July 30, 1968 T. W. MARTIN, SR 3,394,897

SUSPENDED WEB ROLL SUPPORT

Filed Oct. 24, 1966 3 Sheets-Sheet 1

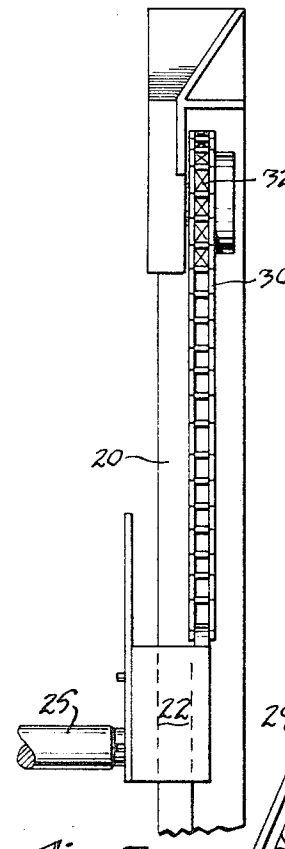


Fig. 3

Fig. 1

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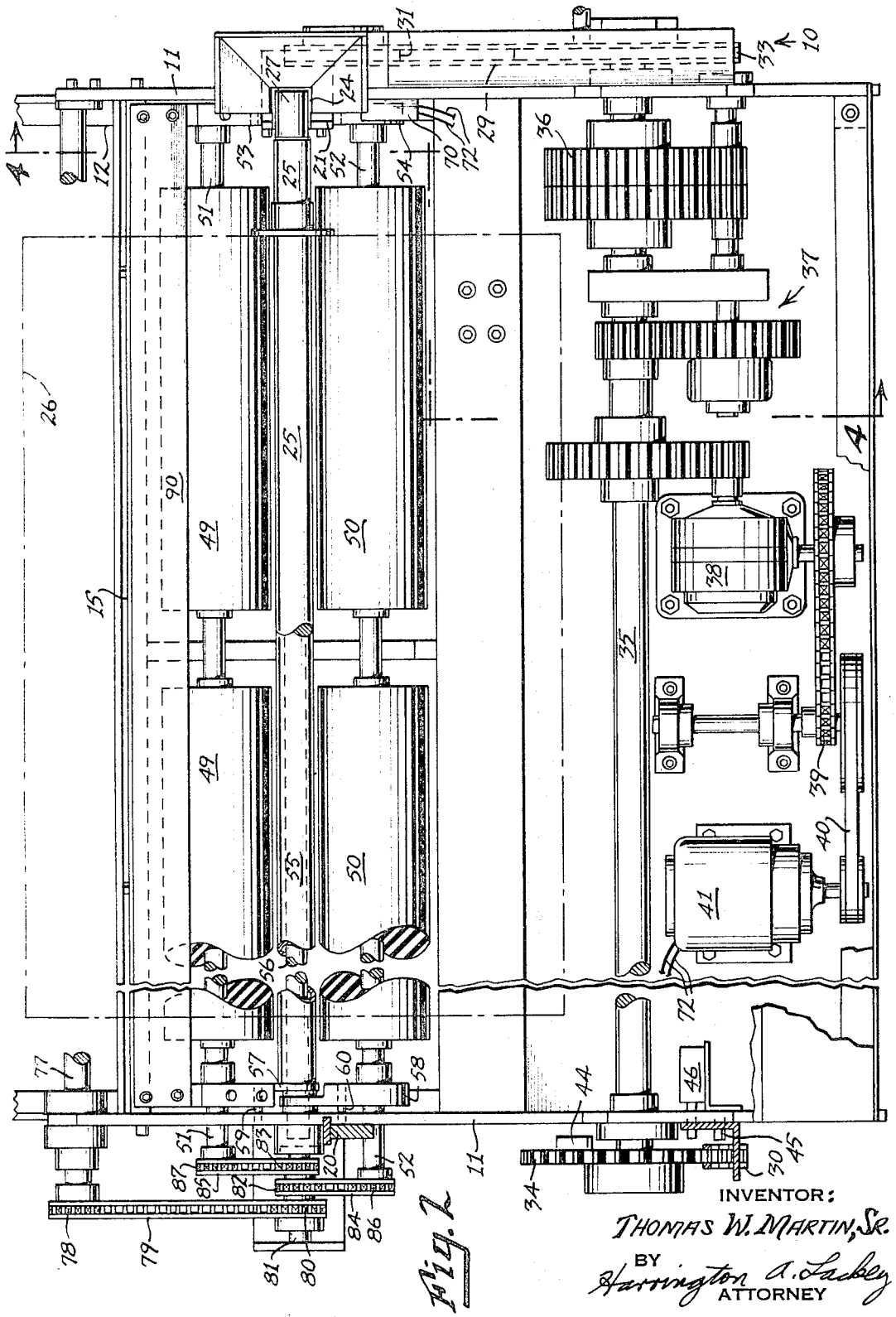


