

July 25, 1972

K. W. BASSETT ET AL

3,679,524

SPLICING WEBS

Filed July 18, 1969

3 Sheets-Sheet 1

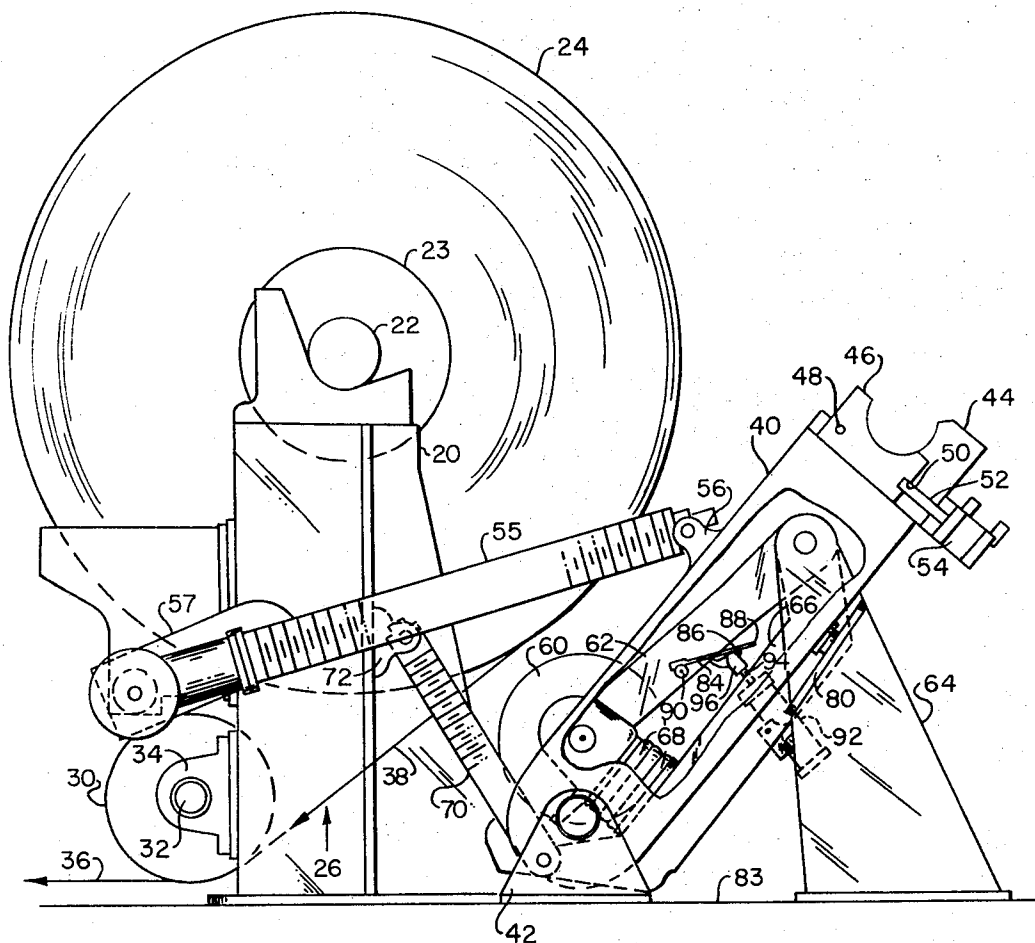


FIG. 1

