end of the machine, it is necessary to feed the bundle pole BP1 first to the dial pockets 282. This is accomplished by feeding a pole P1 between the rollers 334 and 336 until the opposite end is supported in the notch 340 of the arm 338. The bundle pole BP1 is then removed, permitting the loop of the Fourdrinier wire to be supported on the pole P1. The dials are then rotated into a position wherein the elliptical pockets 284 are disposed in the lower right hand portion of the dial, as shown in FIGURE 15. This insures that counterclockwise rotation of the dials will continue to present a number of successive individual pockets 282 sufficient to receive all of the poles to be handled.

With the dials thus indexed, the bundle pole BP1 is then lowered from the notches 330 and fed into the dials. The pole P1 is then shifted to the notches 330 and the remaining poles P2—P8 are inserted within the loop with the aid of the rollers 334 and 336 and then fed

to the dials. As each pole is fed to the dials they are suitably actuated by the hand wheels 302 until all of the poles are maintained in adjacent pockets around the circumference of the dials within the wire loop as shown in FIGURE 15. Finally, the last pole P1 is moved from the notches 330 and placed in notches 346 formed in the upper surface of the outer ends of horizontal base frame members 256. With the buggy thus loaded, the same can be moved into the aisle into a position to assist in the draping of the Fourdrinier wire over the lower carriage of the machine.

Draping the Fourdrinier Wire

With the loaded buggy supported by the ceiling carriage C adjacent the breast roll end of the machine in the tending aisle as shown in full lines in FIGURE 18, and the lower carriage in position therein, the first three poles P1, P2 and P3 are secured within the clamps 156, 160 and 158, respectively, carried by the horizontal and angular supports 148 and 154. The buggy is then moved longitudinally toward the couch roll end of the machine while hand wheels 322 are turned to pay out the wire loop until it is positioned adjacent the supports S4. The pole P4 is then moved from the notches 346 of the lower base frame members and onto engagement with the vertical supports S4. The hand wheels 302 are then turned to index the pole P5 into the notches 346. This pole supporting procedure is repeated successively with poles P5, P6, P7 and P8, the position of the buggy when supporting the pole P6 being shown in dotted lines in FIGURE 18. It will be noted that as successive poles are supported they, in turn, receive and support the upper flight of the wire W while the poles 220 receive and support the lower flight of the wire.

At the couch roll end of the machine, as shown in dot-dash lines in FIGURE 18, the bundle poles BP1 and BP2 are utilized to complete the draping of the wire. To this end, the hydraulic rams 216 are actuated to move the tubular casing and rods of the units 162 outwardly into a position of longitudinal alignment with the frames 10 and 12. The rams 188 are retracted and the bundle poles BP1 and BP2 are then secured in position by the clamps 202 and 208 respectively. Finally, the rams 188 are actuated to tension the entire Fourdrinier wire W and complete the draping thereof about the lower carriage as clearly shown in FIGURE 18. It will be noted that outside bundle pole BP3 is not used in the draping but serves merely to provide a means about which the wire W is wound.

It will be understood that the draping of the new Fourdrinier wire as described above can be accomplished in the tending aisle while the Fourdrinier machine is being operated. After the draping has been completed the machine is shut down and the old Fourdrinier wire is cut off and removed.

Thereafter, the upper carriages are then moved, from the position shown in FIGURE 19 to the position shown in FIGURE 20, laterally outwardly into the tending aisle through the draped Fourdrinier wire by actuation of the motors 144 and hence rotation of the drums 142 to reel in the cables 140. Next, a series of guide channels G are placed on the table rolls and suction boxes of the Fourdrinier machine in alignment with the series of poles P. The adjacent ends of the poles are then moved from the supports S carried by the frame 12 of the machine onto the guide channels and the supports are removed.