Fig. 2

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Filed Oct. 24, 1966 3 Sheets-Sheet 3

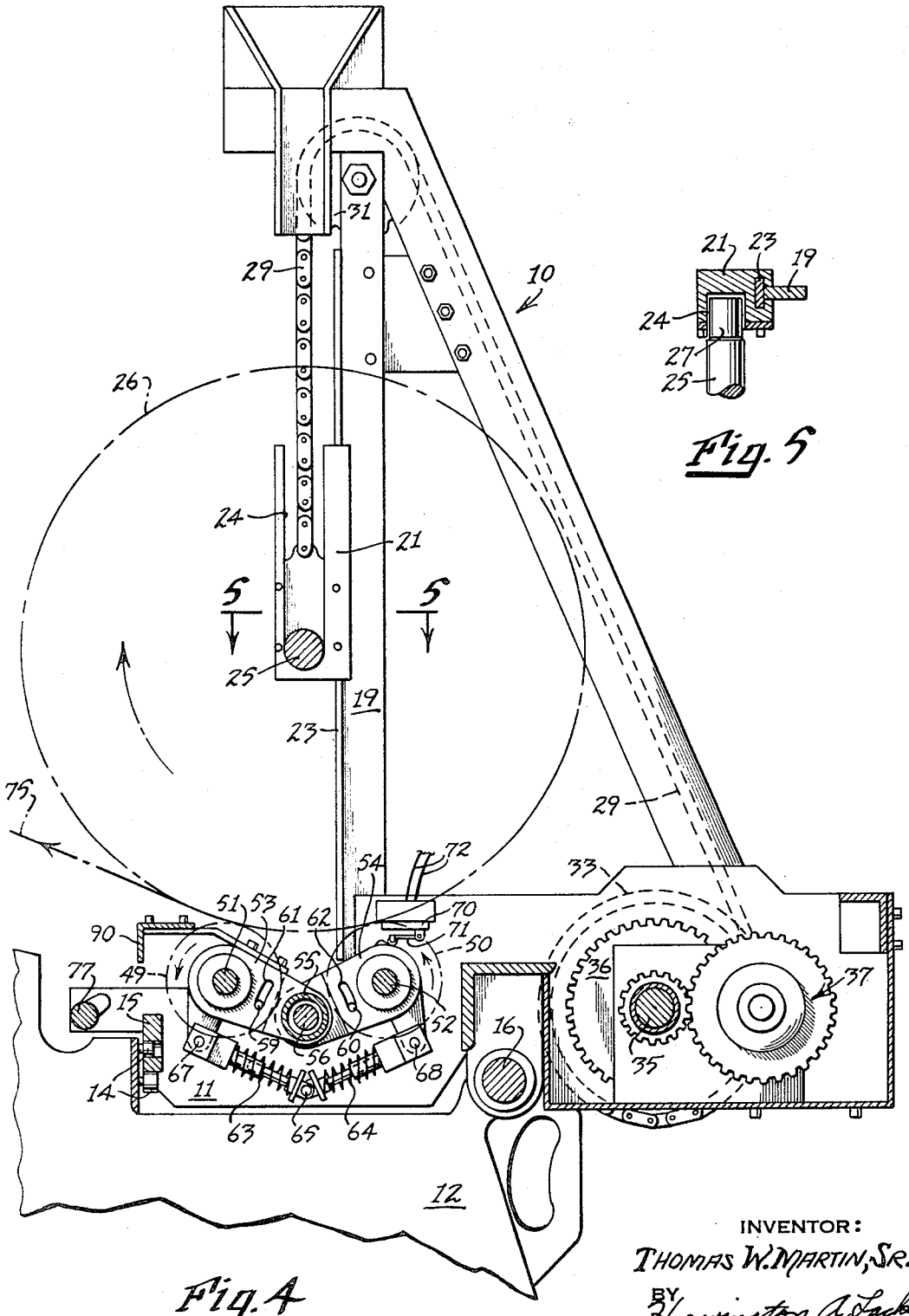


Fig. 4

Fig. 5

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3,394,897

SUSPENDED WEB ROLL SUPPORT

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Filed Oct. 24, 1966, Ser. No. 588,899
5 Claims. (Cl. 242—54)

This invention relates to a web roll support, and more particularly to a suspended web roll support which relieves the weight of the roll upon the web feed means.

