

June 29, 1965

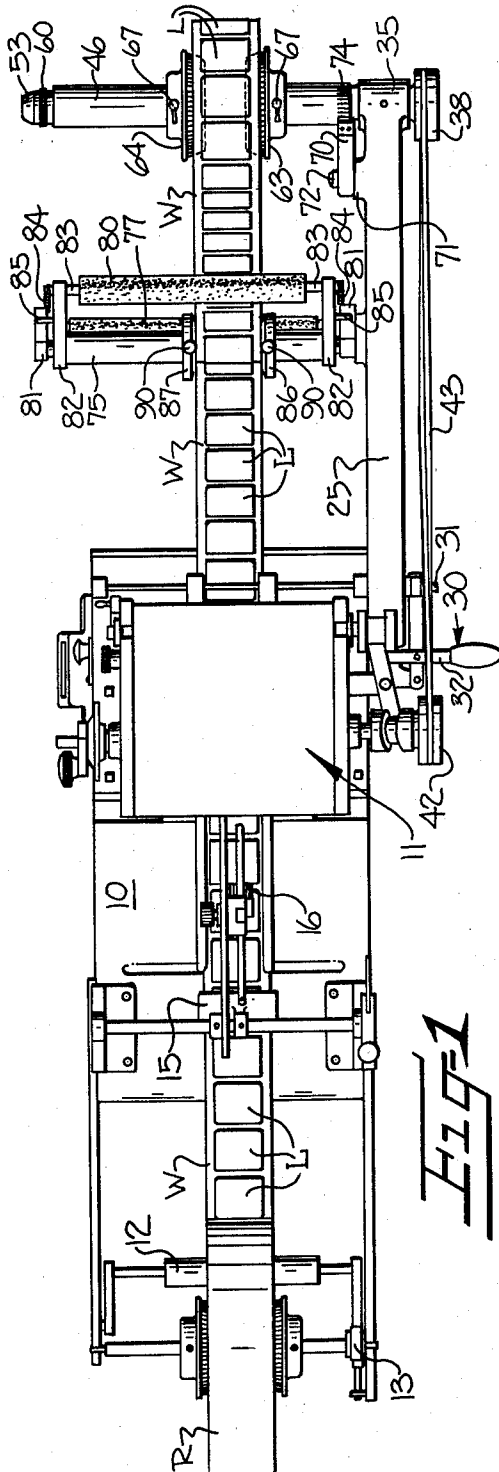
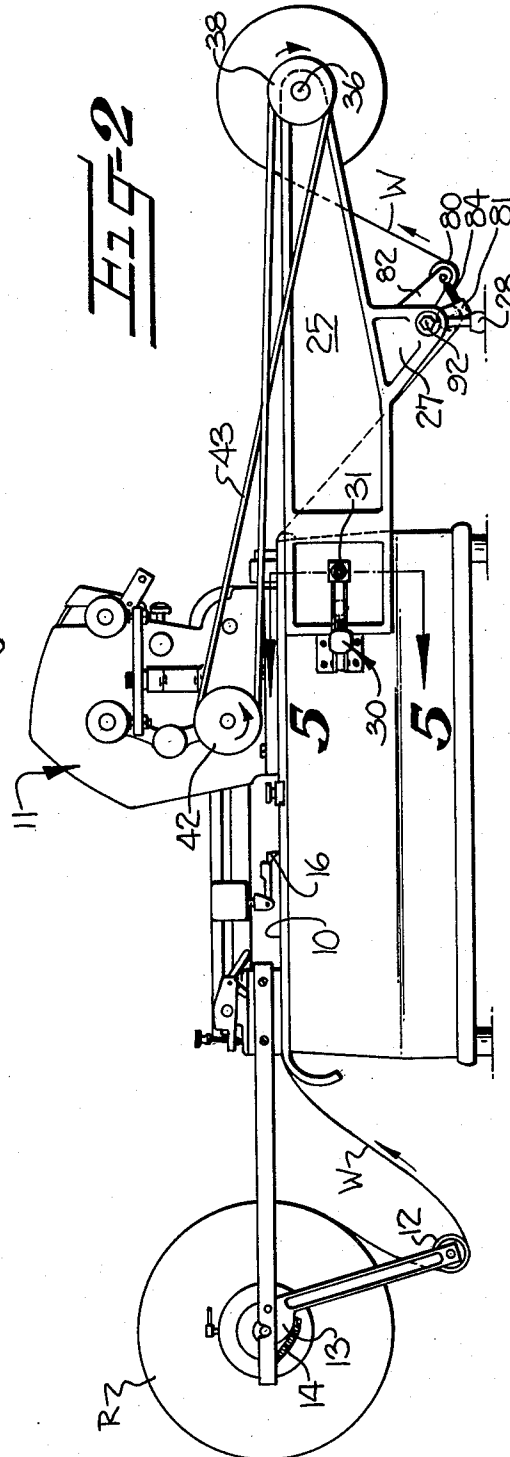
J. A. WEST ETAL