The wire is now ready to be moved into operative position on the machine. However, prior to effecting this movement it is necessary to remove the blocks 46 and 54 supporting the tending side of the couch suction roll 40 and the couch drive roll 48, lower the breast roll 24 about its pivotal axis 28, and raise the take-up and tension rolls 60 and 64, by actuating rams 74, as shown in FIGURE 11. In addition, the intermediate supports

22 of the checking stands must be removed. To this end and referring to FIGURES 22-24, each of the intermediate supports 22 of the checking stands 16 is of generally hollow three sided construction to receive a hydraulic jack or ram unit 350. As shown in FIGURE 22, the lower end of each ram unit seats on the upper surface of the associated lower support 18 and its upper end is arranged to engage the lower surface of the associated upper support 20. Each ram unit extends through the associated intermediate support 22 and is retained therein by any suitable means, such as a cover plate 352 detachably secured to the support. If desired, each intermediate support is detachably fixed to the associated lower support by any suitable means, such as pivot bolts 354.

It will be understood that when intermediate supports 22 are in position between the upper and lower supports as shown in FIGURES 22 and 23, the tending side of the machine is supported thereby. To remove the supports, the ram units 350 are actuated to raise the frame 12 and relieve the load from the intermediate supports which are then removed after suitably unfastening bolts 354. After the intermediate supports 22 are removed, the ram units 350 are actuated to lower the frame 12 until the load thereof is supported on the upper carriage beams 116 through the engagement of rollers 138 with the upper surfaces thereof. The ram units 350 are then removed. The tending side of the Fourdrinier machine is now supported by the carriages in straddling relation to the newly draped Fourdrinier wire.

In this condition, the motors 108 are actuated to move the cables 112 and hence the upper and lower carriages together laterally inwardly with the draped wire into an operative position on the machine as shown in FIGURES 11, 12 and 21.

The new wire is now ready to be transferred to the machine. While the order of the steps in transferring the wire W from the carriage to the machine is not critical, in general, it is preferable to first replace the rams 350 between the upper and lower supports 18 and 20 of the stands and actuate the same to relieve the load of the tending side of the machine from the carriages. The intermediate supports 22 are then replaced and secured in position by bolts 354. Rams 350 are then actuated to lower the frame 12 into supporting relation to the completed stands 16. Next, the couch suction roll block 46 and the couch drive roll block 54 are replaced.

The first step in actually transferring the wire onto the machine is to actuate the cylinders 188 of the units 162 to relax the tension of the wire W. The upper flight of the wire W is positioned on the machine by removing the poles P4-P8 together with the guide channels G4-G8 and supports S4-S8 supporting the same. The couch roll end of the wire is prepared by loosening clamps 156, 160 and 158 and removing the poles P1, P2 and P3 supported thereby. Finally, the angular supports 154 are removed from the sockets 152.

The couch roll end of the machine is prepared by loosening clamps 202 and 208 and removing the poles BP1 and BP2 supported thereby. The vertical supports 206 are removed from the sockets 204 and then cylinders 216 are actuated to pivot the units 162 into a position adjacent to and parallel with the carriage beams at the couch roll end of the machine. The lower flight of the new wire is properly positioned by removing the poles 220. To accomplish this, pins 226 are removed. It will be noted that with the carriage in position beneath the machine frames the major portion of the poles 220 extend beyond the rollers 230 so that the ends thereof adjacent the pins 226 tend to pivot upwardly so that when the pins are removed, the poles are supported by the rollers 230 and the rollers 228. These rollers provide a convenient arrangement for facilitating lateral removal of the poles 220.

Finally, the breast roll 24 is pivoted into its raised position and secured to support 34 and the take-up and ten-

sion rolls 60 and 64 are lowered, by rams 74, to provide the wire W with proper tension.

It thus will be seen that the objects of this invention have been fully and effectively accomplished. It will be realized, however, that the foregoing specific embodiment has been shown and described only for the purpose of illustrating the principles of this invention and is subject to extensive change without departure from such principles. Therefore, this invention includes all modifications encompassed within the spirit and scope of the following claims.