This invention is an improvement of the cloth roll supporting and feeding means employed in the cloth spreading machine disclosed in U.S. patent application S.N. 540,026, filed Apr. 4, 1966, of Thomas W. Martin, Sr., et al., and is particularly adapted for use with heavy cloth rolls. Although this invention was specifically designed for use in supporting and feeding cloth from rolls in a cloth spreading machine, nevertheless, it may be utilized for supporting and maintaining any type of web roll in constant feeding engagement with the web feeding means during the unwinding of the web.

Another object of this invention is to provide a web roll support in which the web roll is suspended and maintained in normal feeding engagement with a web feeding means mounted below the roll.

Another object of this invention is to provide a suspended web roll support in which the roll is lowered to maintain a constant web feeding engagement between the roll and the web feeding means as the web is unwound from the roll.

A further object of this invention is to provide a web roll support including web feed rollers mounted below and biased upwardly into engagement with the bottom of the web roll and means for lowering the roll to maintain constant feeding engagement with the rollers as the web is unwound.

Another object of this invention is to provide a web roll support particularly adapted for supporting a heavy web roll and maintaining it in normal feeding engagement with the web feed means.

A further object of this invention is to provide a web roll support including web feed means mounted below and in normal feeding engagement with the bottom of the roll, and actuator means responsive to the reduction in pressure between the roll and the feed means as the rollers are unwound, causing the roll to be lowered to restore the normal feeding pressure between the roll and the feed means.

Another object of this invention is to provide a web roll support including means for lowering the roll and web feeding rollers mounted below the roll for reciprocable movement and normally urged upwardly into engagement with the bottom of the roll, and an actuator in the upward path of the rollers for engagement by the rollers to energize the means for lowering the web roll.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the drawings, wherein:

FIG. 1 is a right side elevation of the invention mounted on the carriage of a cloth spreading machine, shown fragmentarily;

FIG. 2 is a fragmentary top plan view of the invention disclosed in FIG. 1;

FIG. 3 is a fragmentary front elevation of the suspension means supporting the left end of the roll spindle;

FIG. 4 is a section taken along the line 4—4 of FIG. 2; and

FIG. 5 is a fragmentary section taken along the line 5—5 of FIG. 4.

Referring now to the drawings in more detail, the suspended web roll support **10** comprises a base frame **11** disclosed in the form of a carriage mounted for transverse reciprocable movement on a cloth spreading machine frame **12**. Such transverse movement is permitted by the roller bearings **14** mounted on the frame **12** and rollably engaging the transverse guide bar or track **15** mounted on the front of the base frame or carriage **11**. The rear of the carriage **11** is transversely slidable on the cylindrical rod or bar **16**. This transverse movement may be effected by any means, not shown, and forms no part of this invention.

Mounted on opposite ends or sides of the base frame **11** are a pair of upright standards **19** and **20**, each having a substantially T-shaped cross-section. Slidably mounted for vertical movement upon each standard **19** and **20** is a spindle bearing block or saddle bracket **21** and **22**, respectively. Each bearing block, such as the block **21**, is provided with a T-shaped slot or guideway **23** adapted to slidably receive the T-shaped standard **19**. Each bearing block, such as block **21**, also includes a vertically disposed spindle slot **24** open at its top for receiving the web roll spindle or shaft **25**. Since each bearing block **21** and **22** is constructed identically, the opposite ends of the spindle **25** are supported by the opposed bearing blocks **21** and **22** so that the web or cloth roll **26** is freely and rotatably suspended between the blocks **21** and **22**. The weight of the roll **26** will, of course, cause the ends of the spindle **25** to rest on the arcuate bottoms of the slots **24** in each block **21** and **22**. In order to facilitate the rotatable movement of the web roll **26**, and particularly a heavy roll, the ends of the spindle **25** are rotatably journaled in end caps or bearings, such as **27**, disclosed in FIGS. 2 and 5. Thus, if the end cap **27** binds in the slot **24**, spindle **26** is still free to rotate within the caps **27**.

Each bearing block **21** and **22** is attached to and suspended by one end of each chain **29** and **30**, respectively, carried over upper sprockets **31** and **32**, respectively. The opposite ends of the respective chains **29** and **30** are carried around the fixed to the driven sprockets **33** and **34**, respectively, fixed at opposite ends of the driven shaft **35**. Driven gear **36** is fixed to the shaft **35** and is driven through the reduction gear train **37**, right-angle gear unit **38**, reduction sprocket-and-chain unit **39**, and reduction belt-and-pulley unit **40** by electrical motor **41**. The motor **41** may be reversible to either raise or lower the bearing blocks **21** and **22** and cloth roll **26** upon the proper signal.