3,191,884

WEB REWINDING APPARATUS

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3 Sheets-Sheet 1



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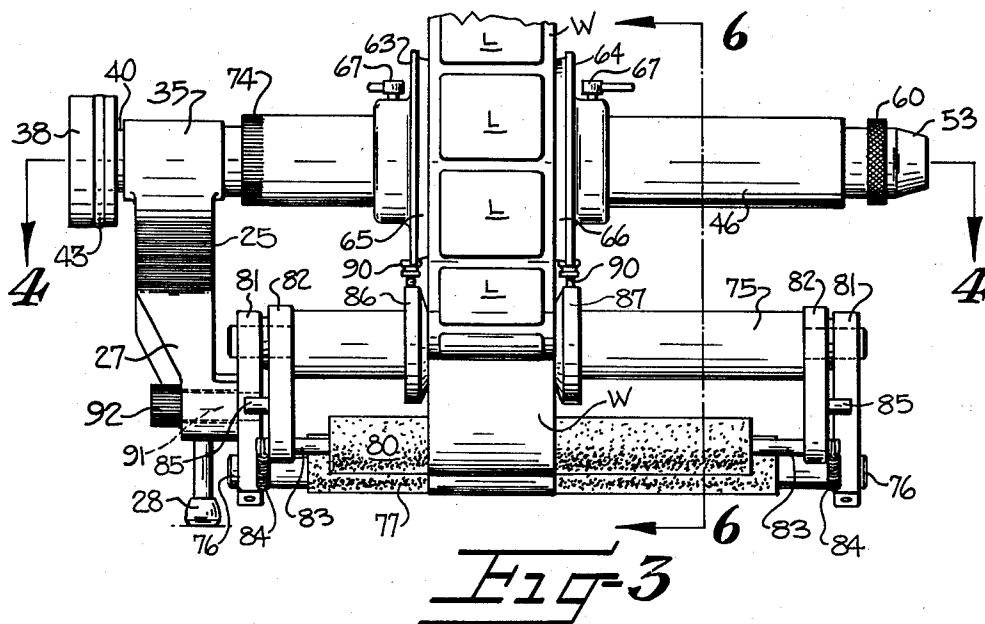
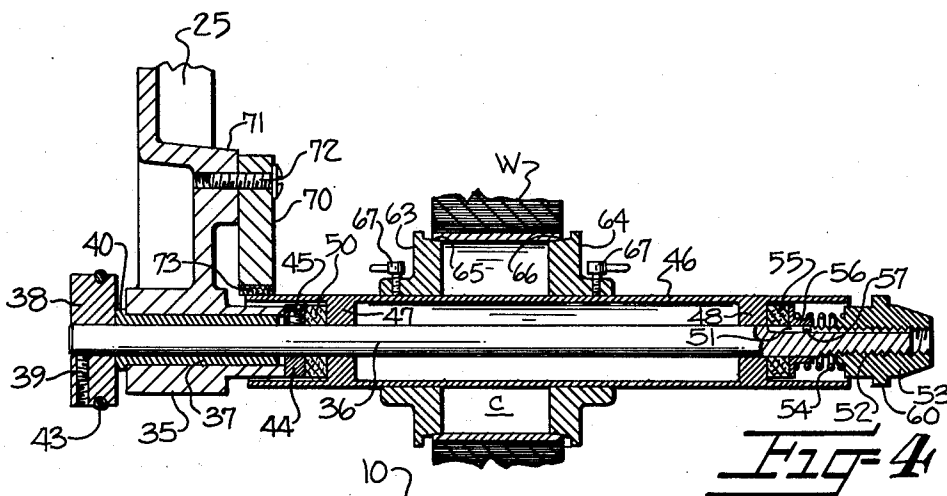
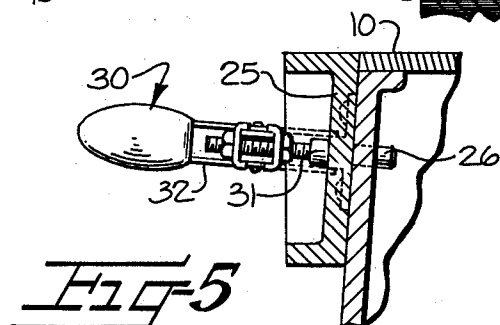
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3 Sheets-Sheet 2



