

Jan. 15, 1952

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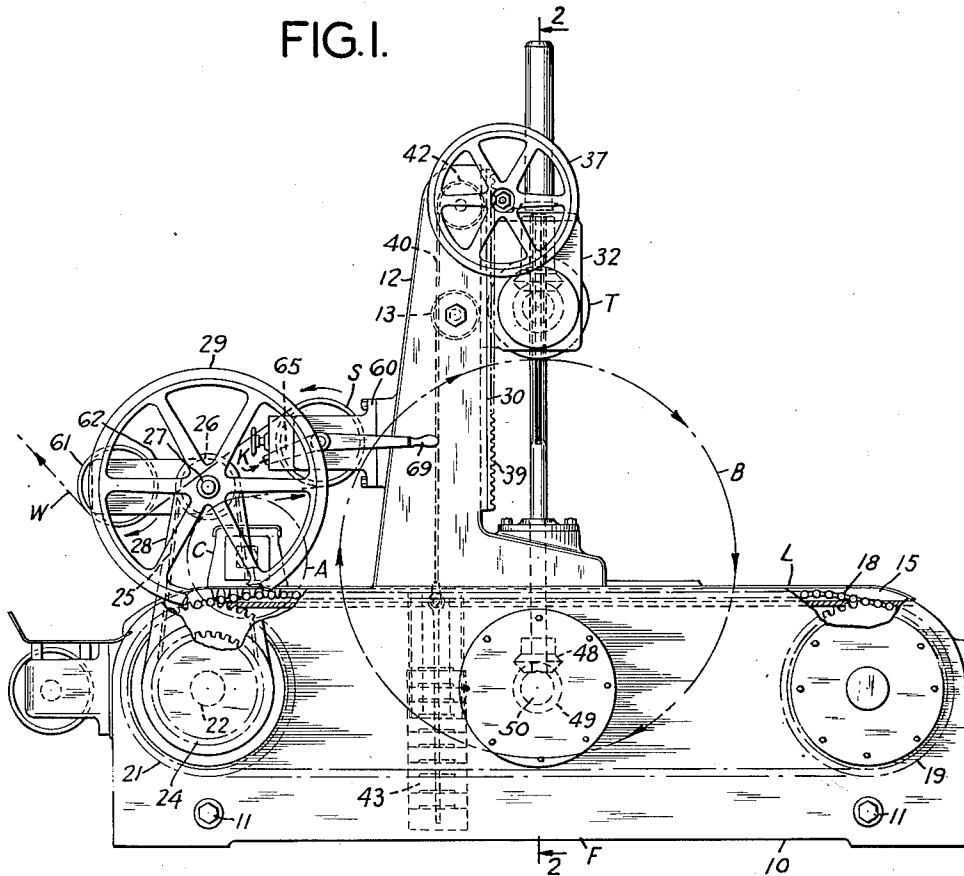
2,582,820

WEB UNROLLING APPARATUS

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4 Sheets-Sheet 1

FIG. I.



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FIG. 3.

