

Oct. 4, 1932.

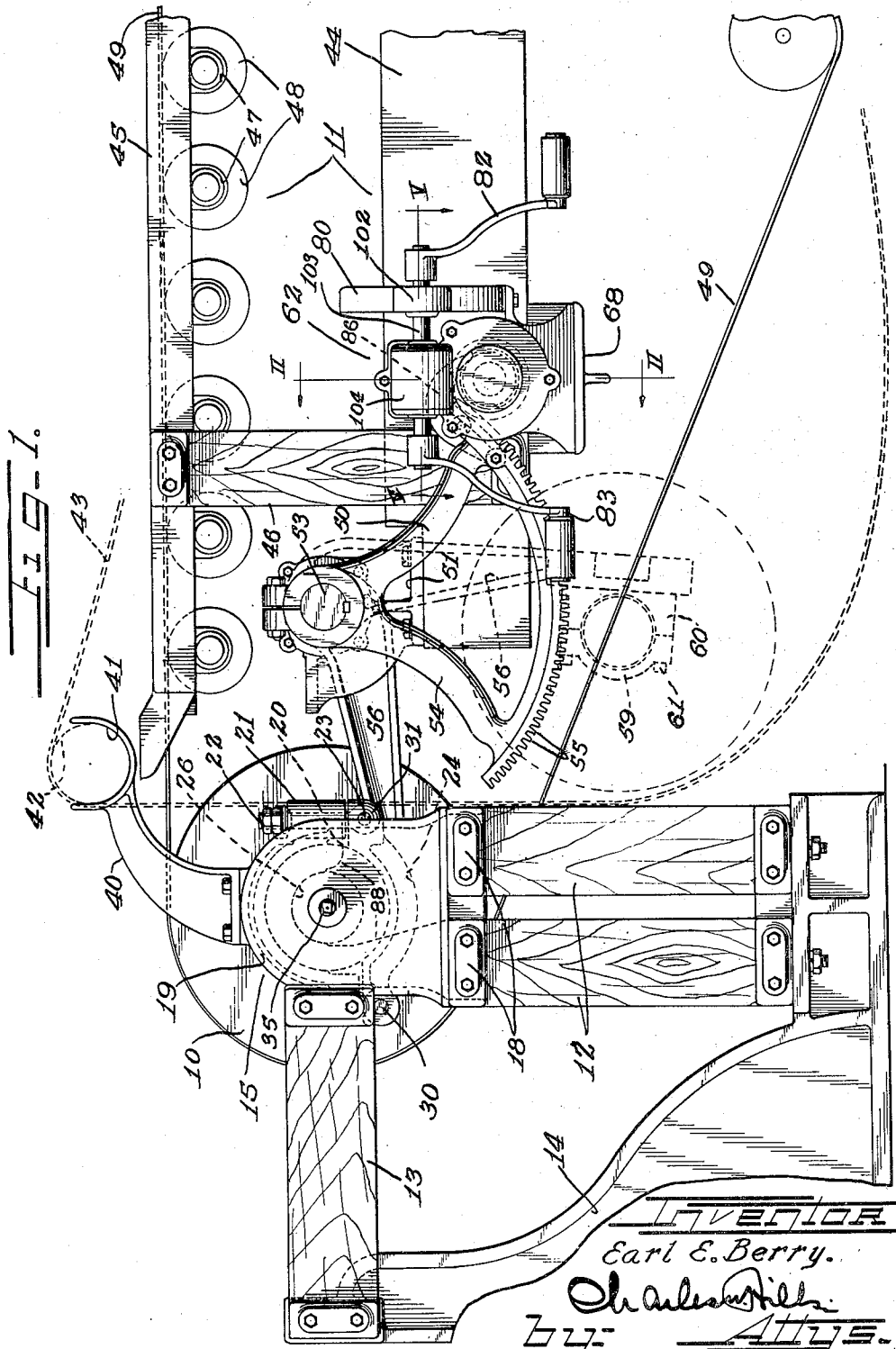
E. E. BERRY

1,880,685

PAPER MACHINE

Filed Oct. 20, 1930

3 Sheets-Sheet 1



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