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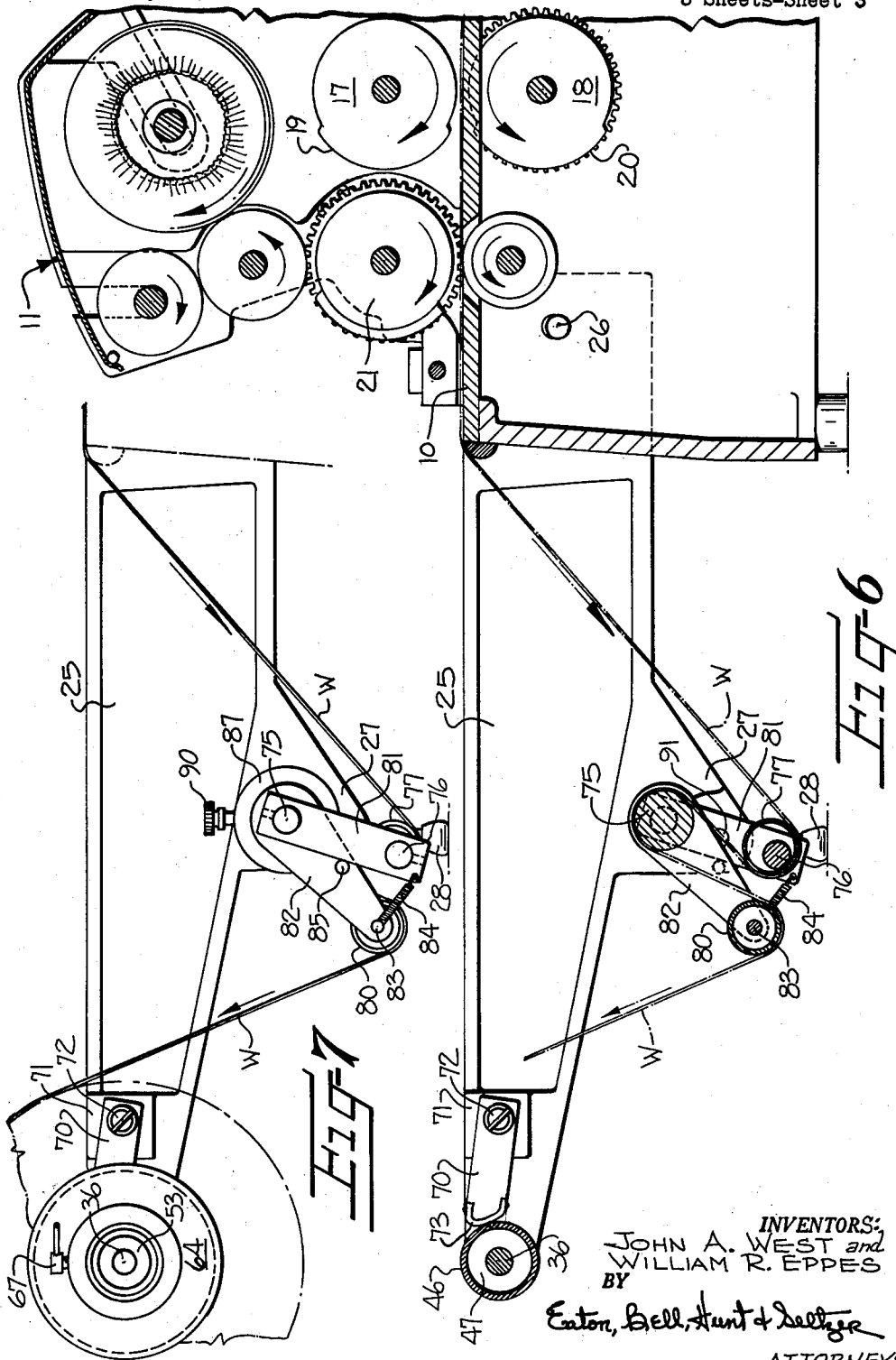
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3 Sheets-Sheet 3



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3,191,884

WEB REWINDING APPARATUS

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Filed July 29, 1963, Ser. No. 298,037

5 Claims. (Cl. 242—67.1)

This invention generally relates to a web rewinding apparatus, and more particularly to a rewinding apparatus for use with a label imprinting machine in which a web of serially arranged labels is intermittently fed from a supply roll in a predetermined path of travel to successively present labels to a printing mechanism for imprinting suitable indicia or legends thereon so that the web of imprinted labels can be subsequently rewound into a roll for convenient handling. The web rewinding apparatus of the present invention is adapted to be used with a label imprinting machine of the type disclosed and claimed in our co-pending United States patent application, Serial No. 283,919, filed May 28, 1963.

Where a web is to be unwound from a supply roll and intermittently fed to a mechanism which performs an operation on successively presented portions of the web, such as the printing of suitable indicia or legends on serially arranged labels, it is desirable to provide an apparatus for rewinding the web in a roll for convenient handling following the performance of the operation on the successively presented portions of the web. The intermittent motion of the web in being fed through such a machine imposes certain problems in accomplishing the rewinding of the web which must be overcome if the web is to be rewound in an efficient manner. In this connection, the take-up reel or roll on which the web is to be rewound must be rotated in synchronized relation to the intermittent motion of the web as the web exists from the machine with which the rewinding apparatus is to be used. Failure to properly synchronize the rotation of the take-up reel with the intermittent movement of the web will eventually result in bunching of the web on the take-up reel where the take-up reel has a rate of rotation less than the feed rate of the web, or, conversely, splitting or breaking of the web where the take-up reel has a rate of rotation greater than the feed rate of the web because of increasing tension imparted to the web.

It is therefore an object of this invention to provide an apparatus for rewinding a web which is intermittently fed in a predetermined path of travel, wherein the apparatus is so constructed as to provide for proper synchronization between the feed rate of the intermittently moving web and a take-up reel of the apparatus to avoid bunching or breaking of the web as it is being rewound on the take-up reel.

It is another object of this invention to provide a web rewinding apparatus for use with a machine in which web material is intermittently fed from a supply roll in a predetermined path of travel to successively present portions of the web for the performance of an operation thereon by the machine so that the web can be subsequently rewound in a roll for convenient handling after it exits from the machine.

It is another object of this invention to provide a web rewinding apparatus for use in rewinding an intermittently fed web, wherein the rotation of a take-up reel of the apparatus on which the web is to be rewound is controlled by an adjustable clutch so that the take-up reel is rotated only when the web is delivered thereto and in synchronization with the rate of delivery.