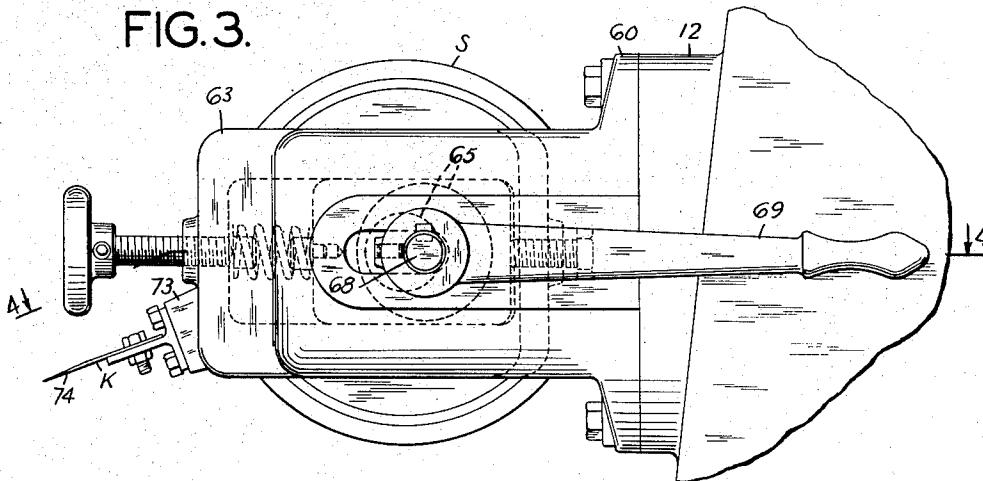


FIG. 5.

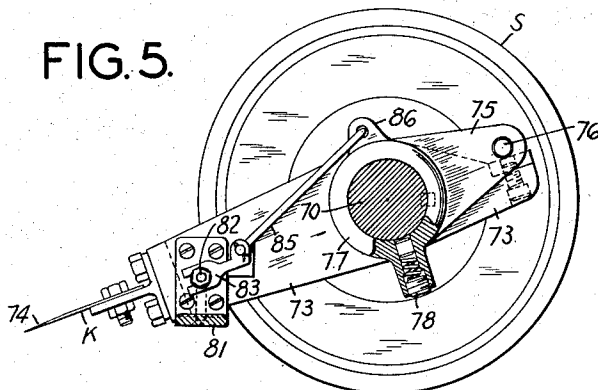
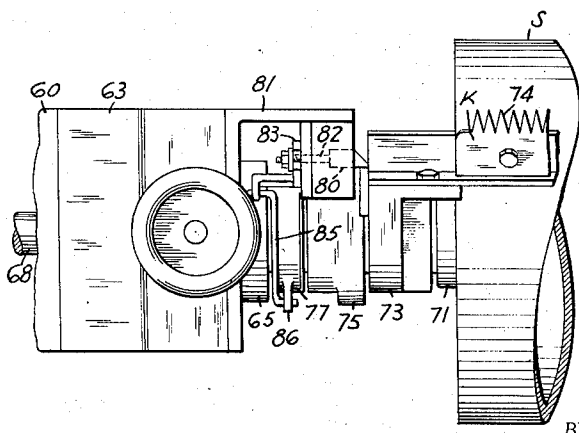


FIG. 6.