I claim:

1. A Fourdrinier machine comprising longitudinally extending frame means having parts thereon for receiving an endless Fourdrinier wire, fixed means for supporting one side of said frame means in substantially laterally fixed relation, and means for supporting the opposite side of said frame means in substantially laterally fixed relation during the movement of an endless wire maintained in open loop formation from a position laterally adjacent the opposite side of said frame means laterally onto the wire-receiving parts on said frame means, said last-mentioned means comprising means mounted for rectilinear movement laterally in cantilever fashion from a position beneath said frame means through the endless wire maintained in open loop formation in said adjacent position and means for effecting support of said laterally movable means in straddling relation to said endless wire independently of and below said frame means, said laterally movable means receiving the opposite side of said frame means during said movement and transmitting the support thereof to said independent support means in straddling relation to said endless wire.

2. A Fourdrinier machine as defined in claim 1 wherein said laterally movable means comprises a plurality of longitudinally spaced beams extending laterally with respect to said frame means, each of said beams having upwardly facing track means formed on its upper surface, and wherein the opposite side of said frame means has rollers mounted thereon for engaging said track means.

3. A Fourdrinier machine as defined in claim 2 wherein each of said beams also includes downwardly facing track means extending longitudinally thereof, and the opposite end of said frame means also includes rollers for engaging said downwardly facing track means.

4. A Fourdrinier machine as defined in claim 2 wherein each of said beams also includes upper rollers mounted on the upper portion of the end thereof adjacent said fixed supporting means and wherein said frame means includes laterally extending track means for engagement by said rollers.

5. A Fourdrinier machine as defined in claim 4 wherein each of said beams also includes lower rollers mounted on the lower portion of said end thereof adjacent said upper rollers and wherein lower track means is fixedly supported in a position below said frame means.

6. A Fourdrinier machine comprising longitudinally extending frame means having parts thereon for receiving an endless wire, fixed means supporting one side of said frame means movable out of supporting relation therewith, upper and lower carriage means mounted for lateral frame means, means supporting the opposite side of said movement with respect to each other and to said frame means between a first position beneath said frame means and a second position laterally adjacent the opposite side of said frame means, said lower carriage means being movable from said first position to said second position during the operation of the machine and having means associated therewith for supporting an endless wire in open loop formation when in said second position, said upper carriage means being positioned to pass through the open loop formation of an endless wire supported by said lower carriage means during its movement from said first position to said second position, means on said lower carriage means for receiving and supporting the end of said upper

carriage means extending through and beyond said endless wire, said upper and lower carriage means together being operable to support the opposite side of said frame means in straddling relation to said endless wire in response to the movement of said opposite side supporting means out of supporting relation therewith and to maintain such support during the lateral movement of said upper and lower carriage means from said second position to said first position to move the endless wire carried thereby onto said wire-receiving parts.

7. A machine as defined in claim 6 wherein said movable supporting means for the opposite side of said frame means comprises a plurality of longitudinally spaced stand assemblies, each of said assemblies including an upper member secured to said frame means, a lower member supported below said frame means in spaced relation to said upper member, and an intermediate member removably mounted between said upper and lower members.

8. A machine as defined in claim 7 wherein each of said stand assemblies also includes a hydraulic jack removably mounted between said upper and lower members and extending through said intermediate member.

9. A machine as defined in claim 6 including power means for effecting lateral movement of said upper and lower carriage means.

10. A machine as defined in claim 9 wherein said power means for said lower carriage means comprises power driven horizontal shaft means mounted adjacent the one side of said frame means in parallel relation thereto, and a cable and pulley assembly between said shaft means and said lower carriage means.

11. A machine as defined in claim 9 wherein said power means for said upper carriage comprises a power-operated drum carried by one of said carriage means, a cable wound about said drum and having an end thereof extending outwardly from said drum and fixed to the other of said carriage means.