It is another object of this invention to provide in an apparatus for intermittently feeding web material in a predetermined path of travel which includes means for intermittently feeding the web material from a supply

roll to successively present portions of the web material for the performance of an operation thereon, a web rewinding apparatus having a slack let-off mechanism and a take-up reel, with the slack let-off mechanism being adapted to be disposed in the path of travel of the web material following the performance of the operation on successive portions of the web material so as to regulate tension in the intermittently moving web material lengthwise thereof as the web material is delivered to the take-up reel in order that the web material may travel between the slack let-off mechanism and the take-up reel in an intermittent motion under a substantially uniform tension.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which:

FIGURE 1 is a top plan view of the web rewinding apparatus in accordance with the present invention, as mounted on the forward end of a label imprinting machine for rewinding a web of serially arranged labels following the printing of suitable indicia or legends thereon by the label imprinting machine;

FIGURE 2 is a side elevation, looking at the lower disposed side of FIGURE 1;

FIGURE 3 is an enlarged end elevation of the web rewinding apparatus;

FIGURE 4 is a sectional view taken along the line 4—4 in FIGURE 3;

FIGURE 5 is a fragmentary enlarged sectional view taken along the line 5—5 in FIGURE 2;

FIGURE 6 is a sectional view taken along the line 6—6 in FIGURE 3, and showing portions of the label imprinting machine; and

FIGURE 7 is a fragmentary enlarged side elevation of the web rewinding apparatus looking at the opposite side from FIGURE 2.

Referring more specifically to the drawings, the web rewinding apparatus in which the present invention is embodied is shown as being attached to the forward end of a label imprinting machine of the type disclosed and claimed in our aforesaid co-pending application, Serial No. 283,919, filed May 28, 1963. Briefly, the label imprinting machine comprises a base having a horizontally extending top member or platform 10 over which a web W having serially arranged labels L thereon is to be intermittently fed for performing a printing operation by a label imprinter mechanism 11 on individual labels as the labels are successively presented thereto. While the web W is shown as a backing web to which pressure-sensitive labels L have been adhesively secured in spaced serially arranged relation, it will be understood that the web may comprise serially arranged labels wherein adjacent labels are interconnected by perforate portions or other suitable interconnecting means disposed therebetween.

A roll R of the label-containing web W is disposed at the rear end of the label imprinting machine, and the web therefrom is threaded behind and beneath a tension sensing bar 12 and then upwardly onto the platform 10. The feed reel carrying the roll R of the label-containing web W is equipped with a brake 13 which is normally maintained in operative engagement with the feed reel containing the roll R by a spring 14 to prevent overrunning of the roll R which would cause an excess amount of the web W to be unwound therefrom. If even a slight tension develops in the web W as it is being unwound from the roll R, the tension sensing bar 12 will move in an upward arc to release the brake 13, thereby preventing damage to the web W as it is being unwound from the roll R. The web W in its path of travel along the platform 10 of the label imprinting machine is threaded under an anti back-up pad 15 and beneath auxiliary feeding fingers 16

prior to being passed between feed cams 17 and 18 (FIGURE 6) which deliver the web W in successive portions to the printing mechanism 11 for imprinting suitable indicia or legends on the individual labels L.

The feeding fingers 16 comprise an auxiliary feed means to insure proper registration of each successive label L as it is fed to the printing mechanism 11 by feed cams 17 and 18 so that the indicia or legends to be imprinted on the label L will be accurately placed. In this respect, the feeding fingers 16 are mounted for reciprocable movement along the platform 10 and are adapted to successively engage the rearmost edges of the type of labels L which are carried by a backing web W, as illustrated, or suitable perforate portions interconnecting serially arranged labels in web form to correctly position each individual label for feeding by the feed cams 17 and 18. Referring to FIGURE 6, it will be observed that the feed cams 17 and 18 have respective raised arcuate portions 19 and 20 on their peripheries which cooperate with each other to intermittently feed the label-containing web W forwardly along the platform 10 in timed relation to the rotation of a printing cylinder 21 disposed forwardly thereof and comprising a component of the printing mechanism 11. Accordingly, the labels L are individually imprinted with suitable indicia or legends contained on the printing cylinder 21, as the labels L are successively presented thereto for the performance of a printing operation thereon. The foregoing description corresponds to the label imprinting machine disclosed and claimed in our aforesaid co-pending United States patent application, with which the web rewinding apparatus embodying the present invention may be used. It should be understood, however, that the present web rewinding apparatus is of general utility and may be suitably employed to rewind an elongate web into a roll for convenient handling in instances where the web undergoes an intermittent feeding motion in a predetermined path of travel.

The web rewinding apparatus in accordance with the present invention comprises an elongate frame member 25 adapted to be secured to the forward end of the label imprinting machine, where the label-containing web W issues from the printing mechanism 11 following the imprinting of suitable indicia or legends on individual labels L. The frame member 25 is releasably secured by a pin 26 to the forward upper end portion of the base of the label imprinting machine so as to extend forwardly thereof. The pin 26 is rigidly fixed to the inner surface of the frame member 25 and penetrates an aperture in the base of the label imprinting machine. The frame member 25 includes a dependent projection 27 intermediate the ends thereof to which is attached a support in the form of a resilient bumper 28 for engagement with the floor on which the label imprinting machine stands to support the frame member 25 of the web rewinding apparatus in a substantially horizontal position extending forwardly of the label imprinting machine. The frame member 25 is also tightly clamped by a suitable clamping assembly to the base of the label imprinting machine to eliminate or substantially reduce vibration of the web rewinding apparatus. The clamping assembly, as shown, comprises a toggle linkage 30 secured to one side of the base of the label imprinting machine adjacent the forward end portion thereof. The toggle linkage 30 applies a clamping force to the frame member 25 through an adjustable bolt 31 upon appropriate manipulation of a toggle lever 32 (FIGURES 2 and 5) to releasably bind the rear end portion of the frame member 25 to one side of the base of the label imprinting machine at the forward upper end portion thereof.