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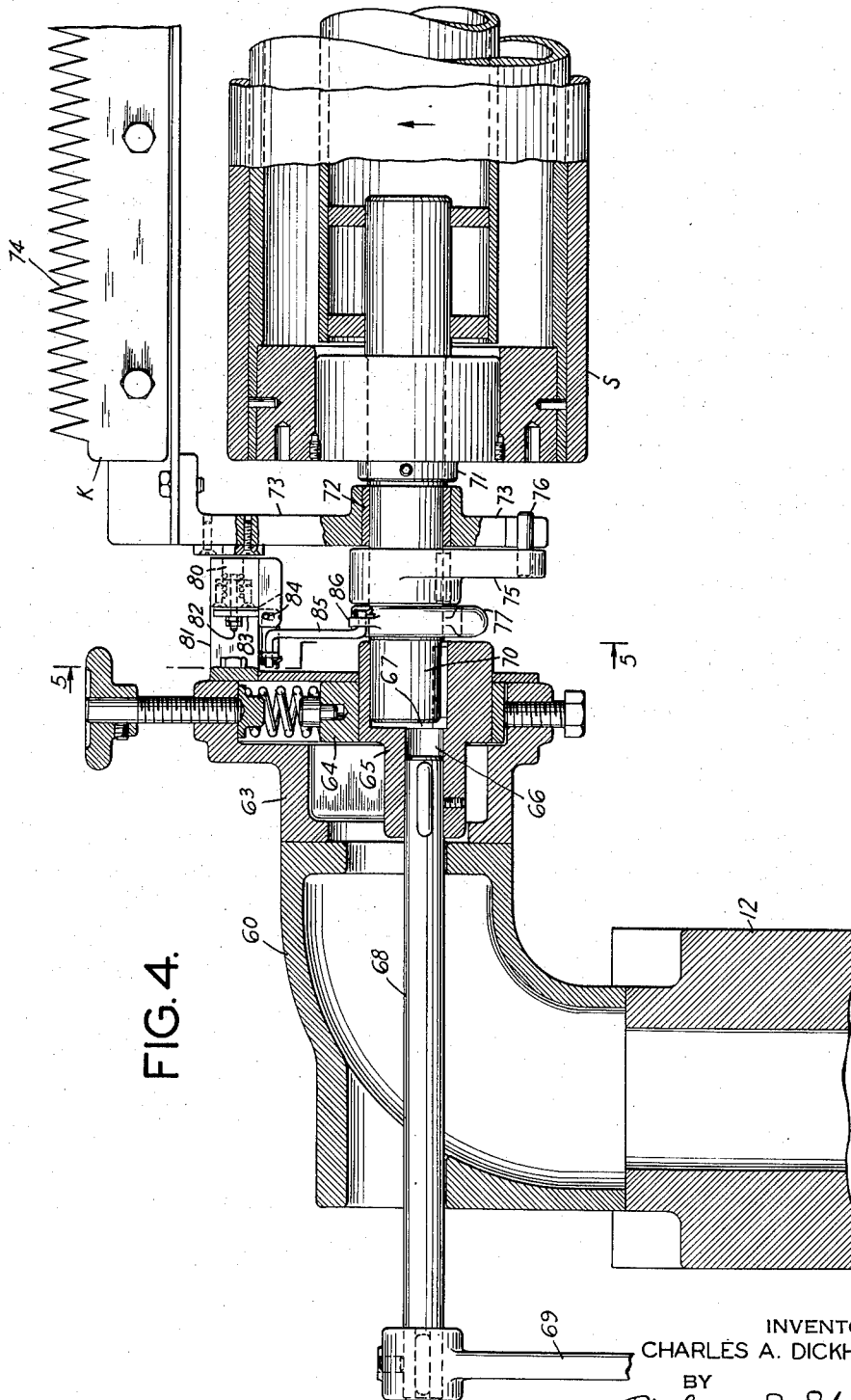
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WEB UNROLLING APPARATUS

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4 Claims. (Cl. 242—58)

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This invention relates to web feeding, and more particularly to apparatus for unrolling or unwinding a web from a roll of stock, and simultaneously feeding the same to a treating operation, such as a coating process.

In the art of treating webs, it is desirable to effect the treatment as a continuous operation, but the web to be treated is supplied in rolls of finite length. The outer end of the web on the roll is fed to the treating machine, which operates continuously until the length of web constituting the roll is exhausted, and the inner end of the web passes through the machine, thus leaving the machine empty. It is therefore necessary to stop the treating machine, and to thread the outer end of a fresh web on a new roll through the treating machine, which threading is a tedious and time consuming operation, and may require as much time as the treating of the entire roll after it has been threaded.

It has been proposed to stop the treating machine before the inner end of the web passes through the machine, and splice the outer end of a fresh roll to the inner end of the treated web. Then the machine is restarted, and the inner end of the treated web threads the outer end of the fresh roll through the machine. But the steps of the treating operation are synchronized for high speed, so that when the machine is stopped before it is empty, the other steps continue, and over treat the web. For example, with a coating process, the coating material continues to feed at high speed, in effect flooding the web with excess coating material, and thereby producing a flaw in the finished product.

The main objects of the present invention are therefore, to avoid interruption of the continuity of the treating operation when the end of a roll of stock web is reached, to supply a continuous web to the treating operation, and to splice the outer end of a fresh roll to the inner end of a treated web on the run at treating speed.