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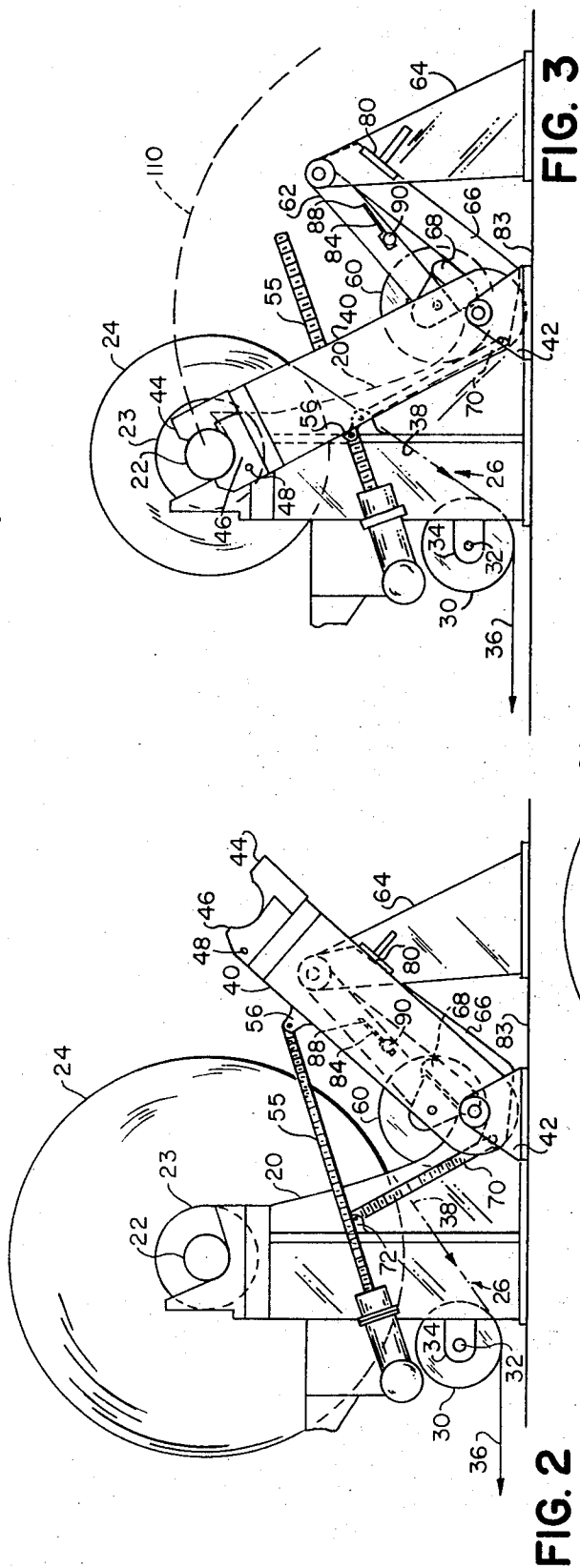
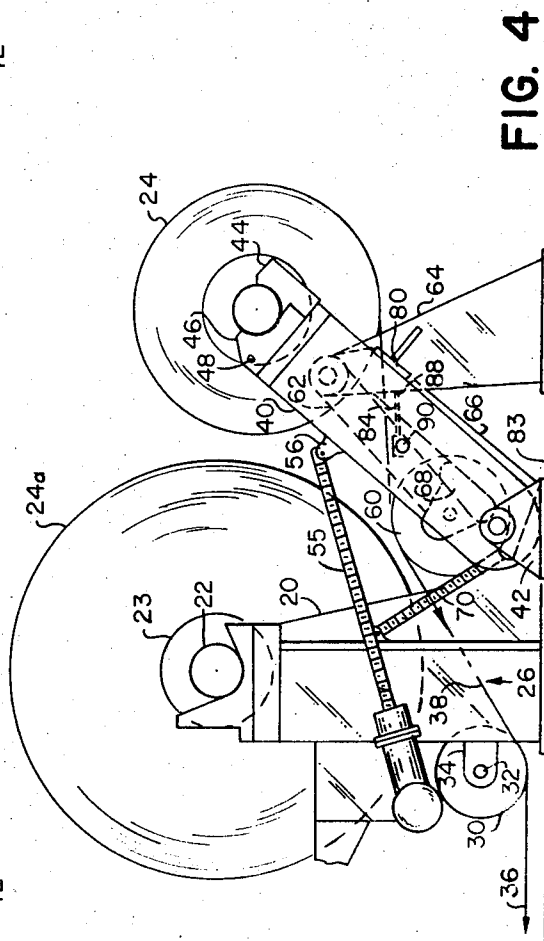
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FIG. 5