The frame member 25 is provided with a hub 35 at the forward end thereof in which a transversely extending rotatable shaft 36 is journaled. A plain bearing sleeve 37 is seated within the cylindrical bore of the hub 35 and fixed to the hub 35 for supporting the shaft 36 which ex-

tends therethrough. A sheave or pulley 38 is fixedly secured to one end of the shaft 36 by suitable means, such as a set screw 39, the pulley 38 being disposed in axially spaced relation to the outer end of the hub 35 by an annular flange 40 integral with the bearing sleeve 37 and extending radially outwardly between the pulley 38 and the hub 35.

The shaft 36 is adapted to be continuously rotated, while the label imprinting machine is in operation, the shaft 36 being driven by a belt and pulley drive which includes the pulley 38 affixed to the shaft 36. To this end, the belt and pulley drive comprises a positively driven pulley 42 mounted on a rotating shaft extending outwardly from one side of the printing mechanism 11 (FIGURES 1 and 2) which is the same side of the label imprinting machine to which the frame member 25 is secured, the pulley 38 rigidly affixed to the shaft 36, and a belt 43 entrained about the positively driven pulley 42 and the pulley 38 to impart rotation to the pulley 38 and the shaft 36 on which it is carried.

The shaft 36 is restrained against relative axial movement with respect to the hub 35 by an annular collar 44 affixed to the shaft 36 for movement therewith by suitable means, such as a set screw 45. The annular collar 44 is disposed in rotating engagement with the radial end surface of the hub 35 remote from the pulley 38 and cooperates with the pulley 38 which is disposed in rotating engagement with the radial flange 40 of the bearing sleeve 37 to prevent relative axial movement of the shaft 36 with respect to the hub 35.

A take-up roll or reel 46 in the form of a hollow cylindrical tube surrounding the shaft 36 is provided for the purpose of rewinding the label-containing web W thereon following the performance of the printing operation on the individual labels L. The cylindrical tube forming the take-up reel 46 includes a pair of integral internal radial walls 47 and 48 respectively spaced inwardly of the opposite ends thereof, the walls 47 and 48 being provided with cylindrical bores therethrough for rotatably receiving the shaft 36.

A clutch assembly is provided between the shaft 36 and the take-up reel 46 to impart controlled rotation to the take-up reel 46 from the shaft 36 which undergoes continuous rotation while the label imprinting machine is in operation. The clutch assembly includes a first annular clutch gasket 50 of resilient material, such as leather, the gasket 50 being interposed between the collar 44 carried by the shaft 36 and the internal radial wall 47 of the take-up reel 46 and presenting oppositely disposed radial clutch faces for respective engagement with opposed radial surfaces on the collar 44 and the internal radial wall 47. The end of the shaft 36 opposite from the pulley 38 is provided with elongated axially extending slot 51 and includes external threads 52 thereon. An annular back-up member or spring retainer 53 is threaded onto the threads 52 provided on the shaft 36, the back-up member 53 seating one end of a coiled compression spring 54 thereagainst. The spring 54 encircles the shaft 36 and biases a second annular clutch gasket 55 of resilient material, such as leather, into engagement with the internal radial wall 48 of the take-up reel 46. An annular L-shaped follower member 56 is interposed between the gasket 55 and the spring 54 to seat the end of the spring 54 opposite from the end thereof seated on the back-up member 53. The follower member 56 is provided with an integral dependent key 57 which is slidably received in the axially elongated slot 51 formed in the shaft 36 so as to prevent relative rotation between the follower member 56 and the shaft 36, while permitting axial movement of the follower member 56 along the shaft 36.

The movement of the clutch gasket 55 under the biasing force of the spring 54 in an axial direction into engagement with the internal radial wall 48 of the take-up reel 46 urges the take-up reel 46 in the same axial direction to bias the internal radial wall 47 thereof into engagement

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with the clutch gasket 50, which in turn is forced against the collar 44 carried by the shaft 36. The first and second clutch gaskets 50 and 55 are frictionally received on the shaft 36, while being spaced radially inwardly of the hollow tube forming the take-up reel 46. The clutch gaskets 50 and 55 therefore tend to rotate with the shaft 36 because of the greater area of contact between the clutch gaskets 50 and 55 and the shaft 36 along with the collar 44 and the follower member 56 carried thereby which respectively engage the clutch gaskets 50 and 55, as compared to the area of contact between the clutch gaskets 50 and 55 and the respective internal radial walls 47 and 48 of the take-up reel 46. In practice, the clutch gaskets 50 and 55 at times probably assume a rotative speed somewhat less than the rotative speed of the shaft 36 and cooperate in clutchingly engaging the internal radial walls 47 and 48 of the take-up reel 46 to impart controlled rotation to the take-up reel 46.

The degree of clutching engagement between the clutch gaskets 50 and 55 and the internal radial walls 47 and 48 of the take-up reel 46 may be adjusted by manually rotating the back-up member 53 axially inwardly or outwardly along the externally threaded end portion of the shaft 36 to increase or decrease the biasing force of the spring 54. To this end, the back-up member 53 is provided with an intermediate radially outwardly extending annular knurled projection 60 to facilitate manual turning of the back-up member 53 for adjusting the clutch assembly. The annular knurled projection 60 on the back-up member 53 further serves as a stop member limiting the axially inward movement of the back-up member 53 along the shaft 36 upon being brought into abutment with the opposed end of the take-up reel 46.

The other end of the take-up reel 46 extends into spaced overlying relation with a reduced end portion of the hub 35. The take-up reel 46 is provided with a pair of annular reel flanges 63 and 64 which serve as guiding elements for receiving the label-containing web W as it is rewound in a roll about the take-up reel 46. The reel flanges 63 and 64 include inwardly tapering annular knurled surfaces 65, 66, respectively for firmly gripping a relatively rigid internal core member C about which the web W is rewound to prevent slipping of the core member C. Each of the reel flanges 63 and 64 is adjustable along the length of the take-up reel 46 to vary the space therebetween for accepting webs of varying width wound thereabout. To this end, each of the reel flanges 63 and 64 may be provided with a set screw 67 which may be readily loosened to permit adjustment of the position of the reel flange along the take-up reel 46, and thereafter tightened to releasably secure the reel flange to the take-up reel 46.

An anti back-up brake member 70 is mounted at one end thereof on an inwardly directed boss 71 formed on the frame member 25 by a threaded bolt 72 which loosely penetrates the brake member 70 and is threadably received in the boss 71. The brake member 70 is freely pivotable about the threaded bolt 72 and comprises an elongate brake arm having its end remote from the bolt 72 provided with a convex pad 73 of frictional material, such as leather, which freely rests upon the end portion of the cylindrical take-up reel 46 at a point spaced upwardly from a horizontal plane including the axis of the take-up reel an angular distance less than 90° relative to the direction of rotation of the take-up reel. This latter end portion of the take-up reel 46 is provided with a plurality of circumferentially arranged, axially extended, parallel score lines 72 (FIGURE 3) for enhancing the frictional engagement between the take-up reel 46 and the brake member 70 to prevent back-up of the take-up reel 46.

A slack let-off mechanism or assembly forms part of the web rewinding apparatus, the slack let-off assembly being mounted on the dependent projection 27 of the frame member 25 so as to be disposed in the path of travel of the web W between the label imprinting machine and the

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take-up reel 46. The slack let-off assembly includes an upper stationary shaft 75 extending transversely of the path of travel of the web W. A transversely extending bar 76 is disposed beneath the shaft 75 in parallel relation thereto. The bar 76 supports a cylindrical roller tube 77 in floating relation, the cylindrical roller tube 77 loosely surrounding the bar 76 and having an abrasive or gritty outer surface to prevent the smearing of ink on the labels L recently imprinted by the printing mechanism 11. The cylindrical roller tube 77 floatingly supported by the bar 76 comprises what may be termed a dancing roll. An idler roll 80 is disposed forwardly of the bar 76 and the dancing roll 77 loosely supported thereby, the idler roll 80 also having an abrasive or gritty outer surface to prevent the smearing of ink on the labels L. The abrasive or gritty outer surfaces on the dancing roll 77 and the idler roll 80 may be provided in any suitable manner, such as by surfacing the dancing roll 77 and the idler roll 80 with sandpaper.

The stationary shaft 75 and the bar 76 are fixedly secured at their opposite ends to a pair of support arms 81, 81 with the dancing roll 77 loosely surrounding the bar 76 being freely received between the support arms 81, 81. The idler roll 80 is connected at its opposite ends to the stationary shaft 75 for arcuate movement about the axis thereof by a pair of arms 82, 82 which are respectively pivotally mounted at one end thereof on the opposite ends of the stationary shaft 75 for pivotal movement thereabout. The opposite ends of the idler roll 80 are straddled by the other ends of the arms 82, 82, and the idler roll 80 is rotatably connected thereto by axles 83, 83 which are fixedly secured to the other ends of the arms 82, 82 and on which the opposite ends of the idler roll 80 are journaled.

The idler roll 80 is resiliently urged in a direction toward the dancing roll 77 by means of a pair of coil springs 84, 84 under tension which are operably connected to the idler roll 80. In the latter connection, it will be observed in FIGURE 3 that the axles 83, 83 on which the idler roll 80 is journaled penetrate the arms 82, 82 and project outwardly thereof, the springs 84, 84 being respectively secured at one end thereof to the portions of the axles 83, 83 projecting outwardly of the arms 82, 82 and being secured at their other ends to the support arms 81, 81 adjacent the opposite ends of the bar 76 supporting the dancing roll 77. A stop member in the form of a peg 85 of resilient material, such as rubber, is fixedly mounted on each of the arms 82, 82 intermediate the opposite ends thereof and extends laterally outwardly of the arm 82 into overlapping relation with a corresponding one of the support arms 81, 81 which are respectively disposed outwardly of the arms 82, 82. The resilient pegs 85, 85 limit arcuate movement of the idler roll 80 about the axis of the stationary shaft 75 under the biasing influence of the tension springs 84, 84 in a direction toward the dancing roll 77 by abutting the side edges of the support arms 81, 81 opposed thereto.

The stationary shaft 75 is provided with a pair of annular guide flanges 86 and 87 which are adapted to be positioned in alignment with the corresponding reel flanges 63 and 64 on the take-up reel 46 so as to accurately guide the label-containing web W in its path of travel from the label imprinting machine through the slack let-off assembly and onto the take-up reel 46. Like the reel flanges 63 and 64, the positions of the guide flanges 86 and 87 along the length of the stationary shaft 75 may be adjusted to vary the space between the guide flanges 86 and 87 for accepting webs of varying width therebetween, set screws 90, 90 being provided for this purpose.