According to the present invention, the ends of the mandrel of the fresh roll are received in a carriage, which is moved inwardly on a loading table. Adhesive is applied to axially spaced areas along the fresh roll. The carriage moves the roll forward, until its periphery between the adhesive bearing areas is engaged by spaced traction wheels which rotate the roll and bring its peripheral speed up to that of the treating operation. Meantime, the roll being treated is being unwound over a delivery roller which presents a bight of the web toward the fresh roll. As the roll being treated is unwound and approaches

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the inner end of the web, the fresh roll and the delivery roll are moved toward each other, until the adhesive on the fresh roll engages the bight of web on the delivery roller. Thus the outer end of the fresh roll adheres to the inner end of the web being treated, and feeds it through the machine at treating speed. To limit the length of overlap, the residual end of the preceding roll is cut off.

Inasmuch as the fresh roll decreases in diameter as it is being unwound, the drive roller bearing the traction wheels is moved inwardly toward the mandrel to maintain peripheral contact. Also the mandrel carriage is moved inwardly and ultimately under the delivery roller, to clear the splicing bight for the next roll.

Other objects and features of novelty will be apparent from the following description and the accompanying drawings in which:

Figure 1 is a side elevation of a machine according to, and for carrying out, the method according to the present invention;

Figure 2 is a vertical section taken generally along the line 2—2 of Figure 1, but with certain rotary parts in advance of that line shown in elevation or only partially broken away.

Figure 3 is an enlarged end elevation of the mounting for the splicing roller and the web severing knife:

Figure 4 is a substantially horizontally section taken along the line 4—4 of Figure 3;

Figure 5 is a vertical section taken along the line 5—5 of Figure 4; and

Figure 6 is a side elevation of the structure shown in Figures 3, 4, and 5.

The apparatus for carrying out the process comprises in general a frame F including a loading table L, and journaling a rotary traction member T. A mandrel carriage C is slidably mounted on the loading table L and supports the mandrel of a roll A, from which the web W is unwound and passed to the treating operation.

In the form shown, the splicing bight is preferably formed by the web from the roll A passing around a splicing roller S so that the side of the web which was innermost on the roll A is outermost on the roller S.

A mandrel of a fresh roll B is provided with a second carriage C which is loaded onto the loading table L so as to slide therealong to position under the rotary traction member T. The roll A meantime having been unwound to a small diameter, the same is moved on its carriage C to a position under the splicing roller S to clear the larger periphery of the fresh roll B when the

latter is moved into position under the traction member T.

After adhesive has been applied to the outer surface of the leading end of the web on the fresh roll B, the rotary traction member T is lowered to engage the periphery of the fresh roll B, and bring it up to treating speed. The carriage of the fresh roll is now moved toward the splicing bight on the roller S, to bring the adhesive bearing outer surface of the leading end of the web on the fresh roll B into contact with the inner surface of the web being unwound from the roll A, which faces outwardly on the bight on roller S and is exposed toward the fresh roll B.

The outer surface of the fresh web from roll B adheres to the inner surface of the web being unwound from the roll A, so that the web being unwound carries the leading end of the fresh web along with it over the roller S and on through the treating operation with their respective surfaces facing in the same direction. The residual end of the web on the roll A now reduced to a few turns on its mandrel, is severed by a knife K.

The frame of the machine comprises a pair of loading table bases 10, connected by tie members 11 and a pair of traction drive supporting pedestals 12 connected by a tie member 13. On top of the bases 10 and between the pedestals 12 are mounted a pair of horizontally extending slotted tracks 15.

The mandrel carriage C comprises a pair of chain blocks 16 in which the ends of the mandrel are journaled. The chain blocks 16 are slidable on the tracks 15, and are provided with rack sprocket teeth 17 depending through the slots of the tracks 15 to engage upper horizontal runs of chains 18 which move along inside the slots.

The chains 18 pass over idler sprockets 19 keyed on a front sprocket shaft 20, and over drive sprockets 21 keyed on a rear sprocket shaft 22. The shaft 22 is driven by sprockets 24 through chains 25 from sprockets 26 keyed on a shaft 27 journaled in casings 28 extending upwardly from the bases 10 and driven by a hand-wheel 29.

With this arrangement, by turning the hand-wheel 29 the chains 18 are driven simultaneously, and the pairs of chain blocks 16 meshing therewith are moved along the racks 15 at the same speed, maintaining the mandrels of the rolls A and B at all times parallel with the shafts of the traction member T and the splicing roller S.

The traction drive supporting pedestals 12 are provided with ways 30 on their front faces on which are vertically slidable traction drive heads 32, on which are journaled the ends of a traction roller shaft 33. The shaft 33 has formed thereon a traction roller 34 on which are axially adjustably mounted a plurality of traction wheels 35. Also journaled on top of the heads 32 is a height adjusting shaft 36 turned by a handwheel 37 and having keyed thereto pinnions 38 meshing with vertical racks 39 secured to the front faces of the pedestals 12. Counterbalance chains 40 have their upper ends secured to the heads 32, pass over sprockets 42 journaled inside the tops of pedestals 12, and extend down to counterbalance weights 43 secured at their lower ends.

The traction roller shaft 33 has keyed thereon a bevel gear 45 meshing with a bevel gear 46 journaled in one of the heads 32, and splined on a vertical spline shaft 47 journaled inside one of the pedestals 12 and having keyed thereto a bevel gear 48 meshing with a bevel gear 49 keyed on a shaft 50.

It will be readily apparent that by turning the handwheel 37 the traction drive heads may be raised in such a manner that the axis of the traction member T is always parallel to the mandrels of the rolls on the loading table L, and that the bevel gear 36 being splined on the spline shaft permits raising and lowering of the traction member T without interrupting the driving means therefor.

The ends of the splicing roller S are journaled in brackets 60 secured to the rear side of the pedestals 12. A delivery roller 61 is journaled in arms 62 extending rearwardly from the tops of the casings 28. In the form shown the web W passes over the roller S and under the roller 61 for delivery to the treating machine.

The knife K is mounted in conjunction with the splicing roller S on the brackets 60 secured to the pedestals 12. As shown in Figure 4, the bracket 60 has rigidly secured thereto a housing 63 containing an adjustably spring pressed bearing ring 64, in which is journaled an eccentric 65. The eccentric 65 has an outer central bore 66, concentric with the ring 64, and a larger inner eccentric bore 67. A crank shaft 68 is keyed in the central outer bore 66, and extends out through the bracket 60 to receive a hand lever 69 for turning the crank shaft 68 through an angle and thereby turning the eccentric 65 in the bearing ring 64 through the same angle.

The eccentric bore 67 has keyed therein a stub shaft 70, on which the bearing 71 of splicing roller S is journaled. Also journaled on the shaft 70 outside of the splicing roller bearing 71, by means of bearing 72 is a knife arm 73. The splicing roller S is hollow, and the inner end of the stub shaft 70 is connected by means of a tube 73 to a corresponding stub shaft at the other end.

The knife K comprises a flat straight blade 74, having a sharply pointed serrated edge, which extends between the outer ends of the knife arms 73 beyond the periphery of the splicing roller S.

Keyed on the stub shaft 67 outside of the knife arm bearing 72 is a stop arm 75 having a laterally extending stop pin 76 engaging a rearward extension of the knife arm 73. A friction ring 77 is mounted on the stub shaft 70 between the stop arm 75 and the eccentric 65. An adjustably spring pressed plug 78 is mounted on the ring 77 to maintain frictional engagement thereof with the shaft 70.

The knife K is normally held in elevated position by a spring pressed latch 80 which engages under the knife arm 73. The latch 80 is mounted on a bracket 81 bolted to the housing 63, and has a stem 82 engaging a forked arm 83 of a bell crank pivoted at 84 on the bracket 81. The other arm of the bell crank is connected by a link 85 to a lug 86 on the friction ring 77.

When the hand lever 69 is turned counterclockwise in Figure 1, about 180° in the direction of rotation of the splicing roller S, the crankshaft 68 turns the eccentric 65, which cams the stub shaft toward the new roll B into contact therewith. The adhesive bearing outer surfaces of the fresh web on the roll B adheres to the contacting surface of the web on the splicing roller S which carries it on through the machine. At the same time the stop arm 75 is turned clockwise away from the knife arm 73 to clear it for the severing stroke. During this clockwise movement the friction collar does not turn, because the bell crank arm is against an abutment and the link 85 overcomes the friction of the plug 76.

Promptly after this counterclockwise half turn,

the hand lever is turned back clockwise about 40°. There is no abutment to hold the bell crank arm 82 in this direction, so that the friction plug 78 causes the friction ring 75 to turn with the stub shaft. The link 85 turns the bell crank arm 82 to pull the latch 80 and release the knife arm 71. The knife K falls, swinging about the bearings 72 into position to sever the reach of web between the roll A and the splicing roller S. The return 40° clockwise movement brought the stop arm 75 into position to prevent the knife K from contacting the new roll B.

After the web has been severed, the hand lever 69 is continued clockwise beyond the 40° position to the full 180° return position. During this final 120°, the stop arm 75 returns the knife K to elevated position.

The invention is not to be limited to the precise details shown, but instead includes such modifications of the disclosure as fall within the scope of the following claims.

What is claimed is:

1. Apparatus for feeding successive rolls of a web to a treating operation, a loading table having parallel tracks thereon, a mandrel carriage comprising a pair of blocks slidably on said tracks and having bearings for journaling the ends of a mandrel, sprocket chains movable parallel to said tracks, parallel shafts journaled in said loading table and having pairs of sprocket wheels over which said sprocket chains pass, means for driving one of said shafts to drive both of said chains, and rack teeth on each of said blocks projecting beyond said tracks and engaging said chains for moving the mandrel carriage along said tracks and off of said tracks, carrying the mandrel therewith to discharge the mandrel and carriage from the loading table.

2. Apparatus for feeding successive rolls of a web to a treating operation, a loading table, a mandrel carriage slidable along said loading table into unwinding position and having bearings for journaling the ends of a mandrel carrying a roll, pedestals extending above said loading table, guides on said pedestals; heads slidable on said guides, a rotary traction member journaled in said heads, a bevel gear in one of said heads and keyed to said rotary traction member, a spline shaft extending upwardly in one of said pedestals, a second bevel gear in said head meshing with

the first and slidable on said spline shaft, means for driving said spline shaft, and means for moving said heads along said guides to slide said second bevel gear down along said spline shaft and to lower said rotary traction member into contact with the periphery of the roll on said mandrel to rotate it in the bearings in said mandrel carriage.

3. Apparatus for feeding successive rolls of web to a treating operation, means for journaling the mandrel of a roll being unwound, a guide roller over which the web passes from said roll, arms pivoted on the axis of said guide roller, a knife blade extending between said arms beyond the periphery of said guide roller, and means for swinging said arms to swing said knife into contact with the web between said roll and said guide roller.

4. Apparatus for feeding successive rolls of a web to a treating operation, comprising means for journaling the mandrel of a roll being unwound, a splicing roller over which the web passes from said roll, eccentric bearings for journaling said splicing roller, a knife extending longitudinally of said splicing roller, arms having bearings on the journals of said splicing roller for supporting said knife, and means actuated by turning said eccentric bearings for engaging said knife with the web passing from said roll mandrel to said splicing roller.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
964,130	Stilwell	July 12, 1910
1,767,728	Ball	June 24, 1930
1,938,888	Bernard	Dec. 12, 1933
2,141,629	Warner et al.	Dec. 27, 1938
2,217,897	Freeman	Oct. 15, 1940
2,258,298	Miller	Oct. 7, 1941

FOREIGN PATENTS

Number	Country	Date
331,937	Great Britain	July 17, 1930
668,530	Germany	Dec. 6, 1938