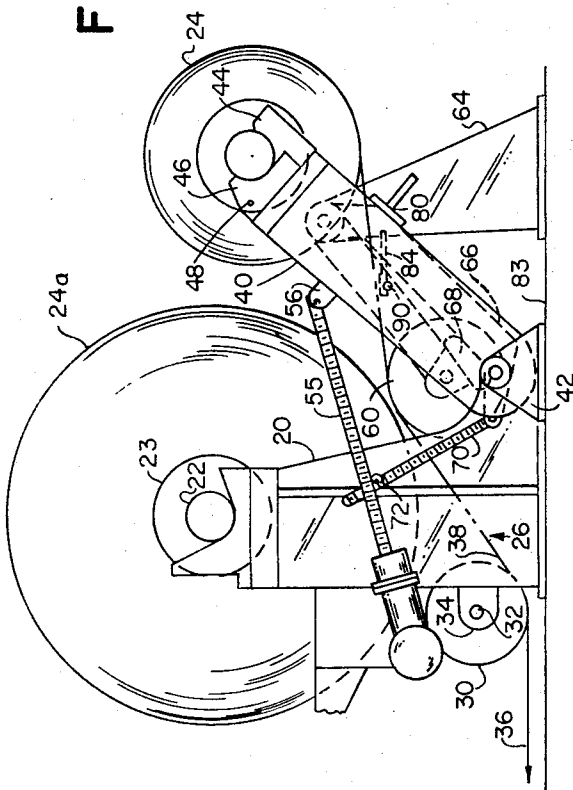
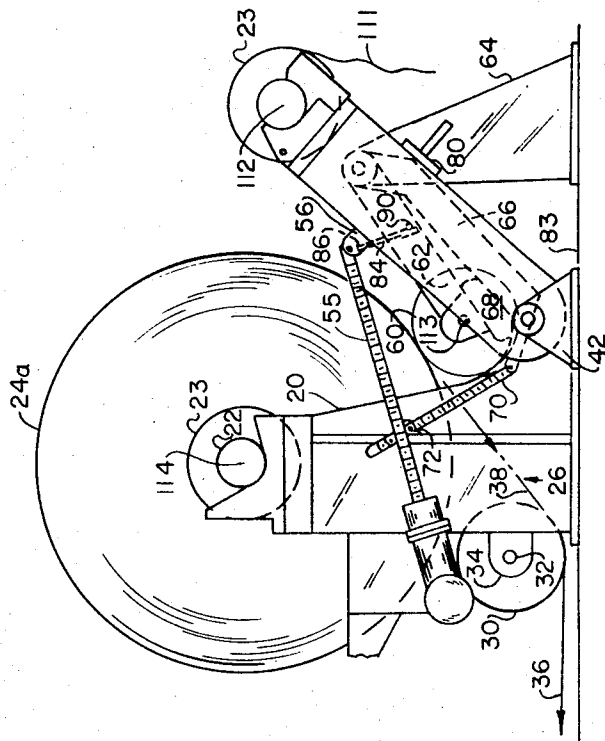


FIG. 6



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SPLICING WEBS

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Filed July 18, 1969, Ser. No. 842,894

Int. Cl. B65h 19/18, 69/06

U.S. Cl. 156—502

9 Claims

ABSTRACT OF THE DISCLOSURE

Splicer for large rolls of sheet material providing generally horizontal sheet run, with stationary primary stands, secondary arms pivoted upstream of the primary stands for movement of the secondary roll axis through an arc above the secondary arm pivots, and a splicing member mounted between the primary and secondary roll axes, so that the sheet run just upstream of the lead-out roll is more nearly horizontal after transfer than before.

This invention relates to splicing large rolls of sheet material.

Objects of the invention, in its respective embodiments, are to provide a splicer that can be conveniently installed on an existing foundation (e.g., without requiring overhead or underground rigging); operates reliably (e.g., with the sheet material not interfering with the splicing mechanism); is easily handled (e.g., with easy threading, good access to the expired roll after a splice, and good access for hand splicing when required); provides improved sheet handling characteristics (e.g., requiring a minimum degree of sheet wrap around the lead-out roll); and is economical to fabricate and install.