12. A Fourdrinier machine comprising longitudinally extending frame means having parts including a roll at one end thereof for receiving an endless Fourdrinier wire; fixed means for supporting one side of said frame means; carriage means mounted for lateral movement between a first position beneath said frame means and a second position laterally adjacent the opposite side of said frame means; means on said carriage means for supporting an endless wire in draped open loop formation in fixed relation to said carriage means when the latter is disposed in said second position, said wire-supporting means comprising bracket means for fixedly receiving a laterally extending wire-supporting pole, means mounting said bracket means on the end of said carriage means adjacent said roll for longitudinal movement toward and away from said carriage means end outwardly thereof, means for retaining said bracket means in a predetermined position away from said carriage means end to thereby retain the wire-supporting pole fixedly received thereby in a position such that the portion of the wire supported by the pole can be moved laterally around said roll during the movement of said carriage means from said second position to said first position, said carriage means including means for supporting the opposite side of said frame means during the movement from said second position to said first position.

13. A machine as defined in claim 12 wherein said bracket means includes means forming upright socket means and wherein an upright pole-supporting member is removably mounted in said socket means.

14. A machine as defined in claim 12 wherein said means for mounting said bracket means for longitudinal movement comprises a first member carried by said carriage means, a second member carrying said bracket means mounted for longitudinal movement with respect to said first member, and ram means between said mem-

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bers for effecting relative longitudinal movement therebetween.

15. A machine as defined in claim 14 wherein said first member is pivoted to said carriage means about an upright axis, and ram means is provided between said carriage means and said first member for effecting movement of said members together about said upright axis.

16. A machine as defined in claim 15 wherein said first member comprises a hollow tube and wherein said second member comprises a bar slidably mounted within said tube, said bar having an elongated slot formed therein and an element fixedly mounted within said tube extending within said slot for limiting the relative longitudinal movement between said tube and said bar.

17. A machine as defined in claim 12 wherein said wire-supporting means includes second bracket means fixed to said carriage means on the opposite end thereof for fixedly receiving a laterally extending pole supporting the opposite end of the wire for movement over a second roll at the opposite end of said frame means.

18. A machine as defined in claim 12 wherein said wire-supporting means includes upright support members removably carried by said carriage at opposite sides thereof for receiving poles supporting the upper flight of said wire.

19. A machine as defined in claim 12 wherein said wire-supporting means includes transversely extending poles for supporting the lower flight of said wire, means for detachably connecting one end of said lower flight supporting poles to said carriage means in fixed relation thereto, and roller means mounted beneath the opposite side of said frame means for supporting the opposite end portion of said lower flight supporting poles.

20. A Fourdrinier machine comprising longitudinally extending frame means having parts thereon for receiving

an endless Fourdrinier wire; fixed means for supporting one side of said frame means; and carriage means mounted for lateral movement between a first position beneath said frame means and a second position laterally adjacent the opposite side of said frame means, means on said carriage means for supporting an endless wire in draped open loop formation in fixed relation to said carriage means when the latter is disposed in said second position, and means for supporting the opposite side of said frame means during the movement thereof from said second position to said first position, said wire-supporting means including a plurality of longitudinally spaced transversely extending poles for supporting the lower flight of the wire, means for detachably connecting one end of each of said poles in fixed relation to said carriage means, and roller means mounted in fixed position beneath the opposite side of said frame means for supporting the opposite end portion of said poles during movement of said carriage means from said second position to said first position.

21. A machine as defined in claim 20 wherein a roller is carried by said carriage means above each pole connecting means for engaging the upper surface of the associated pole and supporting the same with the associated roller means in cantilever position for withdrawal after said carriage means has been moved into said first position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,025,909

March 20, 1962

Harry H. Hart

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 11, line 60, after "frame means" insert -- , means supporting the opposite side of said frame means --; same column 11, line 62, strike out "frame means, means supporting the opposite side of said"; column 12, line 56, for "carirage" read -- carriage --.

Signed and sealed this 14th day of April 1964.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents