Oct. 27, 1942. H. H. HART 2,299,746

FOURDRINIER MACHINE

Filed Oct. 12, 1939 5 Sheets-Sheet 1

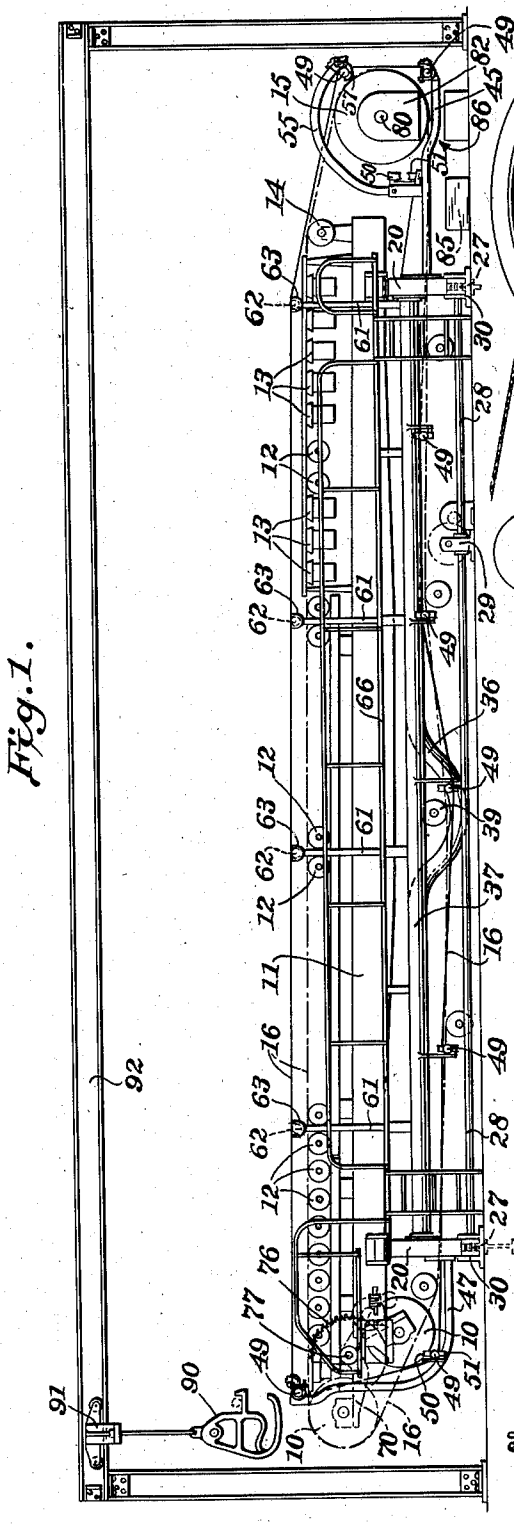


Fig. 1.

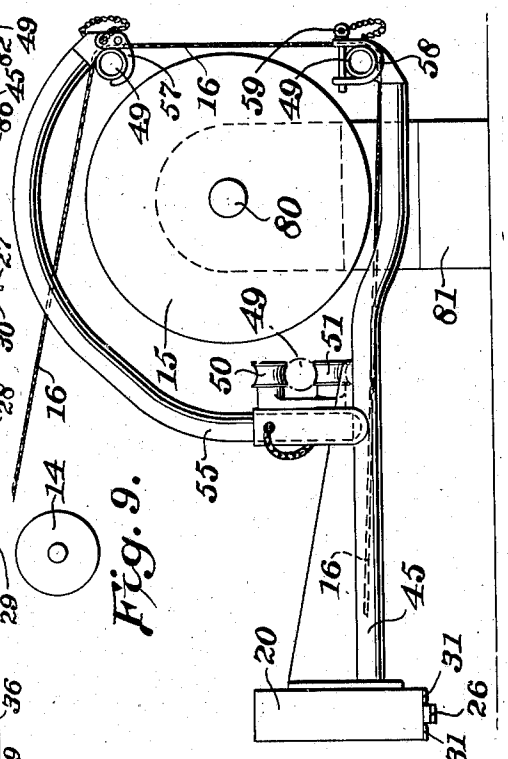


Fig. 9.

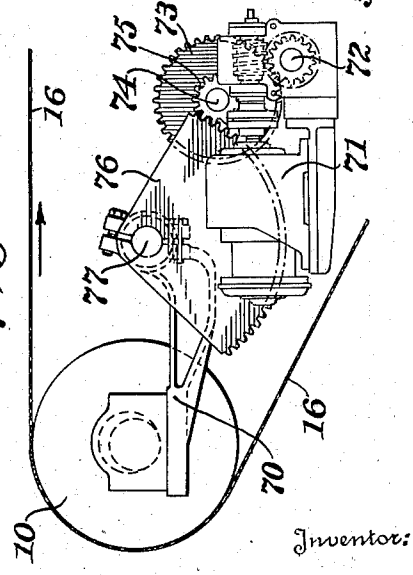


Fig. 8.

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FOURDRINIER MACHINE

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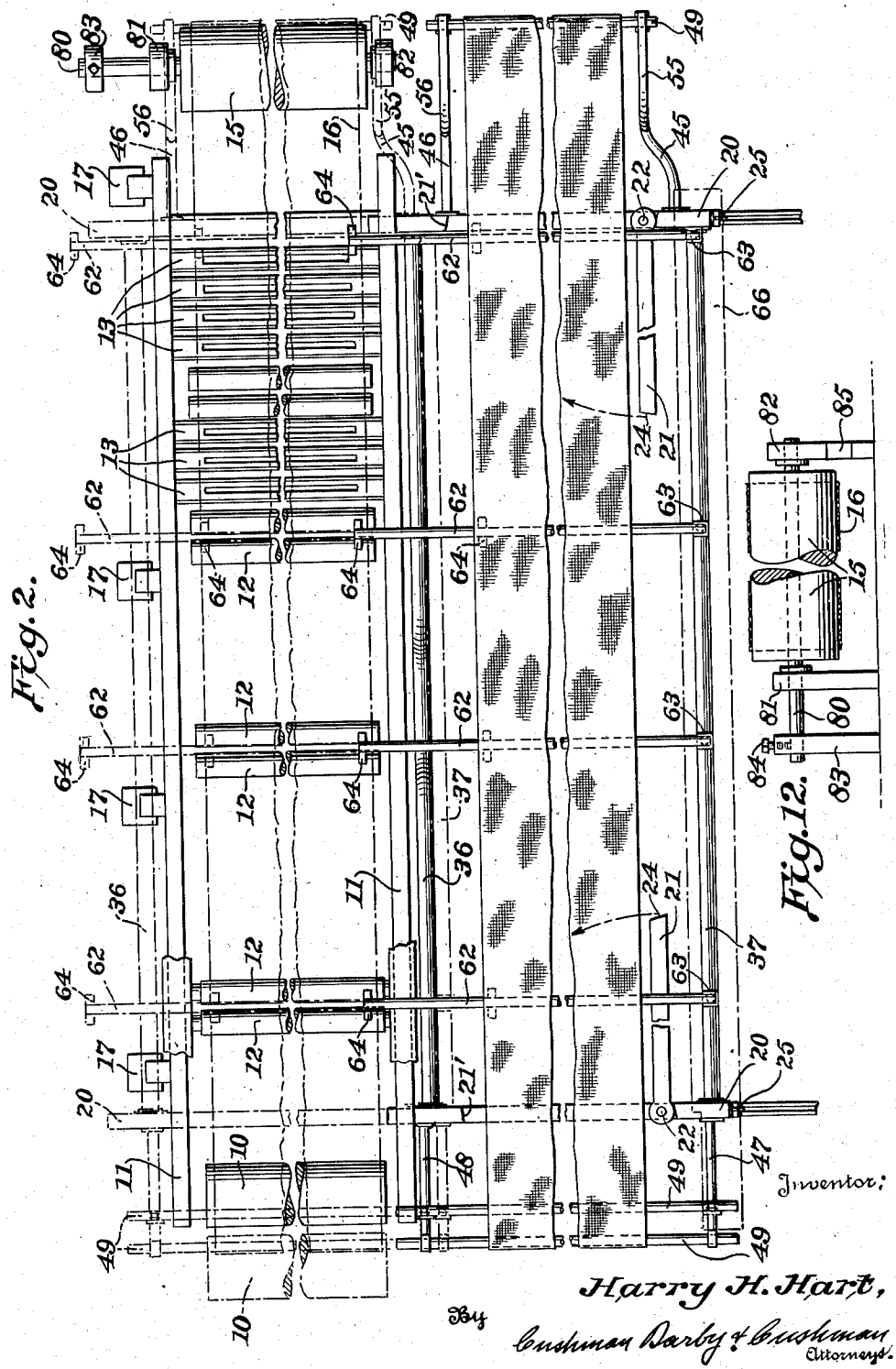


Fig. 2.

Fig. 12.

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FOURDRINIER MACHINE

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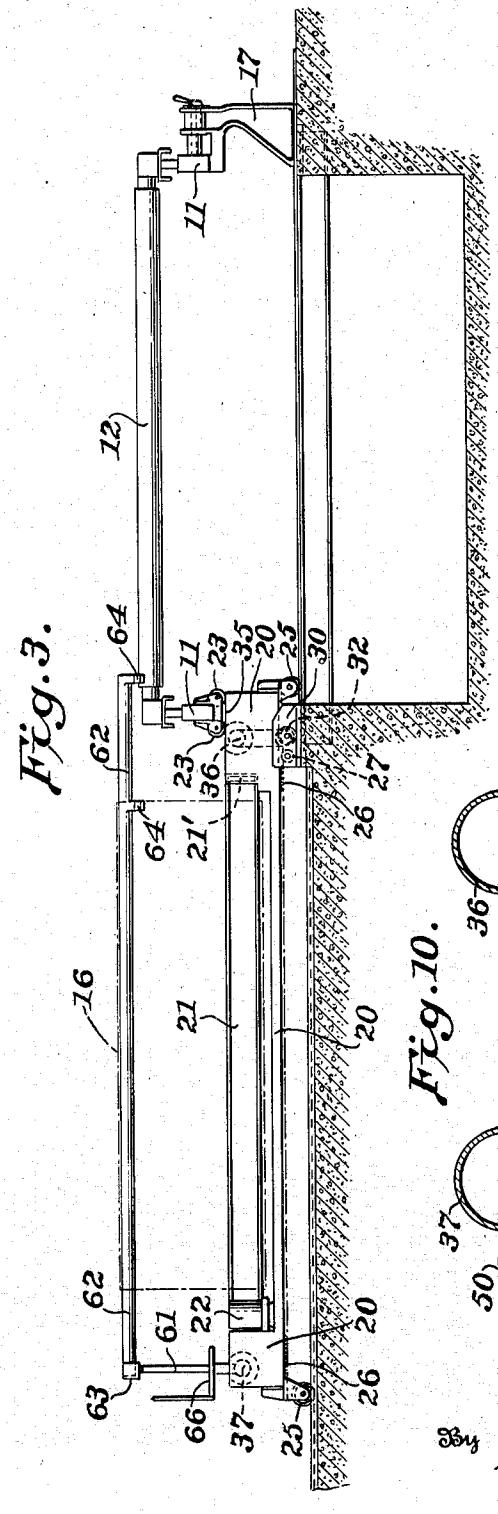


Fig. 3.

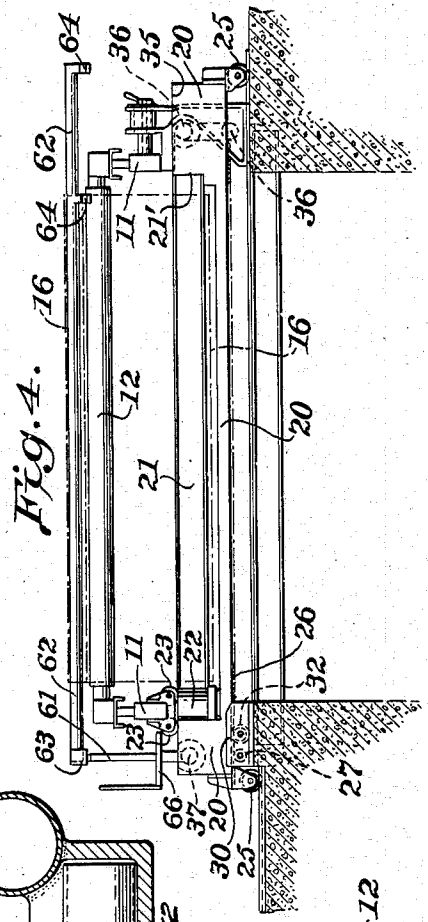


Fig. 4.

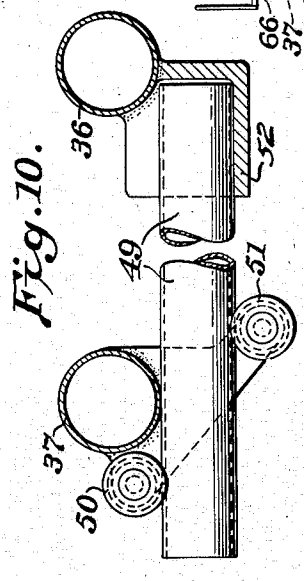


Fig. 10.

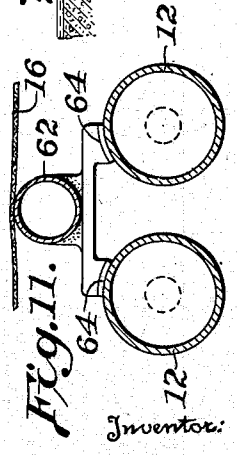


Fig. 11.

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FOURDRINIER MACHINE

Filed Oct. 12, 1939 5 Sheets-Sheet 4

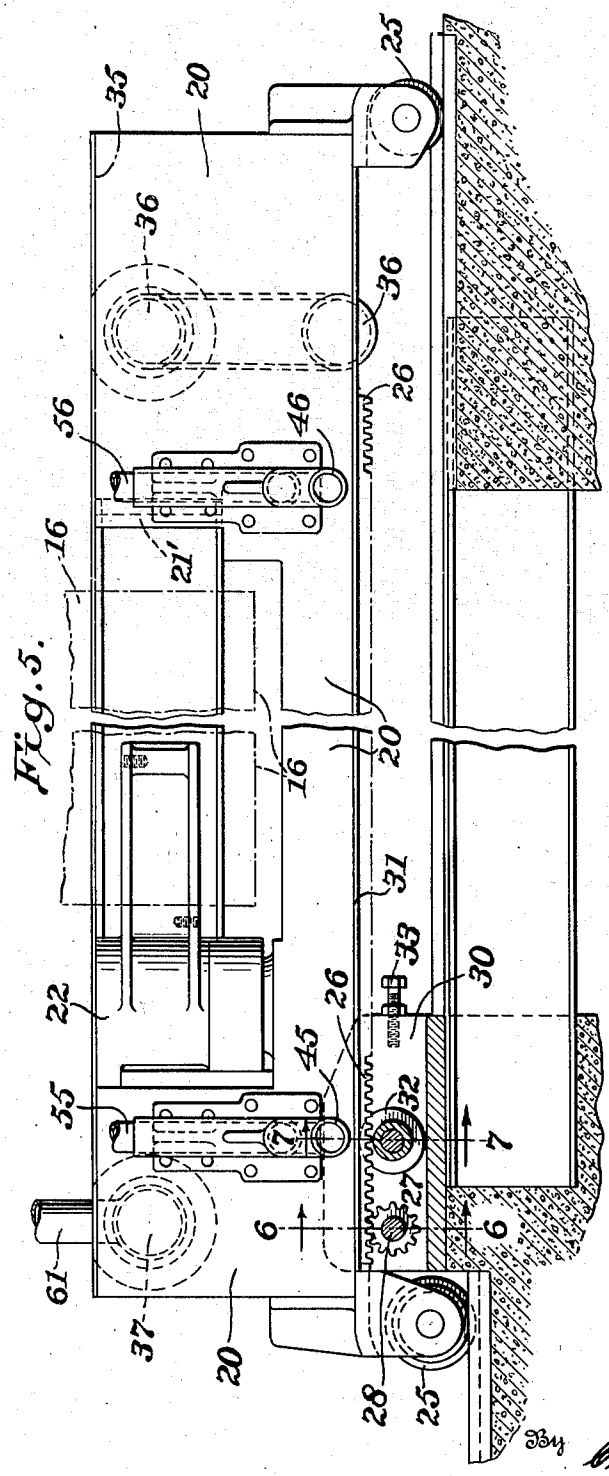


Fig. 5.

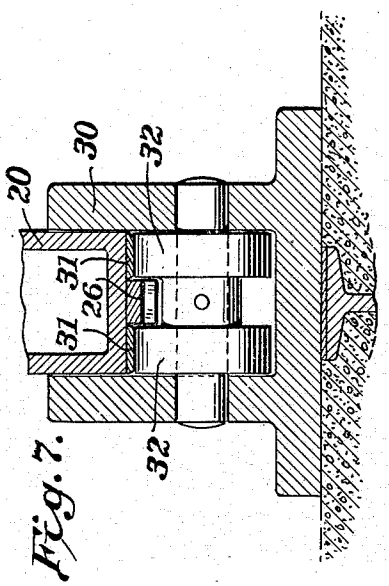


Fig. 7.

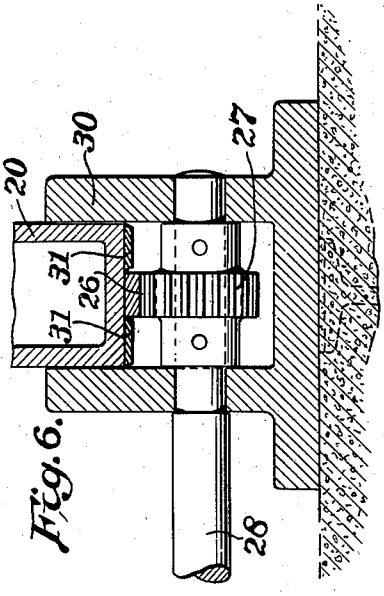


Fig. 6.

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FOURDRINIER MACHINE

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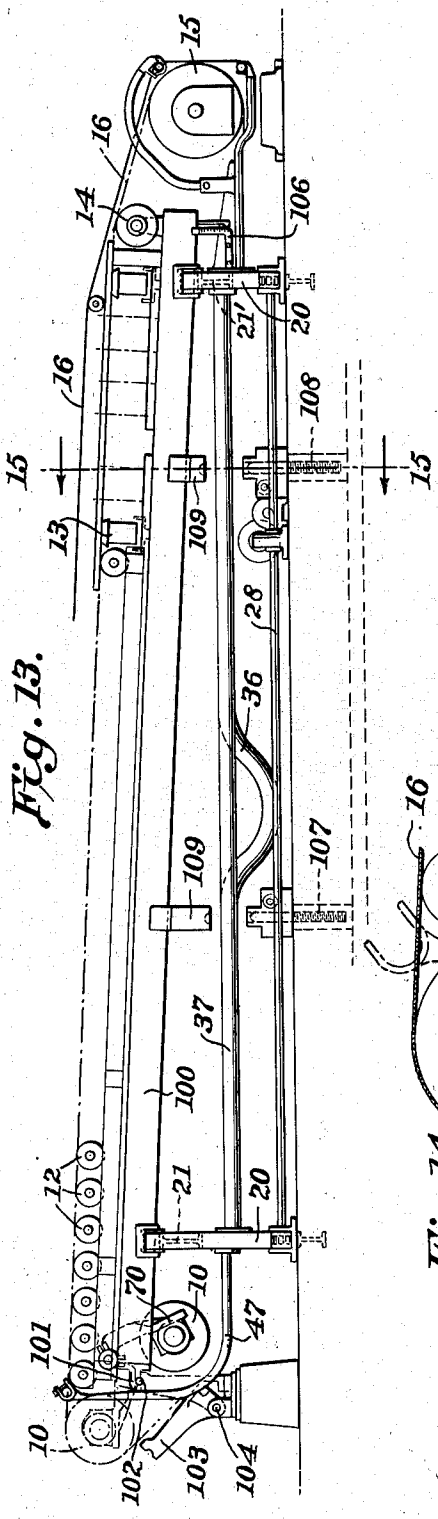


Fig. 13.

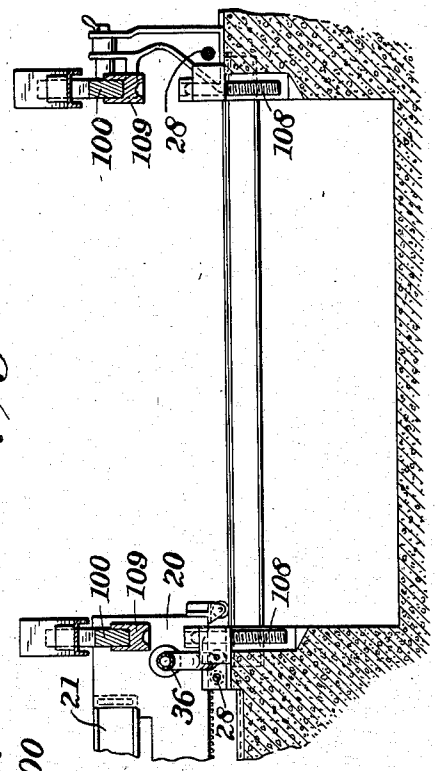


Fig. 15.

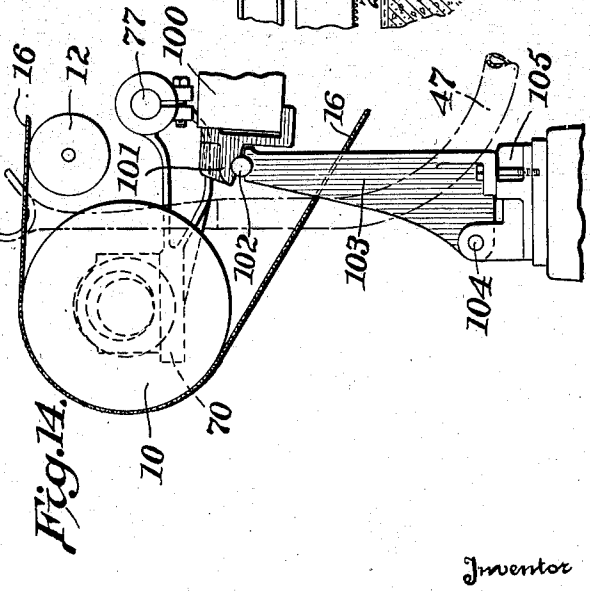


Fig. 14.

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UNITED STATES PATENT OFFICE

2,299,746

FOURDRINIER MACHINE

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Application October 12, 1939, Serial No. 299,195

21 Claims. (Cl. 92—44)

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

In the past, various devices have been designed to accomplish the removal and application of the endless wire screen, which structures served the purpose of the day very well. However, as the paper making machines were increased in size and speed, these wire changing devices were unable to economically perform their required function. The present invention was, therefore, made to provide an apparatus designed to accomplish the rapid changing of the endless wire forming screens on large machines in particular, but it may also be used on smaller sizes of Fourdrinier machines.

Certain of the prior art machines having supporting means for the table section which permit lateral movement of the wire with respect to the table, accomplish the replacement of the wire by providing a movable support under one side of the table. In accordance with all these teachings, however, additional fixed supports are required on the side cooperating with the movable support to maintain the table section during operation, necessitating the lifting of the table to remove the fixed support before the wire may be replaced. The present invention utilizes the principle of the movable support and is an improvement on this type of table supporting means.

It is, therefore, the particular object of this invention to provide means to permit a rapid replacement of the endless wire forming screens used on relatively wide Fourdrinier machines.

Another important object is to provide an apparatus which forms a support for a portion of a Fourdrinier machine comprising a movable support for the front side of the table section of the machine, the movable support having removable wire supporting means thereon forming a unitary structure to carry the forming wire over the table section during replacement of the wire.

Another object is to provide a movable support for one side of the table section of a Fourdrinier serving to maintain its portion of the table during the wire changing process and also during operation of the machine.

Still another object of the invention is to provide a movable carriage supporting structure for the front side of a Fourdrinier machine which has a catwalk integral therewith, from which the wire screen may safely be inspected at all times.

Another object is to provide an apparatus adapted to effect the replacement of an endless wire forming screen without necessitating the removal of any of the driving means, suction pipes, shower pipes, or other necessary operating connections required to be made with elements enclosed within the wire loop.

Other objects accomplished by the present invention will appear more fully below.

In the drawings:

Figure 1 is a diagrammatic side elevation of a Fourdrinier structure embodying the present invention, the usual flow box, deckle straps, pick up felts, etc., not being shown.

Figure 2 is a plan view partly broken away, of the Fourdrinier table section shown in Figure 1 showing an endless wire forming screen draped in the tending aisle over the movable carriage support.

Figure 3 is a sectional end view of the front side supporting carriage shown in its laterally extended position in the tending aisle, looking from the couch end of the machine toward the breast end.

Figure 4 is a sectional end view as in Figure 3 showing the movable carriage in its innermost or normal position with the forming wire in place over the Fourdrinier table section.

Figure 5 is an enlarged end view of the movable carriage structure as seen in Figures 3 and 4.

Figure 6 is a sectional view taken on line 6—6 of Figure 5 showing the lateral driving means for the carriage structure,

Figure 7 is a sectional view taken on line 7—7 of Figure 5 showing the guide bearing rollers for the carriage drive,

Figure 8 is a detail view of the breast roll mounting structure,

Figure 9 is a detail view of the wire screen supporting bracket carried by the carriage at the couch end of the machine,

Figure 10 is a detail view of the supporting means for certain of the poles over which the forming wire is draped,

Figure 11 is a sectional view of the rear supporting means for the wire supporting poles which coact with the table rolls,

Figure 12 is a diagrammatic view of the couch roll mounting looking toward the couch roll from the breast end of the table section,

Figure 13 is a diagrammatic side elevation showing a modified frame support wherein the invention is adapted to a variable pitch Fourdrinier,

Figure 14 is a detailed side elevation of the piv-

otal supporting means for the front end of the frame, and

Figure 15 is a sectional view taken on line 15—15 of Figure 13 showing one pair of the lifting jacks.

The invention herein shown is adapted to be associated with any Fourdrinier paper machine of fixed or variable pitch and in the form shown in Figure 1, a breast roll 10 is movably mounted on a table frame 11 in such a manner that it may be raised from the inoperative position shown in full lines in Figure 1 to the dotted line or operative position by actuation of driving means which will be more particularly described below. The table frame has table rolls 12 mounted thereon in any suitable manner, such that if desirable they may be shaken independently of the breast roll. The usual suction boxes 13 and guide roll 14 are also supported from the table frame in any well known manner. A couch roll 15 is mounted at the end of the table frame section and in the present embodiment of the invention, it is independently mounted in a cantilever type supporting means. The driving and other operative connections (not shown) for all the usual elements supported on the table section, including a shake mechanism, suction pipes, shower pipes etc., are all built into the rear side of the machine or the side opposite from the usual tending aisle which extends longitudinally along the front side of the table section.

An endless wire forming screen 16 is adapted to pass completely around the breast roll, table frame and parts supported therefrom and the couch roll, the invention herein disclosed being directed to a means whereby the endless wire may be replaced from the front side of the machine, and to effect this purpose it is designed to carry the screen on a unitary supporting means.

It is evident that the endless wire screen, to be placed in operative position over the elements contained within the wire loop, must be moved laterally with respect to the table section and its associated parts. In order to accomplish this movement, one of the side supports of the table section of the machine must be designed to permit passage of the lower run of the wire therethrough and in this invention a movable side support is provided which is adapted to carry the wire into proper position for tensioning it from the breast roll to the couch roll.

The table frame 11, as shown in Figure 2, has a plurality of fixed supports or pedestals 17 which support it at its back side and a movable support for the front side of the machine. The movable support is shown in Figure 3 and includes a heavy beam structure 20 which is adapted to carry the full load of one side of the table section of the Fourdrinier at all times. The beam 20 is provided with a recess in its upper face and a swinging track member 21 is pivotally mounted on the beam by the hinge 22 to move horizontally into and out of the recess. The upper edge of track 21 is flush with the upper surface of beam 20 and the front side of the machine is supported from the beam by means of rollers 23 fixed to the front table frame member 11. The free end of the track may be cut on an angle as at 24, Figure 2, which corresponds to the angle of the seat 21' in beam 20 that it engages, and in which the free end is supported, in order that the line of contact between the track and seat will pass under rollers 23 with a relatively gradual transfer of load from beam 20 to the track. In this manner, any possibility of an objectionable bump forming at this point is eliminated. The beam 21 will swing on hinge 22 from a position in lengthwise alignment with beam 20 to a position at right angles thereto, as shown in Figure 2, in order to cover and uncover the recess formed in beam 20.

The beam 20 is provided at its ends with ground-engaging carriage rollers 25 which cooperate with suitable tracks in the foundations of the machine and are designed to carry the full weight of the load transmitted to beam 20 by the table frame. The underside of the beam 20 is provided with a rack 26 which cooperates with a driven pinion gear 27, as best shown in Figure 5. The gear 27 is pinned to a shaft 28 driven by any suitable means 29, the shaft 28 having bearings in a housing 30 supported on the foundation of the machine. On opposite sides of the rack 26, bearing surfaces 31 are formed which ride upon the spaced freely rotatable rollers 32 mounted in housing 30 in order that the rack 26 will not bear too heavily onto the pinion 27 as the movable support is driven laterally during the screen replacing operation. A stop 33, Figure 5, may be carried by housing 30 on its rear side which cooperates with the rear carriage roller support to limit lateral movement of beam 20 into the tending aisle.

The beams 20 are preferably the permanent and only supports for the front side of the table section and the beam shown in Figure 4 is in its innermost position. As there represented, the rollers 23 carried by the front table frame member 11 engage the upper surface of the beam 20 and track 21 at hinge 22 to transmit the load through the carriage roller 25 at the front end of beam 20, to the foundation of the machine. In certain instances a fixed support may be used in conjunction with the carriage to support the front side. As shown in Figure 4, the opposite end of the beam 20 passes under the rear frame 11 but has no engagement therewith, and the pedestals 17 which support the rear frame member 11 are spaced so as not to interfere with the movement of the beams 20.

As above explained, the beam 20 is adapted to be driven into the tending aisle running along the front side of the machine, by means of the pinion 27 engaging rack 26. As the beam 20 is driven from the position shown in Figure 4 to the position shown in Figure 3, the rollers 23 fixed to the front frame member 11 ride longitudinally along beam 21. The transferring of the load along this track may cause beam 20 to flex somewhat and in order to prevent the rack 26 on the bottom thereof from riding too heavily on pinion 27 because of such flexure, bearing rollers 32 above described are provided. When the fully extended position is reached, the rollers 23 will pass off of the track 21 and onto the surface 35 formed on the rear upper surface of beam 20, at which point the full weight of the front table frame section 11 is transmitted through beam 20 to the rear carriage roller 25, supported on the foundation of the machine.

Several of these movable front frame supporting members may be provided, and as shown in Figure 2, two such units are here shown. The several units are integrally united to form a unitary structure, and at the rear side of the machine a rigid connecting element 36 is shown and on the front side a similar connecting element 37 is provided. The connector bars and beams 21 thus form a unitary structure which is

rigid both longitudinally and transversely of the machine. The rear connector bar 36 must be appropriately shaped to pass freely under the machine as the rails 20 and the associated unitary carriage structure are moved laterally of the table, and in Figure 1, a bend 38 is formed midway of its length to pass under the guide roll 39. It is seen that with this construction, a rigid movable structure cooperates with the front frame member 11 at spaced points longitudinally thereof to carry the front side of the table section as above explained.

The unitary carriage structure above described for supporting the front side of the table section carries the brackets 45 and 46 at the couch end of the machine and brackets 47 and 48 at the breast end of the machine. These brackets are provided with suitable pole-supporting means, such as those disclosed in Figure 10 wherein the pole 49 is shown inserted between the laterally displaced rollers 50 and 51 on the front support, the rear end of the pole being carried by a suitable support 52. This type of draping pole support is well known and by reason of the displacement of the rollers, prevents the pole dropping onto the wire and possibly marring it as the pole is being removed.

The couch brackets 45 and 46 each carry upwardly extending arms 55 and 56, respectively, which are adapted to substantially encircle the periphery of the couch roll and have releasable hinge members 57 at their outer ends, which engage and carry one of the poles 49 about which the forming wire is draped during the replacement process. The bracket 45 extends forwardly around the lower periphery of the couch roll and also realeasably carries a pole 49 in the U-shaped carrier 58, the pole being held in place by pin 59 to carry the draped wire. The arm 45 carries a pair of laterally displaced rolls 50 and 51 like those disclosed in Figure 10, the rear arm 56 having a support 52 to carry the rear end of a rod 49 during the act of replacing the wire, these rollers and support being associated with the bracket at the couch end to permit rods 49 carried by the ends of arms 55 and 56 and 45 and 46 to be removed. When the wire screen is ready to be deposited on the structure enclosed within the endless loop, these poles are released from the ends of the brackets 45 and 46 and arms 55 and 56 and are lifted around the couch roll to be deposited one at a time on roller 51 and support 52 from where they are withdrawn laterally into the tending aisle without danger of injuring the screen.

The front bracket arm at the breast end 47 has a pair of the laterally displaced rollers 50 and 51 mounted on it, so as to carry rod 49 below the breast roll and the rear breast roll bracket 48 carries a fixed member 52, which cooperates with the rollers 50 and 51 to support the rear end of rod 49 disposed below the lower periphery of the breast roll. The extreme upper end of the bracket arm 47 releasably engages a rod 49 as shown in Figure 1. The rod carried by the upper ends of the breast brackets, when released, is deposited on roller 51 and support 52 carried at this end to be removed from within the loop.

A plurality of standards 61 are disposed along the length of the carriage structure and are mounted on the front connecting bar 37 to carry one end of certain other poles 62, and a plurality of laterally displaced roller supporting elements, like that disclosed in Figure 10, are supported in a downwardly extending position from connecting bar 37 to support the rods 49 disposed at spaced points along the lower run of the forming wire. Corresponding supports 52 are mounted on the rear connecting bar 36 to cooperate with the roller elements.

The rods 62 are removably mounted at their front ends in U-shaped supporting elements 63 secured to the upper ends of the standards 61 and are adapted to slidably engage the table rollers and suction boxes at their rear ends. In Figure 11, the rear ends of the rods 62 are shown and they have appropriately shaped feet 64 which engage between two table rollers 12 to guide the sliding of the rod as it moves laterally of the table rolls with the unitary carriage structure upon which it is fixedly mounted. In Figures 3 and 4, the rods 62 are shown provided with two sets of feet 64 at their rear ends, so that when the carriage is driven to its innermost position as shown in Figure 4, the rod will be properly supported as its rear end moves inwardly past the rear ends of the table rolls. The two sets of feet are required in this showing of the invention only because the lateral movement of the movable carriage support is greater than the length of the rolls and suction boxes upon which the rear ends of rods 62 ride.

The front side of the carriage structure has a suitable catwalk 66 mounted thereon, the catwalk being movable with the carriage as a unit. This walkway is particularly provided to be used during the draping of the wire screen but is a very useful adjunct at all times because the paper web forming section of the machine may be inspected from it during operation. It is to be noted that the catwalk is always available for use and need never be dismantled neither during operation of the machine nor during the wire replacing process.

The breast roll of the machine is mounted from the table frame members 11 on pivoted remover arms 70 at the front and rear side of the machine, the remover arms serving to carry the breast roll 10 from its operative position shown in dotted lines in Figure 1 to the inoperative position shown in full lines. The purpose of this is to provide a suitable amount of slack to permit easy handling of the endless forming wire as it is moved laterally over the table section.

The detailed mechanism for accomplishing the withdrawal of the breast roll from operative to inoperative position, and vice versa, is shown in Figure 8, wherein a motor 71 is provided to drive a worm gear speed reducing mechanism which drives shaft 72. A pinion is fixed to the end of shaft 72 and meshes with a large spur gear 73 mounted on a cross shaft 74 which has a rotatable bearing in the ends of both table frame members 11 adjacent the breast end. The cross shaft 74 extends entirely across the breast end of the machine and has pinions 75 keyed to its outer ends, each meshing with a sector gear 76 fixed to its corresponding sector shaft 77. The sector shafts are mounted in aligned relation in bearings on the side frame members 11 and the remover arms 70 are rigidly mounted on sector shafts 77, so that as the sector gears are driven, the remover arms 70 at the front and rear of the table section are swung between the operative and inoperative positions shown in Figure 1, about the sector shafts as a center.

The couch roll is mounted in a cantilever type support best shown in Figures 2 and 12. The couch roll is fixed to a suitable shaft 80, which

has bearings for normally supporting the weight of the couch roll on pedestals 81 and 82. One end of the shaft 80 is extended toward the rear of the machine and has a bearing in a pedestal 83 and the extended end of the shaft may be provided with conventional driving means (not shown). The rearmost end of the shaft 80 may be loaded with a downward force by any suitable means, such as the threaded member 84 associated with pedestal 83 so that the load on the shaft is distributed about bearing 81 as a fulcrum point whereby the entire weight of the couch roll is supported by pedestals 81 and 83. In this circumstance, the pedestal supporting the front end of the shaft 80 carries no load and the removable block 85 therein may be displaced from between pedestal 82 and the foundation of the machine, thus forming a gap 86 in the front support through which the endless wire screen may be moved over the couch roll. It is evident, of course, that during normal use of the machine, the block 85 is inserted in the gap 86 and the weight of the couch roll is released from pedestal 83, so that the bearings 81 and 82 may carry the full weight of the couch roll and maintain it in properly aligned position at all times.

In the operation of this Fourdrinier machine, the wire normally passes over the breast roll, table section, and couch roll, as shown in the dot and dash line of Figure 1, to receive the wet pulp and transform it into a web of fibres, the lower run of wire passing around the usual take-up rolls. The rails 21 of the movable carriage, at this time, are swung into parallelism with connector bars 36 and 37 to remove them from over the lower run of the wire while it is stretched taut around the enclosed structure so that there will be no possibility of injuring the wire by its scraping the underside of the rails.

When a forming wire is to be replaced, the old wire is removed from the machine, the rails 21 are swung into alignment with beams 20, and the movable carriage support is driven into the front tending aisle. After the carriage has reached the position shown in Figure 3, the rails 21 are turned about hinges 22 until they are approximately parallel with the front connector bar 37 as shown in Figure 2 and a roll of wire screen is mounted in the bracket 90 supported from traveling crane 91.

The forming screen is supported in the bracket 90 in a well known manner on the two rods upon which the new endless wire screens are shipped from the factories, and is unwound sufficiently to permit a number of the rods 49 and 62 to be placed within the loop and carried by the bracket 90. The roll is then slowly unwound and draped about supporting rods 49 and 62 which are removed from the bracket and disposed at spaced points along the length of the carriage. A pair of rods 49 are fixed to the couch roll brackets to stretch the screen around the couch roll, and as the crane is drawn toward the breast end, the other rods 49 and 62 are placed in position to support the wire from the carriage. As the wire roll is drawn longitudinally over the carriage in the tending aisle, the lower run of the loop will fall into the recesses provided in the beams 20 and when the crane 91 reaches the breast end of its track 92, rods 49 are placed in the breast end brackets and the wire is fully draped.

It is to be understood that with the present wire handling construction, the wire may be draped starting at the breast end and working toward the couch end. The wire is fully unwound and draped in the tending aisle on a single unitary structure before it is applied and it may therefore be worked from either end to effect the draping process.

The wire screen being fully unwound and stretched around the supporting rods 49 and 62, it will assume the full line position shown in Figure 1. The rails 21 are then swung from the position shown in Figure 2 to closed position along beam 20 and the carriage is ready to be moved inwardly to carry the wire around the structure normally enclosed within the loop. The rails 21 in closed position overlay the wire, see Figure 5, the lower run of the wire loop being disposed between beam 20 and pivoted track 21, as shown by the dot and dash line. The carriage is then driven laterally. The rolls 23, carrying the table frame 11, are completely separated from the wire by this construction and the forming screen is carried as a unit with the movable carriage support over the structure it encloses, without any possible danger of marring its delicate structure.

When the innermost position of the carriage is reached, the various elements are arranged as shown in Figure 4. The endless wire forming screen is thus positioned in operative alignment with the operating parts it encloses. The poles 49 and 62 about which the screen is draped are carefully withdrawn from within the loop and the wire is deposited on the table section. The breast roll is then driven to operative position, the front couch supporting pedestal 82 is arranged for normal operation, and the screen is tensioned around the table section by the usual take up rolls which act upon the lower run of the wire. The deckel strap, flow box, and pick up felts are brought into proper position and the Fourdrinier is again ready to function.

The invention is readily adapted to a variable pitch type of Fourdrinier and in Figure 13 a suggested structure to accomplish this is shown. In this embodiment of the invention, the main frame 100 which has the usual breast roll 10, table rolls 12, suction boxes 13, guide roll 14, and couch roll 15 associated therewith, has a horizontal pivotal support which may be and preferably is located at the front and rear sides of the breast end of the machine. The frame may be swung about this pivotal bearing to vary the pitch of the forming table section mounted on the frame and the pivotal mounting includes bearings 101 mounted on the frame which bearings, ride upon a horizontal bearing shaft 102 that is carried by a pair of pedestals 103 disposed on each side of the machine at the breast end. When the machine is adjusted to its maximum pitch, the front side of the frame 100 is carried on the removable under support previously described, this carriage being modified only to the extent necessary to adapt beams 20 to the changed condition of the frame being slanted with respect to the level floor. The breast end supporting beam 20 of the removable carriage must therefore, be taller than the beam disposed adjacent the couch end, however, the beams are otherwise exactly like those used on a Fourdrinier having a fixed pitch and the whole carriage structure functions as above described to effect a replacement of the wire screen.

The rear side of frame 100 is maintained by any suitable stationary supports when adjusted to its maximum pitch and a plurality of fixed supports 17 may be provided. The frame is then supported front and rear on the carriage and fixed supports

respectively and bearing shaft 102 may be easily withdrawn from between bearings 101 and pedestals 103.

The front pedestal 103 is hingedly mounted at 104 on a suitable base and may be swung to the position shown in Figure 13 after the shaft 102 has been removed. The pedestal is normally maintained in an upright position to support shaft 102 but may be pivoted about hinge 104 to remove it from the path of brackets 47 and 48 mounted on the breast end of the carriage which carry the draped wire laterally into position over the breast roll with the unitary carriage structure.

If the pitch of the table section is to be reduced, the front pedestal 103 is placed in its normal position and locked by a suitable bolt 105 and shaft 102 is inserted between bearings 101 and pedestals 103. Suitable jacks are then operated to lift the frame 100 off the undercarriage beams 20 and fixed supports 17, the table pivoting about shaft 102 as a center until gage 106 located at the couch end indicates that the desired pitch has been attained. In the present disclosure two pairs of screw jacks 107 and 108 are shown, the four jacks being placed in pairs to cooperate with the frame 100 at spaced points along the front and rear sides. Each of the jacks includes a screw member which may be driven upward to engage a suitable bearing pad 109 fixed to the underside of frame 100 and the driven member is adapted to be spaced from the pad when in fully retracted position, a distance sufficient to permit connector bars 36 and 37 of the carriage to pass therebetween. The screw members are designed to be driven from shaft 28 against pad 109 or in any other well known manner to lift the frame 100 to vary the pitch and it is obvious that the jacks closer to the pivot must be adapted to lift through a shorter range than the jacks nearer the couch end due to their disposition at spaced points along the frame which is really a radius arm.

In the operation of the variable pitch machine, during a run at a reduced pitch, the frame is supported on the bearing shaft 102 and the two pairs of jacks 107 and 108 and the pitch may be further varied as above explained by lifting the frame on the jacks so that the frame will pivot about shaft 102.

When a wire screen is to be replaced, the frame is lowered onto beams 20 of the undercarriage and fixed supports 17 at the rear and shaft 102 may then be withdrawn from between bearings 101 and pedestals 103 so that the front pedestal may be removed to permit lateral movement of the undercarriage. After the screw members of the jacks have been fully retracted and the couch roll and breast roll arranged for a change of wire, the carriage is driven laterally into the tending aisle and the wire change is accomplished as above described.

It is to be understood that the usual driving, vacuum, shower pipe, shaker, etc., connections made to variable pitch machines are located along the rear of the machine and need not be disturbed for the purpose of replacing a screen.

On the smaller machines of the variable pitch type, the wire may be draped from the couch end toward the breast end as is the well known practice. On larger machines however, a considerable advantage may be obtained by starting to drape the new screen at the breast end and working toward the couch end. The wire on the larger machines becomes increasingly unwieldly as the size increases and as the wire must be stretched somewhat over the draping poles, any structure which renders the stretching more easily accomplished is particularly desirable. In the design of a variable pitch machine of large capacity the breast end is somewhat higher than the couch end and it is difficult for men to climb upon the machine to unwrap the wire and distribute it carefully over the draping poles.

The structure herein described permits the wire to be draped from either the couch or breast end and therefore is particularly suitable for large variable pitch machines. The wire may be unwound starting at the high breast end and the workmen will have only a very short portion of the wire to manipulate so that it may be easily draped. As the wire is worked toward the couch roll, the men work toward a lower level until a stage is reached where other workmen may more conveniently aid in the draping process. It is to be borne in mind also that the wire is very heavy and being draped over the poles in a downwardly slanting direction, the weight of the wire itself tends to stretch it thus lessening the effort required to spread it over the draping poles.

The structure herein described provides a single unitary carriage means upon which the forming wire is draped so that during lateral movement of the rigid carriage with respect to the table section, the wire is carried therewith as a unit. The brackets supporting the wire at the couch end and breast end and their respective poles, the standards 61 and poles 62, and poles 49 supported from the connector bars 36 and 37, are all fixedly mounted with respect to each other whereby when the carriage is moved, the whole wire supporting structure is carried with it, so that a rigid unitary wire replacing structure is provided which carries the whole wire screen over the enclosed structure.

During the forming wire replacing process above described, of course, the breast roll is carried by the table frame in inoperative position as shown in full lines in Figures 1 and 15 and the couch roll is carried by pedestals 81 and 83, the gap 86 being provided in the front pedestal 82. Inasmuch as the table section couch roll, suction boxes and table roll remain within their normal or operative positions at all times, their respective connections are permanent and being built into the rear side of the fixed or variable pitch machines need not be disturbed during the wire replacing operation.

It is readily apparent that the present invention may be used to remove a forming wire as well as carry a new one into place. Usually, however, the old wire will be cut and discarded, the movable support being required only to carry a new wire into place.

Many modifications of this machine may occur to those skilled in the art and therefore the embodiment herein described is not intended as a limitation, the invention being particularly pointed out in the following claims.

I claim:

1. A Fourdrinier machine having an endless wire forming screen and a structure normally enclosed within the wire loop, including a breast roll, table section, and couch roll, comprising supports for the structure and means for applying the screen around said structure, said means including a unitary and longitudinally and transversely rigid wire support over which the entire loop is draped, said first named supports being adapted to permit relative lateral movement between the wire loop and the structure whereby

said unitary support and the loop draped thereon may be moved laterally to enclose the structure within the loop.

2. A wire screen replacing apparatus for a Fourdrinier paper making machine including a table section having a breast roll, table rolls, and a couch roll associated therewith and an endless wire screen passing therearound comprising a fixed support on one side of the frame and a unitary and rigid movable support for the other side, said movable support serving to maintain the table during lateral movement of the support with respect to the table, means fixedly mounted on said movable support about which both the upper and lower runs of the endless wire screen are draped whereby when said movable support is moved laterally said screen is carried as a unit therewith.

3. A Fourdrinier machine having a table section including a breast roll, table rolls and a couch roll, and an endless wire screen passing therearound, comprising a fixed support on the rear side and a movable carriage support on the front side of said section, said last named support maintaining the front side of said section during normal operation of the machine and being arranged for withdrawal laterally of the section, said movable support including a beam having a recess therein, a track member pivotally mounted on said beam to swing in said recess, a roller carried on said section cooperating with said beam and said track, said track serving to support said section as said carriage is moved laterally of the machine, means on said movable support about which the wire loop may be draped, said track being adapted to be turned out of said recess when said carriage reaches fully extended position whereby the lower run of the wire loop draped about said means may fall into said recess, said track then being returned to its position within said recess so that the carriage may be returned to its normal position under said section while carrying the draped wire therewith.

4. A movable support for one side of the table section of a Fourdrinier machine comprising a rigid laterally movable structure having engagement with the underside of the table section at spaced points along the front edge thereof, said structure being adapted to cooperate with an endless wire screen to entirely support the same and to effect a replacement of said screen on the table section, means carried entirely by said structure upon which said screen is draped longitudinally along the front edge of the table section, said movable structure serving to carry the lower run of the draped screen into operative position as the wire screen is moved laterally over the table section.

5. A Fourdrinier paper-making machine comprising a frame supporting a table section, said section including a breast roll, table rolls, and suction boxes; a couch roll having a cantilever support associated with said section, an endless wire adapted to pass around said section and said couch roll; a laterally removable carriage forming a support for one side of said frame and a fixed support on the other side thereof; said fixed support and said cantilever support being on the same side of the Fourdrinier machine; means on said carriage over which the upper and lower runs of said wire may be draped, said means being fixedly mounted with respect to said carriage to support the draped wire so that the carriage and wire supporting means are movable as a unit inwardly to apply said wire over said section and couch roll.

6. A Fourdrinier machine having a table section including a breast roll, table rolls, suction heads, and a couch roll, and an endless wire forming screen to enclose the table section, comprising supports for the table section including a laterally movable support for the front side thereof, means about which the upper and lower runs of the wire loop are draped, said last named means being carried by said movable support to carry the wire laterally with respect to the table section to effect a replacement of the screen, bearing means carried by the table and cooperating with the breast roll, said bearing means including arms supported from the table section and movable with respect thereto, said arms forming the permanent and only support for the breast roll during operation of the machine and serving to transport the roll from operative to inoperative position whereby the overall length of the table section is reduced so that the draped forming wire may be moved laterally of the table section.

7. A Fourdrinier machine having a table section including a breast roll, table rolls, and a couch roll, and an endless wire forming screen enclosing the table section, comprising supports for the table section including a laterally movable structure cooperating with the front edge thereof, bearing means carried by the table section and cooperating with the breast roll, said bearing means including arms supported from the table section and movable with respect thereto, said arms forming the permanent and only support for the breast roll during operation of the machine and serving to transport it from operative to inoperative position, a front support for the couch roll adapted to permit lateral movement of the wire screen therethrough, means carried by said movable structure upon which both the upper and lower runs of an endless wire screen may be draped for movement laterally of the table section when the breast roll is moved to inoperative position, said means including brackets to support the draped wire for movement laterally over the peripheries of the breast and couch rolls, whereby the forming screen may be replaced.

8. A support for the table section of a Fourdrinier machine including a movable structure having a beam adapted to support a portion of the table section, said beam being provided with a recess in its upper surface, and a track member pivotally mounted on said beam to swing in said recess, means upon which said beam is mounted for movement, said beam being movable laterally with respect to the table section, said track member serving to support the table section during the lateral movement, said beam being adapted to carry the lower run of a forming wire under the table section to effect a replacement thereof.

9. A support for the table section of a Fourdrinier machine including a movable stucture having a beam adapted to support a portion of the table section, said beam being provided with a recess in its upper surface, and a track member pivotally mounted on said beam to swing in said recess, means upon which said beam is mounted for movement, said beam being movable laterally with respect to the table section, said track member serving to support the table section during the lateral movement, and a power driven member coacting with said beam to cause

the lateral movement thereof, said beam being adapted to carry the lower run of a forming wire under the table section to effect a replacement thereof.

10. A support for the table section of a Fourdrinier machine including a movable structure having a beam adapted to support a portion of the table section, said beam being provided with a recess in its upper surface, and a track member pivotally mounted on said beam to swing in said recess, means upon which said beam is mounted for movement, said beam being movable laterally with respect to the table section, said track member serving to support the table section during the lateral movement, a power driven member coacting with the underside of said beam to cause lateral movement thereof, and bearing means associated with said driven member and spaced closely adjacent thereto for engaging the underside of said beam to control the frictional engagement between the underside of said beam and said driven member, said beam being adapted to carry the lower run of a forming wire under the table section to effect a replacement thereof.

11. A variable pitch Fourdrinier machine having an endless wire forming screen and a structure normally enclosed within the wire loop, including a breast roll, table section, and couch roll, laterally movable means normally positioned beneath the structure for supporting the structure at one angle of pitch, said means being also operative for applying the screen around the structure and including a longitudinally and transversely rigid and unitary wire support over which the entire loop is draped, said structure supporting means being adapted to permit relative lateral movement between the wire loop and the structure whereby said unitary support and the loop draped thereon may be moved laterally to enclose the structure within the loop.

12. The combination with a machine of the Fourdrinier type having an endless forming screen, of means for supporting one side of said machine and a laterally movable support for the other side of said machine, said last named support carrying means upon which both the upper and lower runs of the screen are draped, said movable support and said last named means comprising a rigid unitary screen supporting structure.

13. The combination with a machine of the Fourdrinier type having an endless forming screen, of means for supporting one side of said machine and a laterally movable support for the other side of said machine, said last named support carrying means upon which both the upper and lower runs of the screen are draped, said movable support and said last named means comprising a rigid unitary screen supporting structure, driving means including a pinion for said laterally movable support, a rack on the underside of said movable support, said pinion cooperating with said rack, and a bearing roller closely spaced from said pinion and engaging the underside of said movable support to prevent too heavy an engagement between said rack and pinion as said support is driven laterally by said pinion.

14. A Fourdrinier machine having a table section including a breast roll, table rolls and a couch roll, and an endless wire screen passing therearound, comprising a fixed support on the rear side and a movable carriage support on the front side of said section, said last named support maintaining the front side of said section during normal operation of the machine and being movable laterally of the section, means cooperating with the underside of said support to drive it laterally, said movable support including a beam having a recess therein, a track member pivotally mounted on said beam to swing in said recess, a roller carried on said section cooperating with said beam and said track, said track serving to support said section as said carriage is moved laterally of the machine, a gear rack on the underside of said beam, said driving means including a driven pinion to engage said rack and bearing means closely spaced to said pinion and engaging the underside of said beam, means on said movable support about which the wire loop may be draped, said track being adapted to be turned out of said recess when said carriage reaches fully extended position whereby the lower run of the wire loop draped about said means may fall into said recess, said track then being returned to its position within said recess so that the carriage may be returned to its normal position under said section while carrying the draped wire therewith.

15. A Fourdrinier machine having a table section including a breast roll, table rolls and a couch roll, and an endless wire screen passing therearound, comprising a fixed support on the rear side and a movable carriage support on the front side of said section, said last named support maintaining the front side of said section during normal operation of the machine and being movable laterally of the section, means cooperating with the underside of said support to drive it laterally, said movable support including a beam having a recess therein, a track member pivotally mounted on said beam to swing in said recess, a roller carried on said section cooperating with said beam and said track, said track serving to support said section as said carriage is moved laterally of the machine, a gear rack on the underside of said beam, said driving means including a driven pinion to engage said rack and bearing means closely spaced to said pinion and engaging the underside of said beam, means on said movable support about which the wire loop may be draped, said last named means and said movable support comprising a rigid and unitary screen supporting structure, said track being adapted to be turned out of said recess when said carriage reaches fully extended position whereby the lower run of the wire loop draped about said means may fall into said recess, said track then being returned to its position within said recess so that the carriage may be returned to its normal position under said section while carrying the draped wire therewith.

16. A support for the table section of a Fourdrinier machine including a movable structure having a beam adapted to support a portion of the table section, said beam being provided with a recess in its upper surface, and a track member pivotally mounted on said beam to swing in said recess, means upon which said beam is mounted for movement, said beam being movable laterally with respect to the table section, said track member serving to support the table section during the lateral movement, and means carried by said movable structure upon which the entire screen is draped, said last named means and said movable structure forming a rigid and unitary screen support.

17. A support for the table section of a Fourdrinier machine including a movable structure

having a beam adapted to support a portion of the table section, said beam being provided with a recess in its upper surface and a track member pivotally mounted on said beam to swing in said recess, means upon which said beam is mounted for movement, said beam being movable laterally with respect to the table section, said track member serving to support the table section during the lateral movement, and a power driven member coacting with said beam to cause the lateral movement thereof, and means carried by said movable structure upon which the entire screen is draped, said last named means and said movable structure forming a rigid and unitary screen support.

18. A support for the table section of a Fourdrinier machine including a movable structure having a beam adapted to support a portion of the table section, said beam being provided with a recess in its upper surface and a track member pivotally mounted on said beam to swing in said recess, means upon which said beam is mounted for movement, said beam being movable laterally with respect to the table section, said track member serving to support the table section during the lateral movement, a power driven member coacting with the underside of said beam to cause lateral movement thereof, and bearing means associated with said driven member and spaced closely adjacent thereto for engaging the underside of said beam to control the frictional engagement between the underside of said beam and said driven member, and means carried by said movable structure upon which the entire screen is draped, said last named means and said movable structure forming a rigid and unitary screen support.

19. A support for the table section of a Fourdrinier machine including a movable structure having a beam adapted to support a portion of the table section, said beam being provided with a recess in its upper surface and a track member pivotally mounted on said beam to swing in said recess, means upon which said beam is mounted for movement, said beam being movable laterally with respect to the table section, said table section having a direct bearing on said beam and said track to support said section during lateral movement of said structure, said track member being adapted to be swung out of said recess when said structure is in its fully extended lateral position whereby the lower run of a forming wire may be placed in said recess, means on said structure to support the upper run of said wire, said last named means and said structure comprising a rigid wire supporting structure to carry the wire during the wire replacement process.

20. A variable pitch Fourdrinier machine having an endless wire forming screen and a structure normally enclosed within the wire loop, including a breast roll, table section, and a couch roll, a pivotal support at one end of the structure, and additional laterally movable means normally positioned beneath the structure for supporting the structure at one angle of pitch, said means being also operative for applying a screen around said structure, said means including a longitudinally and transversely rigid unitary wire support over which the entire loop is draped, said pivotal support having a removable pedestal between the pivot point and the foundation of the machine, said pedestal being removable when the structure is supported on said laterally movable means, whereby said screen may be moved laterally with said means when said pedestal is removed to enclose the structure within the loop.

21. A Fourdrinier machine having a structure enclosed within an endless wire loop including a breast roll, table rolls, and means upon which said rolls and suction heads are mounted, said means including a frame extending longitudinally of the machine having a fixed support on one side, and a unitary laterally movable rigid support engaging the other side at spaced points, means carried by said movable support for carrying both the upper and lower runs of said endless wire loop whereby said loop may be replaced by moving said wire laterally with respect to said structure.

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