The invention features a splicer providing a generally horizontal sheet run, with stationary primary stands, secondary arms pivoted upstream of the primary stands for movement of the secondary roll axis through an arc above the secondary arm pivots, and a splicing member mounted intermediate the primary and secondary roll axes, so that the sheet run just upstream of the lead-out roll is more nearly horizontal after transfer than before. In preferred embodiments, the sheet wraps the lead-out roll by less than 90°; a paste roll is spaced below the arc of movement of the secondary roll axis and is operated through a pair of coaxially pivoted arms; the lead-out roll is forward of the primary roll, and the sheet just upstream of the lead-out roll makes an angle of less than 45° to the horizontal when the roll of sheet material is at maximum machine capacity diameter; secondary arm pivots are floor mounted at generally the same level as the primary stands and the paste roll arm stands, the pivots are midway between the primary and secondary roll axes, and screw jacks operate the secondary arms; and the secondary roll axis is horizontally spaced from the paste roll sufficiently so that, after a splice, the severed end of the sheet will not hang into the paste roll nip.

Other objects, features, and advantages of the invention will be apparent from the following description of a preferred embodiment thereof, taken together with the drawings, in which

FIG. 1 is a side view, partially broken away and sectioned, of a splicer embodying the invention; and

FIGS. 2-6 are views similar to FIG. 1, somewhat schematized, showing the splicer in different positions.

Referring to FIG. 1, primary stands 20 support shaft 22 carrying for rotation spool 23 wound with roll 24 of paper from which a traveling web 26 unwinds (as with other members that are provided in pairs at opposite sides of the splicer, only one stand 20 is shown).

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Lead-out roll 30 is mounted for rotation on shaft 32 journaled in bearings 34 carried at the bottoms of stands 20, beneath roll 24. Sheet 26 is wrapped under roll 30 and continues therebeyond along horizontal lead 36. Shaft 32 is forward of shaft 22 (in the direction of web travel), so that the wrap of sheet 26 around roll 30 is always substantially less than 90° of the circumference of roll 30, and sheet lead 38 just upstream of roll 30 makes an angle of less than 45° to the horizontal when roll 24 is at its initial full diameter (e.g., FIG. 2).

Secondary arms 40 are pivotally mounted on brackets 42, respectively inwardly of and behind stands 20, and have at their free ends saddles 44. Each saddle is provided with a latch 46 pivoted at 48 and having a blind hole 50 to receive locking pin 52 extending from the piston of fluid operated cylinder 54. Screw jacks 55 are pivoted at their opposite ends, respectively, to brackets 56 on arms 40 and brackets 57 on stands 20. A cross shaft (not shown) extends between jacks 55 at their pivots to brackets 57, so that the jacks will be synchronized in their action.

Paste roll 60 is rotatably supported between arms 62 pivoted to stands 64 respectively inwardly of secondary arms 40. Arms 66 are pivoted coaxially with arms 62. Air springs 68 are mounted between the free ends of arms 62 and 66. Screw jacks 70 are pivoted at their opposite ends, respectively, to the free ends of arms 66 and to brackets 72 on stands 20.

Stops 80 are provided on stands 64 to locate arms 40 in their normal positions (FIG. 2, e.g.)

Stands 20, brackets 42, and stands 64 are all mounted on a common floor 83.

Knife 84, with blade 86 providing cutting edge 88, is pivotally mounted at 90 on arms 62. Fluid operated cylinders 92 are mounted on arms 66 and have their pistons 94 pivoted to knife 84 at 96.

Standard mechanism (well known in the art and hence not shown) is provided for rotating the paste and paper rolls, tensioning the web, and controlling the machine.

In operation, a full roll 24 (up to a machine capacity of, e.g., 88" diameter) is loaded into primary stands 20, sheet 26 is threaded under roll 30, and roll 24 is accelerated to operating speed (FIG. 2). When roll 24 has been partially wound down (e.g., to 45" diameter) (FIG. 3), screw jacks 55 are actuated to pivot secondary arms 40 toward the primary stands, bringing saddles 44, through generally horizontal arcs 110 above their pivot points on brackets 42, into engagement with shaft 22. Latches 46 are locked closed by actuating cylinders 54 to move pins 52 into holes 50 (FIG. 1). The secondary arms are then returned to their normal positions against stops 80 (FIG. 4), and sheet 26 will run in contact with paste roll 60. In this position sheet lead 38 makes a smaller angle to the horizontal than it did just prior to transfer of roll 24 to the secondary arms, so that the transfer has the effect of making the sheet run more nearly horizontal. A new roll 24a is then loaded into the primary stand (FIG. 4), with a pressure sensitive paste pattern on the leading end of its sheet. As roll 24 becomes depleted, roll 24a is accelerated to normal splicing speed, and screw jacks 70 are actuated to pivot arms 62 and 66 and paste roll 60 toward roll 24a until the path of sheet 26 is within 1/4" of the outer periphery of roll 24a (FIG. 5). When a splice is to be made, air springs 68 are loaded to pivot arms 62 away from arms 66 and move paste roll 60 against roll 24a to press sheet 26 against the paste pattern thereon, effecting the splice (FIG. 6). After a short time lag, cylinders 92 are actuated to swing blade 86 through sheet 26 upstream of the splice. The trailing end 111 of sheet from roll 24 will hang vertically, out of the way of the paste roll, due to the horizontal spacing of axis 112 of secondary roll 24, axis 113