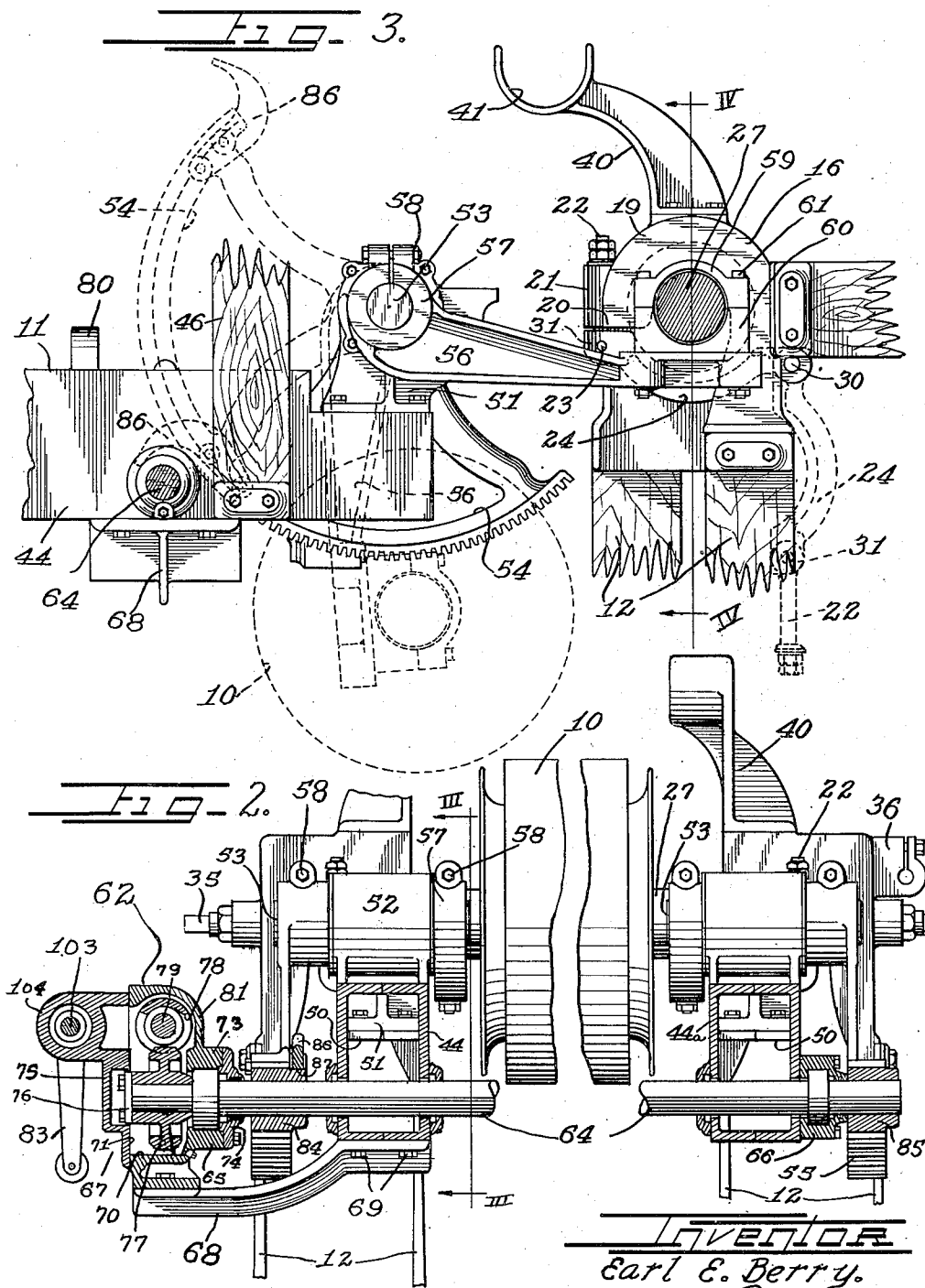
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3 Sheets-Sheet 2



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Oct. 4, 1932.

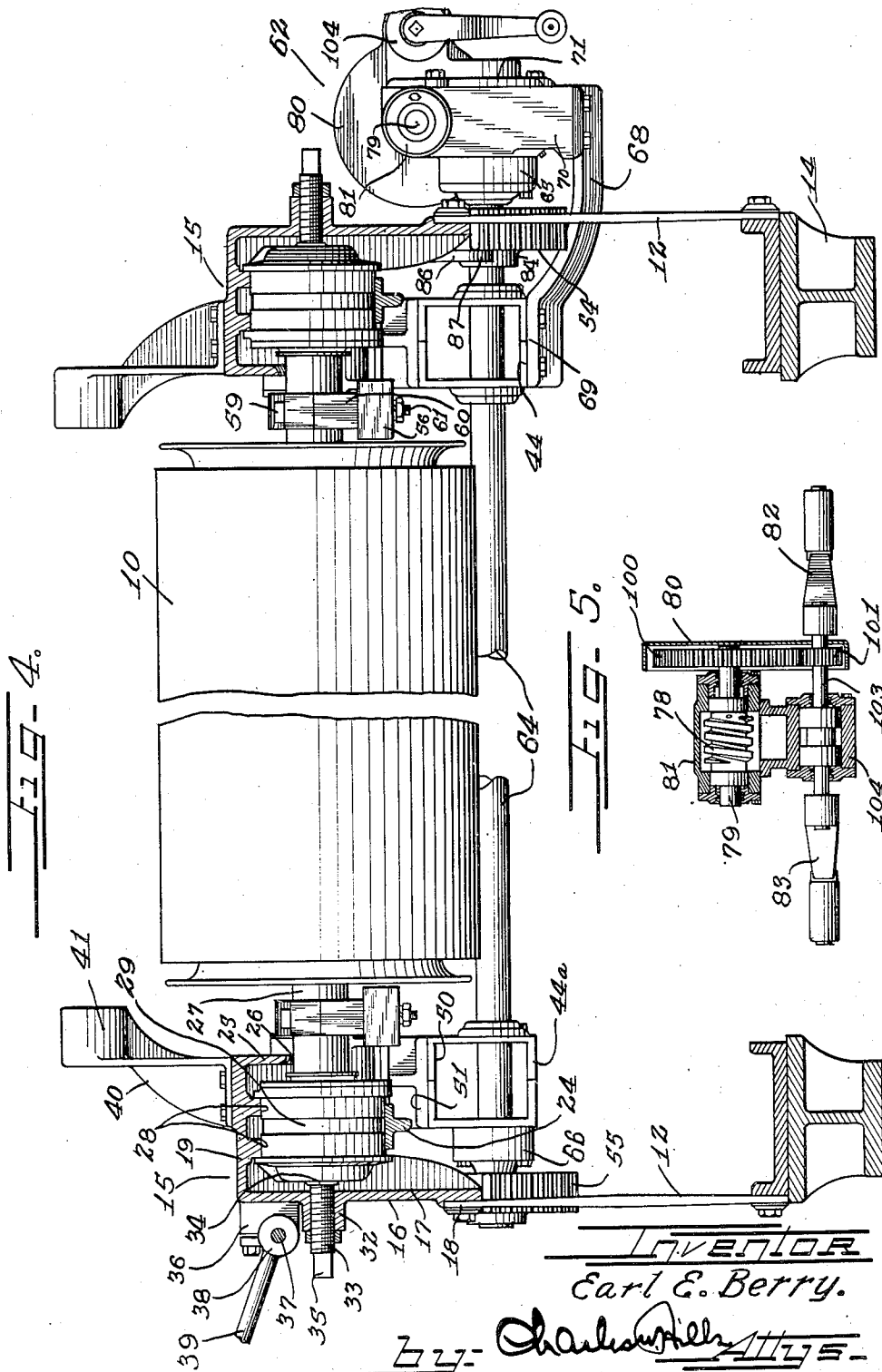
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UNITED STATES PATENT OFFICE

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PAPER MACHINE

Application filed October 20, 1930. Serial No. 489,787.

This invention relates to a paper machine and more particularly to a mounting for the breast roll of a Fourdrinier machine.

In my previously issued Patent No. 1,599,402, dated September 14, 1926, there is described and claimed a breast roll transfer mechanism for Fourdrinier paper machines by which the breast roll is transferred over removable bridging members to the table structure for removal therewith during the changing of a wire. In the operation of the mechanism therein described, it is necessary to remove the first few tube rolls to provide room for the transfer onto the table structure of the breast roll.

It is an object of the present invention to eliminate the necessity for handling any of the tube rolls during the transfer of the breast roll and to provide a simpler and more easily operable mechanism for effecting such transfer.

It is a further object of this invention to simplify the changing of a wire on a Fourdrinier machine by providing a mechanism, either hand or power operated, for transferring the breast roll into a suspended position from the table structure out of the way of the table rolls and sufficiently closer to the couch roll to provide the necessary slack in the wire for the removal of the table structure during the changing of a wire.

It is a further object of this invention to provide a breast roll transfer mechanism that is always in place ready for operation and that includes means for easily and accurately aligning the breast roll upon its return to its normal position.

It is a further important object of this invention to provide a breast roll mounting which cooperates with the transfer mechanism in permitting the removal of the breast roll with a minimum expenditure of time and labor and in permitting independent shaking of the breast roll.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is il-

lustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a side elevational view of a breast roll mounting and a part of the table structure associated therewith, illustrating a transfer mechanism and breast roll mounting embodying my invention and showing the operation in dotted lines.

Figure 2 is a broken sectional view taken substantially on line II—II of Figure 1 with parts in elevation and parts removed.

Figure 3 is a sectional view taken substantially on line III—III of Figure 2, with parts in dotted lines to show the operation of the transfer mechanism.

Figure 4 is a broken sectional view taken substantially on line IV—IV of Figure 3 with parts in elevation.

Figure 5 is a sectional view taken substantially on line V—V of Figure 1.

The reference numeral 10 indicates a breast roll separately mounted from a table structure 11 upon spring supporting members, including the vertical spring members 12 and the horizontal spring members 13. Said spring members 12 and 13 are suitably secured to standards 14 at their lower and outer ends, respectively, and at their adjacent upper and inner ends are secured to bearing boxes, indicated generally by the reference numeral 15. The spring members 12 and 13 are preferably formed of some hard wood, since wooden spring members have been found to be even more satisfactory than metal members.

The bearing boxes 15 for supporting the front and rear ends of the breast roll 10 are substantially identical in structure so that only one of them need be described. Each bearing box 15 (Figure 4) comprises a main, or outer casting 16 having an outer wall 17 to the bottom of which are bolted or otherwise secured the outer vertical spring members 12, as at 18. Said casting 16 has an arcuate-shaped top wall 19 embracing slightly more than the arc of a semi-cylinder and terminating on the table structure side thereof as at 20 (Figures 1 and 3). A split eye 21 is integrally formed on said side of the top wall 19 for receiving a swinging bolt 22 pivotally

connected at its lower end by a pin 23 to a lower, inside casting 24 forming the complementary portion of the bearing box 15. The casting 16 is further provided with an integral inside wall 25 that is cut away, as at 26, to provide an opening toward the table structure for the passage of the shaft 27 on which the breast roll 10 is mounted.

On the inside of said upper wall 19 are formed a plurality of spaced ribs 28 having inner segmental cylindrical faces for contact with a bearing housing 29 in which an end of a shaft 27 is journaled. The lower casting 24 of the bearing box 15 is hinged at its end toward the flow box, as at 30, to the main stationary casting 16 and is provided at its end toward the table structure with a pair of apertured spaced lugs 31 between which extends the pin 23 on which the bolt 22 is pivotally mounted. When in normal position, the casting 24 forms the vertical support for the breast roll 10. In order to provide for the exact alignment of the ends of the breast roll, the wall 17 of the casting 16 is provided with an internally threaded boss 32 for receiving a threaded bolt 33, which at its inner end is centered in the end of the journal box 29, as at 34. The outer end of said bolt 33 is squared, as at 35, for reception in a wrench socket, or the like, to facilitate its manipulation.

The rear of said bearing boxes 15 (Figures 2 and 4) is provided at its upper outer corner with a pair of spaced split ears 36 for receiving a pin 37 that passes through an eye 38 provided on one end of a link 39 forming a part of the shaking mechanism (not shown). By means of such mechanism and the connections described, the breast roll 10 may be independently vibrated upon its supporting spring members 12 and 13 in a manner well known to the art.

An upstanding supporting bracket 40 is secured to the top wall 19 of each of the bearing boxes 15 and is provided with a semi-cylindrical socket or rest 41 at its upper end for receiving an end of a wooden spindle 42 of the type used in changing a wire to support a loop of the new wire, indicated in dotted lines at 43 in Figure 1.

The table structure 11 includes front and rear side beams 44 and 44a, respectively, of double channel construction, and a pair of table rails 45 supported from said side beams 44 and 44a by means of spring members 46. Said table rails 45 provide bearings 47 in which are journaled the ends of the table rolls 48. A forming wire 49 is trained in the usual manner around the breast roll 10 and over said table roll 48.

The ends of the side beams 44 and 44a are stepped, as at 50, to receive the bases of supporting brackets 51. Each of said supporting brackets 51 provides an integrally formed journal housing 52 in which

is mounted a stub shaft 53 that extends beyond the journal box 52 at both ends thereof. On the outer end of each of said stub shafts 53 is keyed a segmental gear 54 having gear or ratchet teeth 55. To the inner end of each of said stub shafts 53 is secured a breast roll transfer arm 56, the hub 57 of said arm being split and provided with a clamping bolt 58 for clamping engagement with the end of said stub shaft 53. The other end of each of said arms 56 is provided with a bearing yoke 59 secured to a lower yoke member 60 integrally formed with said arm 56 by means of bolts 61. Said yoke members 59 and 60 provide together a cylindrical opening slightly larger than the diameter of the breast roll shaft 27 for receiving said shaft without interfering with its freedom of rotation when the breast roll is in normal position. It is thus apparent that when the lower castings 24 of the bearing boxes 15 are opened up, the breast roll is supported by the transfer arms 56 from the stub shafts 53.

The mechanism, indicated as a whole by the reference numeral 62, for effecting rotation of the stub shafts 53 and, consequently, swinging movement of the breast roll 10, comprises a transverse shaft 64 extending through aligned apertures in the side beams 44 and 44a. Said shaft 64 is rotatably mounted in bearing housings 65 and 66 supported from the front and rear side beams 44 and 44a, respectively. The front housing 65 (Figure 2) forms a part of a larger housing 67 supported by a bracket 68 secured, as at 69, to the underside of the front side beam 44. Said housing 67 comprises a main casting 70 and a front cover plate 71 secured thereto. An apertured boss 73 formed integrally with said main casting 70 on the back side thereof together with an apertured cover plate 74 constitutes the bearing housing 65 for the shaft 64 previously referred to. The front cover plate 71 is provided with an outwardly dished portion 75 into which extends a plate 76 securing a worm gear 77 to the end of the shaft 64. Said worm gear 77 meshes with a worm 78 which is carried on a shaft 79. Said shaft 79 is mounted for rotation in bearings formed in the end walls of a housing 81 and extends through one of said end walls into a casing 80. Said extension of the shaft 79 carries thereon a spur gear 100 keyed thereto and encased within the housing 80. A smaller gear 101 mounted within an extension 102 of said housing 80 meshes with said gear 100. Said gear 101 is mounted on a shaft 103 that extends each way beyond said housing extension 102 and is journaled in a bearing support 104 secured to the worm housing 81. At each of its extended ends, said shaft 103 is provided with handles 82 and 83, respectively, secured thereto. Rotation of either of the handles

82 or 83 acts through the gears 101 and 100 to effect revolution of the worm 78 and the meshing worm gear 77 on the transverse shaft 64.

Said shaft 64 (Figure 2) carries at its respective front and rear ends, outside of the side beams 44 and 44a, gears 84 and 85, which are suitably splined or otherwise secured to said shaft 64. Each of said gears 84 and 85 mesh with the ratchet teeth 55 of the corresponding segmental gear 54. Consequently, rotation of the worm 78 by means of the handles 82 or 83 operates through the gears 84 and 85 and the segmental gears 54 to revolve the stub shafts 53, thereby swinging the transfer arms 56 and the breast roll 10 secured thereto through an arc of a circle.

The segmental gear 54 on the front side of the machine is provided with a hook-shaped stop member 86 that engages with the extended hub of the gear 84 as at 87 (Figures 2 and 4). When the stop member 86 is thus engaged with the hub of the gear 84, the journal boxes 29 on the ends of the breast roll shaft 27 are substantially in their normal position within the bearing boxes 15, but, as previously explained, the centering bolts 33 serve to more exactly align said journal boxes 29.

The operation of the transfer mechanism is substantially as follows:

When it becomes necessary to change the forming wire on the machine, the old wire is first removed in the usual manner and, in the case of a removable table structure, the table structure 11 is laterally removed so as to lie outside of the path of the wire. The centering bolts 35 are loosened to release the journals 29 of the breast roll 10. The nuts on the ends of the swinging bolts 22 are then loosened in order that the bolts may be swung out of the lugs 21 to permit the lower castings 24 of the bearing boxes 15 to swing downwardly, as indicated in dotted lines in Figure 3. The handles 82 and 83, or either of them, are now operated to revolve the worm 78, which in turn causes a revolution of the worm gear 77 meshing therewith and a rotation of the transverse shaft 64. Such rotation of the shaft 64 acting through the meshing gears 84 and 85 and the segmental gears 54 serves to rotate the stub shafts 53 and to swing said transfer arms 56 downwardly. Movement of the transfer arms 56 causes the breast roll 10 to swing bodily about the stub shafts 53 as an axis, downwardly into the dotted line position indicated in Figures 1 and 3.

It should be noted that the main outer castings 16 of the bearing boxes 15 are cut away as at 26 to provide openings 88 (Figure 1) in said bearing boxes through which the journal boxes 29 may pass clear of said bearing boxes. The transfer arms 56 clear

the extended ends of the side beams 44 on the inside and said journal boxes 29 clear the ends of said side beams 44 and 44a as will be clearly indicated by an inspection of Figure 1. It will be further noted (Figure 4) that there is no spring member secured to the inside of the standards 14 corresponding to the vertical spring member 12 that would lie in the path of the breast roll ends during its swinging movement.

When the breast roll is in its extreme pendant position, supported at its ends in the yokes 59 and 60 on the ends of the transfer arms 56, the breast roll is sufficiently nearer to the couch roll (not shown) to provide considerable slack in the loop of the new wire 43 that is suspended around the spindle 42 supported at its ends in the sockets 41, all as indicated in dotted lines in Figure 1. This slack in the loop of the new wire 43 provides sufficient clearance at the breast roll end of the table structures to permit the table structure to be moved again into position within the loop of the new wire. After the table structure is again in its normal position, the handles 82 and 83 are again operated in the reverse direction to swing the breast roll up into its normal position, thereby stretching the new wire 43 into its normal position also. The lower castings 24 are again swung back into place and bolted to the main castings 16 and the centering bolts 35 are turned in to engage and align the breast roll journals 29. When so aligned, the breast roll shaft 27 is free to rotate with a slight clearance within the bearing yokes 59 and 60 of the transfer arms 56.

It should be particularly noted that in the movement of the breast roll as described, there is no interference with any of the table rolls 48 so that there is no necessity for removing any of the table rolls nearest the breast roll end of the table structure. The time and labor involved in the stringing of a new wire are thus reduced to a minimum. It will be understood, of course, that in place of the hand operated transfer mechanism, power means may be supplied for operating such mechanism.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. In a Fourdrinier paper machine, a breast roll, means releasably supporting the ends thereof, pivotal means independent of said first means for engaging said breast roll ends and means for actuating said pivotal means to swing said breast roll out of its normal position when its supporting means are released.

2. In a Fourdrinier paper machine, a breast roll, supporting means therefor including split bearing clamps, a separately mounted table structure, means pivotally mounted on said table structure engaging said breast roll and means for actuating said pivotally mounted means for swinging said breast roll into and out of normal position. 70
3. In a Fourdrinier paper machine, a breast roll, individual supporting means therefor, a table structure and means independent of said supporting means including pivotally mounted arms on said table structure engaging said breast roll for swinging said breast roll into and out of normal position. 75
4. In a Fourdrinier paper machine, a breast roll independent supports therefor, separately mounted means including pivoted arms engaging said breast roll and means for actuating said pivoted arms to swing said breast roll into and out of normal position. 80
5. In a Fourdrinier paper machine, a breast roll, spring supporting members, hinged clamping members carried by said spring members in which said breast roll is journaled, a table structure, rotatable shafts carried on said table structure, arms secured to said shafts engaging said breast roll and mechanism for rotating said shafts to swing said breast roll into and out of position in said hinged clamping members. 85
6. In a Fourdrinier paper machine, a breast roll, means releasably supporting said breast roll in normal position, a table structure, arms pivotally mounted on said table structure engaging the ends of said breast roll and means including segmental gears for actuating said arms to swing said breast roll through a limited arc when said supporting means are released. 90
7. In a Fourdrinier paper machine, a breast roll, spring supporting members therefor, bearing boxes in which the ends of said breast roll are journaled, said bearing boxes including a stationary casting secured to said spring members and a hinged casting releasably secured to said stationary casting and transfer mechanism including pivotally mounted transfer arms engaging said breast roll for swinging said roll out of said bearing boxes when the hinged castings are released. 95
8. In a device of the class described, a roll having extended journals, journal boxes therefor secured thereto and housings for said journal boxes each comprising a stationary casting and a hinged casting releasably secured thereto, said stationary castings being cut away to permit said journal boxes to pass out of said housings when said hinged castings are released and swung into open position, separately mounted roll transfer means including pivotally mounted arms in engagement with said roll for swinging said roll out of said housings and means associated with said stationary castings for properly aligning said journal boxes when in normal position. 100
9. In a device of the class described, a roll having extended journals, journal boxes therefor secured thereto and housings for said journal boxes each comprising a stationary casting and a hinged casting releasably secured thereto, said stationary castings being cut away to permit said journal boxes to pass out of said housings when said hinged castings are released and swung into open position. 105
10. In a device of the class described, a roll having extended journals, journal boxes therefor secured thereto and housings for said journal boxes each comprising a stationary casting and a hinged casting releasably secured thereto, said stationary castings being cut away to permit said journal boxes to pass out of said housings when said hinged castings are released and swung into open position and centering bolts associated with said stationary castings for properly aligning said journal boxes when in normal position. 110
11. In a device of the class described, a roll having extended journals, journal boxes therefor secured thereto and housings for said journal boxes each comprising a stationary casting and a hinged casting releasably secured thereto, said stationary castings being cut away to permit said journal boxes to pass out of said housings when said hinged castings are released and swung into open position and separately mounted roll transfer means including pivotally mounted arms in engagement with said roll for swinging said roll out of said housings. 115
12. In a device of the class described, a roll having extended journals, journal boxes therefor secured thereto and housings for said journal boxes each comprising a stationary casting and a hinged casting releasably secured thereto, said stationary castings being cut away to permit said journal boxes to pass out of said housings when said hinged castings are released and swung into open position, separately mounted roll transfer means including pivotally mounted arms in engagement with said roll for swinging said roll out of said housings and means associated with said stationary castings for properly aligning said journal boxes when in normal position. 120
13. A bearing housing comprising a stationary casting having an arcuate top wall and side walls integral therewith, a lower arcuate casting hinged at one end to said stationary casting and means for releasably securing said other end of said lower casting to said stationary casting, the inner walls of said castings when in normal position being complementarily formed to provide a cylindrical surface. 125
14. A bearing housing comprising a stationary casting having an arcuate top wall and side walls integral therewith, a lower arcuate casting hinged at one end to said stationary casting and means for releasably se- 130

curing said other end of said lower casting to said stationary casting, the inner walls of said castings when in normal position being complementarily formed to provide a cylindrical surface, side walls of said stationary casting being cut away to provide a passage out of said housing for the bearings when the hinged casting is released.

15. In a paper machine including a breast roll and a table structure, a breast roll mounting releasably supporting said roll and transfer mechanism including a pair of segmental gears carried by the table structure for swinging said breast roll from its mounting into supported relation from said table structure.

16. In a Fourdrinier paper machine, including a breast roll and table structure, supports releasably sustaining said breast roll, transfer arms independent of said supports pivotally supported on said table structure and having yokes on the free ends thereof enclosing the breast roll shaft and means for actuating said arms to swing said breast from its normal position to beneath said table structure.

17. In a Fourdrinier paper machine including a breast roll, table structure and table rolls forming a part thereof, independent mountings for releasably sustaining said breast roll, transfer arms pivotally mounted on said table structure below certain of said table rolls and engaging said breast roll and means for actuating said transfer arms to swing said breast roll clear of said mountings into supported relation from said table structure, the arc of travel of said breast roll being clear of any of said table rolls in their normal position.

18. In a Fourdrinier paper machine, a breast roll, independent mountings for releasably supporting the extended ends thereof, a table structure including table rolls and side beams supporting said table rolls, members pivotally mounted on said side beams having oversize openings in the free ends thereof receiving the ends of said breast roll and means for actuating said members for swinging said breast roll without displacement of any of said table rolls into supported relation from said side beams.