The label-containing web W issuing from the label imprinting machine is threaded through the slack let-off assembly in a zig-zag path. In this connection, the web W engages the stationary shaft 75, the dancing roll 77, and the idler roll 80, first passing under the dancing roll 77, then over the stationary shaft 75 where it is guided

between the guide flanges 86 and 87, and then under the idler roll 80 before it proceeds to the take-up reel 46. Even though the web W is being fed from the label imprinting machine in an intermittent motion, the slack let-off assembly is responsible for maintaining a substantially constant tension in the web W as it is intermittently delivered to the take-up reel 46 where it is rewound in a roll for convenient handling.

In the operation of the web rewinding apparatus, the clutch assembly between the rotating shaft 36 and the take-up reel 46 is adjusted by appropriate manual adjustment on the back-up member 53 as described so that the take-up reel 46 will be rotated only in response to the delivery of the web W thereto from the slack let-off assembly and in synchronization with the delivery of the web W thereto. At all other times, the take-up reel 46 will remain stationary even though the shaft 36 continues to rotate, since the clutch assembly has been adjusted to permit the first and second clutch gaskets 50 and 55 to fully rotate with the rotating shaft 36 while engaging the internal radial walls 47 and 48 of the take-up reel 46 in freely slipping relation. The adjustment of the clutch assembly is such that the movement of the web W in an intermittent motion as it is delivered to the take-up reel 46 overcomes the inertia of the take-up reel 46 and cooperates with the clutch assembly to impart intermittent rotation to the take-up reel 46 synchronized with the delivery of the web W thereto.

As the web W is being rewound in a roll on the take-up reel 46 in the manner described, the slack let-off assembly continues to maintain a substantially constant tension in the web W to prevent either bunching or tearing of the web W. In this respect, the idler roll 80 swings back and forth or oscillates in an arcuate path about the axis of the stationary shaft 75 in directions away from the dancing roll 77 in opposition to the tension springs 84, 84 and toward the dancing roll 77 drawn by the tension springs 84, 84 to accommodate the intermittent feeding motion of the web W which would otherwise cause rather large variations in the degree of tension maintained on the web W along the length thereof. The floating cylindrical roller tube or dancing roll 77 assumes various positions with respect to its supporting bar 76 as required, while the idler roll 80 undergoes oscillatory movement in an arcuate path about the axis of the stationary shaft 75, to prevent binding of the web W and to insure maintenance of a substantially uniform tension in the web W.

As previously mentioned, the slack let-off assembly is mounted on the dependent projection 27 of the frame member 25. In this respect, the support arm 81 of the slack let-off assembly proximate the dependent projection 27 of the frame member 25 is fixedly but releasably secured thereto by a suitable fastener means permitting pivotal adjustment of the slack let-off assembly about an axis transverse to the path of travel of the web W. As shown, the fastener means may take the form of a stem or pin 91 rigidly secured to the support arm 81 medially of the ends thereof, the pin 91 penetrating the dependent projection 27 of the frame member 25 and having a threaded end portion extending outwardly thereof for receiving a knurled, internally threaded cap 92 to secure the support arm 81 against the dependent projection 27 of the frame member 25. The cap 92 may be manually loosened to permit the pin 91 to be turned with respect to the dependent projection 27 of the frame member 25 for pivoting the slack let-off assembly about the transverse axis of the pin 91 to a selected adjusted position in arranging the stationary shaft 75, the dancing roll 77, and the idler roll 80 of the slack let-off assembly to maintain a particular degree of tension along the length of a web W threaded therethrough.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes

of limitation, the scope of the invention being defined in the claims.

We claim:

1. A web take-up apparatus for a driven elongated web, said web take-up apparatus comprising
 - (a) a frame member adapted to be supported in proximity to the path of travel taken by the web as it is driven forwardly,
 - (b) a slack let-off assembly carried by said frame member, said slack let-off assembly including
 - (1) a stationary shaft,
 - (2) a dancing roll disposed below said shaft,
 - (3) means loosely supporting said dancing roll for limited floating movement in which said dancing roll is generally constrained in parallel relation to said shaft,
 - (4) an idler roll disposed forwardly of said dancing roll and below said shaft in parallel relation to said shaft,
 - (5) means connecting said idler roll to said shaft for arcuate movement of said idler roll about the axis of said shaft, and
 - (6) resilient means operably connected to said idler roll for biasing said idler roll in a direction toward said dancing roll;
 - (c) a take-up roll disposed after said slack let-off assembly and constituting the end of the path of travel of the web,
 - (d) said shaft, said dancing roll, and said idler roll extending transversely to the path of travel of the web, and the web being adapted to engagingly pass beneath said dancing roll, over said shaft, and beneath said idler roll to said take-up roll,
 - (e) means to drive said take-up roll in response to the delivery of the web thereto, and
 - (f) said idler roll oscillating in an arc about the axis of said shaft to compensate for any tendency toward variations in tension in the web so that a substantially uniform tension may be maintained in the web as it is delivered to said take-up roll.
2. A web rewinding apparatus for use with a machine in which an elongated web is intermittently fed from a supply roll of web material in a predetermined path of travel to successively present portions of the web for the performance of an operation thereon; said web rewinding apparatus comprising
 - (a) a slack let-off assembly disposable in a position following the intermittent feeding of the web from the supply roll of web material and the performance of an operation on successive portions of the web, said slack let-off assembly comprising
 - (1) a stationary shaft,
 - (2) a dancing roll disposed below said shaft,
 - (3) means loosely supporting said dancing roll for limited floating movement in which said dancing roll is generally constrained in parallel relation to said shaft,
 - (4) an idler roll disposed forwardly of said dancing roll and below said shaft in parallel relation to said shaft,
 - (5) means connecting said idler roll to said shaft for arcuate movement of said idler roll about the axis of said shaft, and
 - (6) resilient means operably connected to said idler roll for biasing said idler roll in a direction toward said dancing roll;
 - (b) a take-up roll disposed after said slack let-off assembly and constituting the end of the path of travel of the web,
 - (c) said shaft, said dancing roll, and said idler roll extending transversely to the path of travel of the web, and the web being adapted to engagingly pass beneath said dancing roll, over said shaft, and beneath said idler roll to said take-up roll,
 - (d) means for imparting rotation to said take-up roll,

- (e) clutch means operatively connected to said rotation imparting means and controlling the rotation of said take-up roll,
- (f) means for adjusting said clutch means so that said take-up roll is rotated only in response to the intermittent delivery of the web thereto from said slack let-off assembly and in synchronization with the delivery of the web thereto, and
- (g) said idler roll oscillating in an arc about the axis of said shaft to compensate for the intermittent feeding of the web tending to cause variations in tension in the web so that a substantially uniform tension may be maintained in the web as it is intermittently delivered to said take-up roll.
3. In an apparatus for intermittently feeding an elongated web in a predetermined path of travel including a supply roll of web material, means for intermittently feeding the web from the supply roll of web material to successively present portions of the web for the performance of an operation thereon, means to apply tension to the web lengthwise of its path of travel, and a take-up roll for rewinding the web thereon following the performance of the operation thereon;
- (a) slack let-off means disposable in the path of travel of the web between the intermittent feeding means and the take-up roll and being engageable with the web to maintain a substantially uniform tension therein lengthwise of its path of travel, said slack let-off means comprising
- (1) A shaft extending transversely of the path of travel of the web,
 - (2) a bar extending below said shaft in parallel relation thereto,
 - (3) a cylindrical roller tube loosely surrounding said bar and supported thereby in floating relation,
 - (4) an idler roll disposed forwardly of said floating cylindrical roller tube and below said shaft in parallel relation thereto,
 - (5) means connecting said idler roll to said shaft for arcuate movement of said idler roll about the axis of said shaft, and
 - (6) resilient means operably connected to said idler roll for biasing said idler roll in a direction toward said floating cylindrical roller tube;
- (b) the web being adapted to engagingly pass beneath said floating cylindrical roller tube, over said shaft, and beneath said idler roll to the take-up roll, and
- (c) said idler roll oscillating in an arc about the axis of said shaft to compensate for the intermittent feeding of the web tending to cause variations in tension in the web so that a substantially uniform tension may be maintained in the web as it is delivered to the take-up roll.
4. In an apparatus for rewinding an elongated web being fed from a supply roll of web material in a predetermined path of travel,
- (a) a hollow cylindrical take-up reel,
 - (b) said take-up reel having at least one internal radial wall,
 - (c) a driven rotatable shaft journaled through said take-up reel and said internal radial wall thereof, and
 - (d) a clutch assembly between said take-up reel and said driven rotatable shaft for imparting controlled rotation to said take-up reel from said driven rotatable shaft, said clutch assembly comprising

- (1) an annular clutch gasket mounted about said shaft and having a radial clutch face opposed to said internal radial wall of said take-up reel,
 - (2) resilient means carried by said shaft and biasing said clutch gasket into engagement with said internal radial wall, and
 - (3) adjustment means on said shaft for varying the biasing force of said resilient means to regulate the degree of engagement between said clutch gasket and said internal radial wall;
- (e) whereby controlled rotation may be imparted to the take-up reel from said driven rotatable shaft through the engagement of said clutch gasket with said internal radial wall of said take-up reel.
5. In an apparatus for rewinding an elongated web being fed from a supply roll of web material in a predetermined path of travel,
- (a) a hollow cylindrical take-up reel,
 - (b) said take-up reel having a pair of internal radial walls respectively positioned in the opposite end portions thereof,
 - (c) a driven rotatable shaft journaled through said take-up reel and said internal radial walls thereof, and
 - (d) a clutch assembly between said take-up reel and said driven rotatable shaft for imparting controlled rotation to said take-up reel from said driven rotatable shaft, said clutch assembly comprising
 - (1) first and second annular clutch gaskets mounted about said shaft and having radial clutch faces respectively opposed to said internal radial walls of said take-up reel in outwardly disposed relation thereto,
 - (2) a collar on said shaft disposed outwardly of said first clutch gasket,
 - (3) a back-up member on said shaft disposed outwardly of said second clutch gasket,
 - (4) a spring encircling said shaft and interposed between said back-up member and said second clutch gasket, said spring biasing said second clutch gasket into engagement with the internal radial wall of said take-up reel opposed thereto to in turn bias said take-up reel in a direction causing the other internal radial wall thereof to engage the first clutch gasket and force it into abutment with the collar on said shaft, and
 - (5) means for axially adjusting said back-up member along said shaft to vary the biasing force of said spring for regulating the degree of engagement between said first and second clutch gaskets and the respective internal radial walls of said take-up reel corresponding thereto;
 - (e) whereby controlled rotation may be imparted to said take-up reel from said driven rotatable shaft through the engagement of said first and second clutch gaskets with said internal radial walls of said take-up reel.

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