The inside of the driven sprocket **34** is provided with a stop lug **44** adapted to engage stationary stop pin **45** fixed on frame **11** when the driven sprocket **34** has been rotated to a position in which the spindle block **22** has descended to its lowermost limit. A limit switch **46** is also mounted on the left side of the carriage **11** and in the path of the stop lug **44** so that the motor **41** will automatically be turned off when the bearing block **22** has reached or approaches its lowermost limit.

Mounted below and in engagement with the bottom of the cloth feed roll **26** are a pair of cloth feed rollers **49** and **50** fixed on roller shafts **51** and **52**, respectively. As best disclosed in FIG. 2, any number of feed rollers or feed roller sections **49** and **50** may be mounted coaxially on the roller shafts **51** and **52**, respectively.

As best disclosed in FIGS. 1 and 4, the right ends of the roller shafts **51** and **52** are journaled for rotation within the outer or free ends of pivot or link arms **53** and **54**, respectively. In order to pivotally mount the inner ends of both link arms **53** and **54** about a transverse axis, the inner end of link arm **53** is fixed to a transverse hollow tubular shaft **55**, while the inner end of the link arm **54** is fixed to a smaller transverse shaft **56** extending concentrically and journaled within the tubular shaft **55** for

free coaxial rotatable movement. The left end portion of the feed roller shaft **51** is also freely journaled within the outer end of left link arm **57**, while the left end portion of feed roller shaft **52** is freely journaled within the outer end of link arm **58**. The inner end of the left link arm **57** is fixed to the left end of the tubular pivot shaft **55**, while the inner end of the left rear link arm **58** is fixed to the inner pivot shaft **56**. Thus, the front feed roller shaft **51**, the two link arms **53** and **57** and the tubular pivot shaft **55** move in unison and pivotal relation with the rear feed roller shaft **52**, link arms **54** and **58** and the inner pivot shaft **56**.

The pivotal movement of the link arms **53** and **54** are limited by stop pins **59** and **60** fixed in the right wall of the base frame **11** and extending through arcuate slots **61** and **62** formed in the respective link arms **53** and **54** and having equal radii concentric with the pivot shaft **56**. As best disclosed in FIG. 4, the link arms **53** and **54** are shown urged to their uppermost position by springs **63** and **64**, respectively. The inner ends of the springs **63** and **64** are pivoted about a common pivot pin **65**, and the outer ends of the springs **63** and **64** are pivotally connected by pins **67** and **68** to the respective link arms **53** and **54**.

The common axis of the pivotal shafts **55** and **56** is preferably parallel to and in vertical alignment with the axis of the spindle **25** when mounted in the bearing blocks **21** and **22**. Consequently, the positions of the stop pins **59** and **60** in the arcuate slots **61** and **62** are such that the pivotal movement of the drive roller shafts **51** and **52** is limited to opposite sides of the vertical plane containing the axis of the spindle **25** and the axis of the pivot shafts **55** and **56**, so that the weight of the cloth roll **26** will be substantially balanced between the feed rollers **49** and **50**.

Fixed to the base frame **11** in the path of the upward movement of link arm **54** is a motor actuator, such as limit switch or microswitch **70** having a switch arm or finger **71** adapted to be engaged by and moved to operative position by the upward pivoting link arm **54**. The limit switch **70** is connected by leads, such as **72**, to the electric motor **41** so that when the switch arm **71** is moved to energize the switch **70**, the motor **41** will be driven in a direction to lower the bearing blocks **21** and **22**. As the bearing blocks **21** and **22** lower the roll spindle **25** and cloth roll **26**, the bottom of the roll **26** will descend until it engages and forces downwardly the cloth feed rollers **49** and **50**. The downward movement of the cloth feed rollers **50** will move the link arm **54** away from the switch arm **71** until the switch **70** is de-actuated to de-energize the motor **41** and stop the downward movement of the cloth roll **26**.

It will thus be seen, that as the web or cloth **75** is unwound from the roll **26**, the diameter of the roll **26** will gradually decrease, permitting the springs **63** and **64** to urge the link arms **53** and **54**, and consequently the feed rollers **49** and **50** upwardly, to constantly engage the outer circumference of the web roll **26**. As the feed rollers **49** and **50** continue to rise, the limit switch **70** will eventually be actuated to energize the motor **41** and lower the feed roller **26** to depress the feed rollers **49** and **50** until the switch **70** is de-actuated and the motor **41** is de-energized. This operation is repeated as long as the web is unwound to constantly restore and maintain the proper feeding engagement and pressure between the web roll **26** and feed rollers **49** and **50**.