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of the paste roll, and axis 114 of primary roll 24a. After the splice, rings 68 are relaxed, screw jacks 70 are expanded to lower the paste roll to its original position, and roll 24 is decelerated so that the empty spool can be removed.

The spacing of axis 112 from axis 114 in the direction opposite that of web travel provides for easy access to the empty spool 24 on the secondary arms, as well as easy access to rolls 24 and 24a should a hand splice be required. The placement of the secondary arm pivots about midway (in the horizontal direction) between axes 112 and 114 (which represent, respectively, the horizontal extremes of travel of the secondary arms) facilitates the pivoting of the secondary arms with screw jacks 55, since brackets 42 will bear the weight of roll 24 during most of the travel of arms 40. The generally horizontal sheet run allows generous spacing between axes 112 and 113, so that the web will not interfere with the paste roll during splicing; facilitates threading, since the entire splicer is generally at floor level; and minimizes the degree of sheet wrap around the lead-out roll.

Other embodiments will occur to those skilled in the art and are within the following claims.

What is claimed is:

1. A splicer for traveling sheet material comprising a lead-out roll,

stationary primary stands for initially supporting a roll of said sheet material for rotation about a stationary first axis,

secondary arms having normal positions for subsequently supporting said roll for rotation about a second axis spaced horizontally from said first axis in the direction opposite that of sheet travel away from said lead-out roll, said arms being pivoted intermediate said axes for movement of said second axis through an arc to a position coincident with said first axis, all points on said arc being spaced above the pivot for said arms, said secondary arms having means for grasping a said roll supported on said primary stands and carrying said roll through said arc to said normal positions of said secondary arms, and a splicing member mounted intermediate said axes, when said arms are in said normal position, and spaced from said lead-out roll in the direction opposite that of said sheet travel,

whereby, said roll of said sheet can undergo transfer from said primary stands to said secondary arms upon pivotal movement of said arms through said arc, and, upon return of said arms to said normal position, said sheet will have a path upstream of said lead-out roll more nearly horizontal than just prior to said transfer.

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2. The splicer of claim 1 wherein the wrap of said sheet around the periphery of said lead-out roll is always less than 90°.

3. The splicer of claim 1 wherein said splicing member is a paste roll spaced below all points on said arc.

4. The splicer of claim 2 wherein said lead-out roll is spaced horizontally from said first axis in the direction of said sheet travel, and a lead of said sheet upstream of said lead-out roll makes an angle of less than 45° to the horizontal when said roll of said sheet material is of the maximum diameter permitted by the capacity of said splicer.

5. The splicer of claim 1 wherein said pivot is midway between said axes when said arms are in their normal positions.

6. The splicer of claim 3 wherein said paste roll is mounted on a first of two coaxially pivoted arms, a first actuator is provided between said coaxial arms to pivot said first arm relative to the second, and a second actuator is provided to pivot said arms and said paste roll as a unit.

7. The splicer of claim 1 further including a knife for severing a sheet portion unwound from an expiring roll after a splice has been accomplished between said expiring roll on said secondary arms and a new roll on said primary stands, said splicing member and said second axis being spaced horizontally sufficiently so that said sheet portion will, after being severed, hang from said expiring roll out of contact with said member.

8. The splicer of claim 1 wherein said secondary arms are pivoted on supports, said supports and said primary stands being floor-mounted at the same level.

9. The splicer of claim 8 wherein said splicing member is carried by arms pivoted to stands floor-mounted at said level.

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J. J. DEVITT, Assistant Examiner

U.S. Cl. X.R.

242—58.3, 58.6