19. In a Fourdrinier paper machine, a breast roll having extended ends, a journal box carried as a unit on each of said ends, spring supporting members, hinged bearing boxes mounted on said supporting members and releasably enclosing said journal boxes, a table structure, transfer arms pivotally supported on said table structure and enclosing at their free ends the extended ends of said breast roll and a mechanism including gear trains for actuating said transfer arms to swing said breast roll out of said bearing boxes into supported position from said table structure.

20. In a Fourdrinier paper machine, a breast roll, independent mountings therefor releasably sustaining said breast roll, a table structure, transfer arms permanently associated with said breast roll and table structure and pivotally mounted upon the latter and means for actuating said arms to swing said breast roll from its mountings into supported relation on said arms from said table structure.

21. In a Fourdrinier paper machine, a breast roll, independent mountings therefor, hinged housings secured to said mountings and releasably enclosing the ends of said breast roll, a table structure including side beams and table rolls carried thereupon, stub shafts rotatably supported on said side beams, transfer arms secured to said stub shafts and loosely engaging said breast roll ends and means for rotating said stub shafts to swing said breast roll upon said transfer arms out of said housing into supported relation from said side beams.

22. In a Fourdrinier paper machine, a breast roll, journal boxes carried by extended ends of said breast roll, independent mountings therefor, hinged housings secured to said mountings and releasably enclosing journal boxes on the ends of said breast roll, a table structure including side beams and table rolls carried thereupon, stub shafts rotatably supported on said side beams, transfer arms secured to said stub shafts and loosely engaging said breast roll ends and means for rotating said stub shafts to swing said breast roll upon said transfer arms out of said housing into supported relation from said side beams.

23. In a Fourdrinier paper machine, a breast roll, independent mountings therefor, hinged housings secured to said mountings and releasably enclosing the ends of said breast roll, a table structure including side beams and table rolls carried thereupon, stub shafts rotatably supported on said side beams, transfer arms secured to said stub shafts and loosely engaging said breast roll ends and means including segmental gears also secured to said stub shafts for rotating said stub shafts to swing said breast roll upon said transfer arms out of said housing into supported relation from said side beams.

24. In a Fourdrinier paper machine, a breast roll, independent mountings therefor, hinged housings secured to said mountings and releasably enclosing the ends of said breast roll, a table structure including side beams and table rolls carried thereupon, stub shafts rotatably supported on said side beams, transfer arms secured to said stub shafts inside of said side beams and below certain of said first few table rolls and loosely engaging said breast roll ends and means for rotating said stub shafts to swing said breast roll upon said transfer arms out of said housing into supported relation from said side

beams, the path of said breast roll in its movement being clear of said table rolls or other part of said table structure.

25. In a Fourdrinier paper machine, a breast roll, individual supporting means releasably enclosing the ends thereof for rotation, a table structure, arms pivotally mounted on said table structure enclosing said breast roll ends without restricting their freedom of rotation and means for swinging said arms to move said breast roll from its normal position through an arc clear of said table structure into supported position from said table structure upon said arms.

26. In a Fourdrinier paper machine including a breast roll, a table structure and a forming wire trained therearound, breast roll transfer mechanism carried by said table structure comprising arms pivotally mounted on said table structure and enclosing at their free ends the ends of said breast roll and means including a pair of segmental gears for swinging said arms to move said breast roll into supported position from said table structure to effect a slack in said wire.

27. In a Fourdrinier paper machine including a breast roll, a table structure and a forming wire trained therearound, breast roll transfer mechanism carried by said table structure comprising arms pivotally mounted on said table structure and enclosing at their free ends the ends of said breast roll without restricting rotation thereof and means for swinging said arms to move said breast roll into supported position from said table structure therebeneath to effect a slack in said wire, the path of movement of said breast roll being clear of any part of said table structure as operatively positioned.

28. In a Fourdrinier paper machine including a breast roll, a table structure and a forming wire trained therearound, breast roll transfer mechanism carried by said table structure comprising arms pivotally mounted on said table structure and normally at all times enclosing at their free ends the ends of said breast roll and means for swinging said arms to move said breast roll into supported position from said table structure to effect a slack in said wire, the path of movement of said breast roll being clear of any part of said table structure as operatively positioned.

In testimony whereof, I have hereunto subscribed my name at Beloit, Rock County, Wisconsin.

EARL E. BERRY.