The cloth feed rollers **49** and **50** are driven at the same rate and in the same direction from power means, not shown, such as normally carried on the frame **12** of the cloth spreading machine which drives the feed roller drive shaft **77**. Fixed to the end of the drive shaft **77** is drive sprocket **78** which carries chain **79** for driving sprocket **80** fixed to driven shaft **81**, which also carries driven sprockets **82** and **83**. Chains **84** and **85** carried by the sprockets **82** and **83** in turn drive sprockets **86** and **87** fixed to the left ends of feed roller shafts **51** and **52**, respectively.

If desired, a web guide plate **90** may be fixed transversely to the front pivot arms **53** and **57** and between the forward feed roller or rollers **49** and the bottom of the web roll **26** to prevent the web **75** from winding around the feed roller **49**.

It will be understood that the motor **41** may be driven in a reverse direction by manual controls in order to raise the spindle brackets **21** and **22** to an elevated position for loading a new cloth roll **26**. However, the descent of the brackets **21**, **22**, spindle **25** and cloth roll **26** is automatically controlled through the limit switch **70** as the diameter of the roll **26** is decreased by unwinding.

It will thus be seen that a web roll support has been provided that will not only support the weight of heavy web rolls, and relieve the tremendous pressure upon the web feed means, such as web feed rollers stationed beneath the roll, but it will also lower the roll and maintain continuous engagement at relatively even pressure between the web feed means and the roll even as the roll is unwound.

This invention is a considerable improvement over the type of web roll supporting and feeding means, particularly the cloth roll support and feed means disclosed in patent application S.N. 540,026 in which the pair of cloth feeding rolls not only feed the web, but also have to support the roll. Where the weight of the cloth rolls is excessive, considerable pressure and stress is placed on the prior feed rollers, which affords inefficient, slow, and sometimes interrupted feeding of the cloth.

It will be apparent to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof, and therefore the invention is not limited by that which is shown in the drawings and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. A suspended web roll support comprising:

(a) a base frame,

(b) a pair of spaced standards mounted upright on said frame,

(c) a spindle bearing block mounted for vertical slidable movement on each of said standards, said blocks opposing each other,

(d) a spindle carrying a web roll, the opposite ends of said spindle being rotatably supported in said opposed bearing blocks,

(e) means on said frame suspending said blocks on said standards,

(f) motive means connected to said suspending means to move said blocks on said standards when said motive means is actuated, and to hold said blocks stationary when said motive means is de-actuated,

(g) web feed means adapted to rotatably engage said web roll,

(h) means mounting said web feed means on said frame below said web roll to bias said feed means upwardly into feeding engagement with said web roll,

(i) means for driving said web feed means, and

(j) a motive means actuator mounted on said frame for operative engagement by said web feed means when said feed means has been biased to a predetermined elevation, to actuate said motive means to move said bearing blocks and the web roll carried thereby until said feed means has been moved to disengage said actuator.

2. The invention according to claim **1** in which said suspending means comprises a flexible lineal member for each of said bearing blocks, each lineal member having opposite ends and being carried over a rotatable idler member mounted on each of said standards, one of said ends being fixed to said bearing block and the other of said ends being connected to said motive means.

3. The invention according to claim 1 in which said motive means comprises an electrical motor, and said actuator comprises a switch electrically connected to said motor and mounted above and in the path of said web feed means for energizing said motor when said web feed means has attained said predetermined elevation.

4. The invention according to claim 1 in which said web feed means comprises a roller whose axis is parallel to said spindle and said web feed mounting means comprises a link arm having opposite ends, one of said ends being pivotally mounted to said frame, and the other of said ends rotatably supporting said roller for pivotal movement about said one end, said web feed mounting means further comprising a coil spring biasing said link arm to pivot said roller toward engagement with said web roll.

5. The invention according to claim 1 in which said web feed means comprises a pair of feed rollers whose axes are parallel to said spindle, a transverse pivot shaft

mounted on said frame parallel to and below said spindle, a pair of link arms having inner and outer ends, said inner ends being pivotally journaled about said pivot shaft, and said outer ends rotatably supporting said feed rollers, said web feed mounting means further comprising springs biasing said link arms to pivot said feed rollers toward engagement with said web roll, said web feed driving means comprising means for driving said web feed rollers simultaneously in the same direction.

References Cited

UNITED STATES PATENTS

2,618,945	11/1952	Bellini	242—65 X
3,239,161	3/1966	Dutro et al.	242—75.1
3,306,547	2/1967	Reid et al.	242—66
3,334,834	8/1967	Davidson et al.	242—65

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