

- [54] **TIRE RING DRIVE FOR LABEL PRINTERS**

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- [58] **Field of Search**.....101/228, 226, 227,  
101/225, 224, 219, 375, 376, 220-227;  
226/8, 140, 153; 83/260, 261

- [56]
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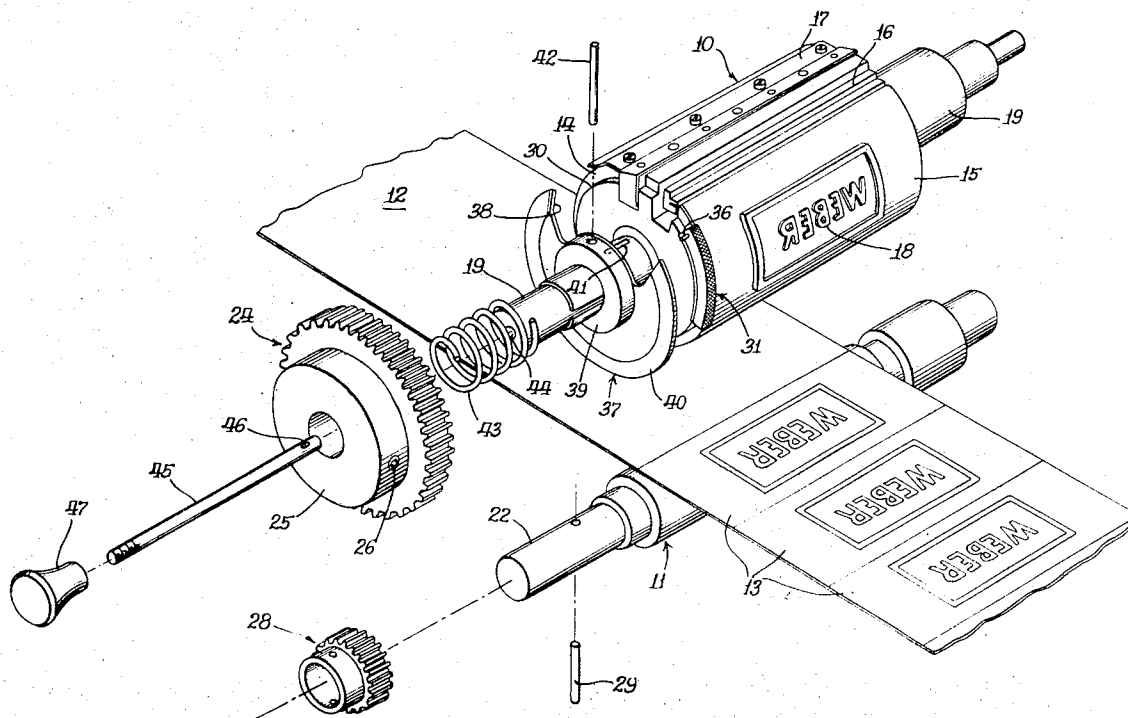
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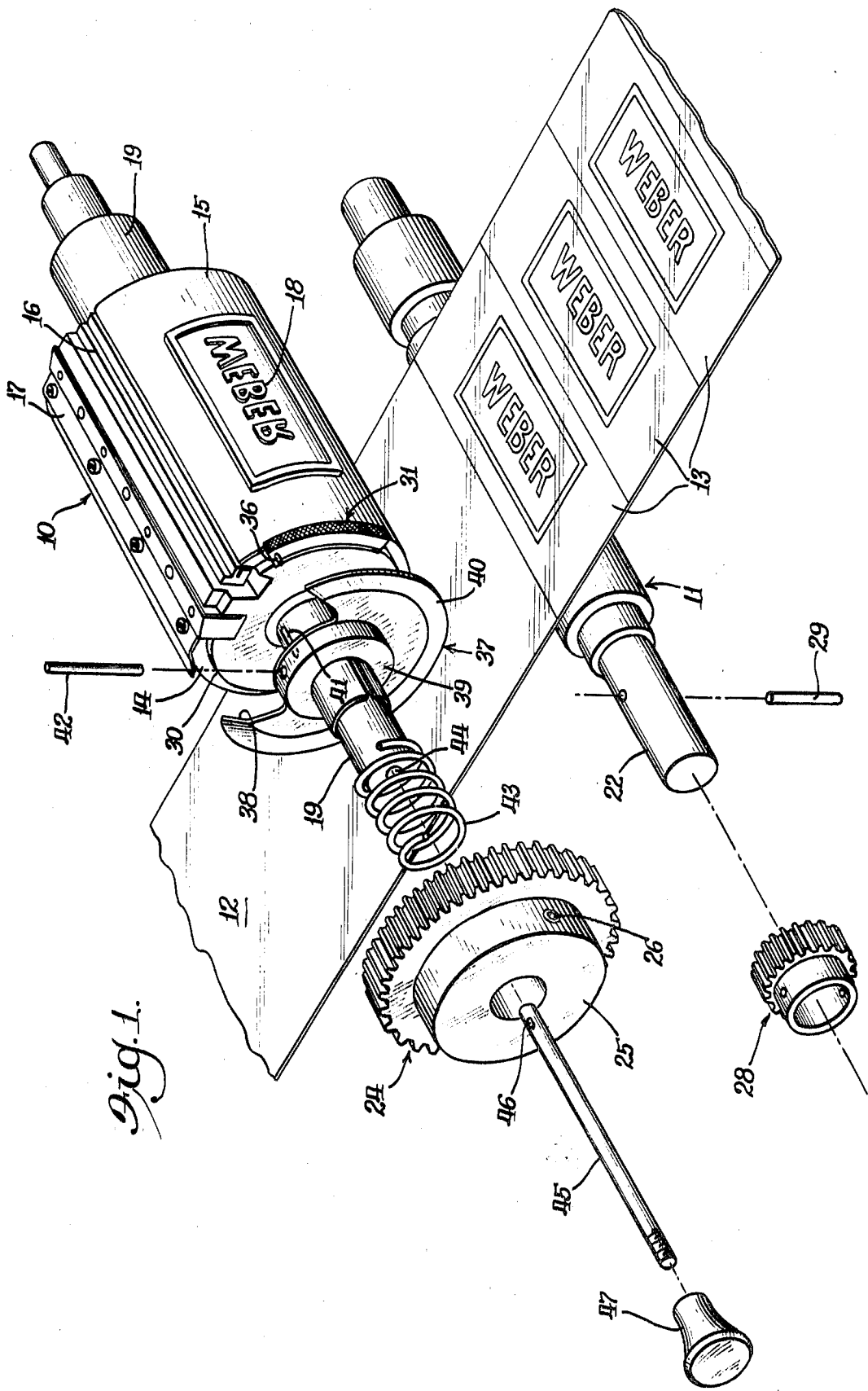
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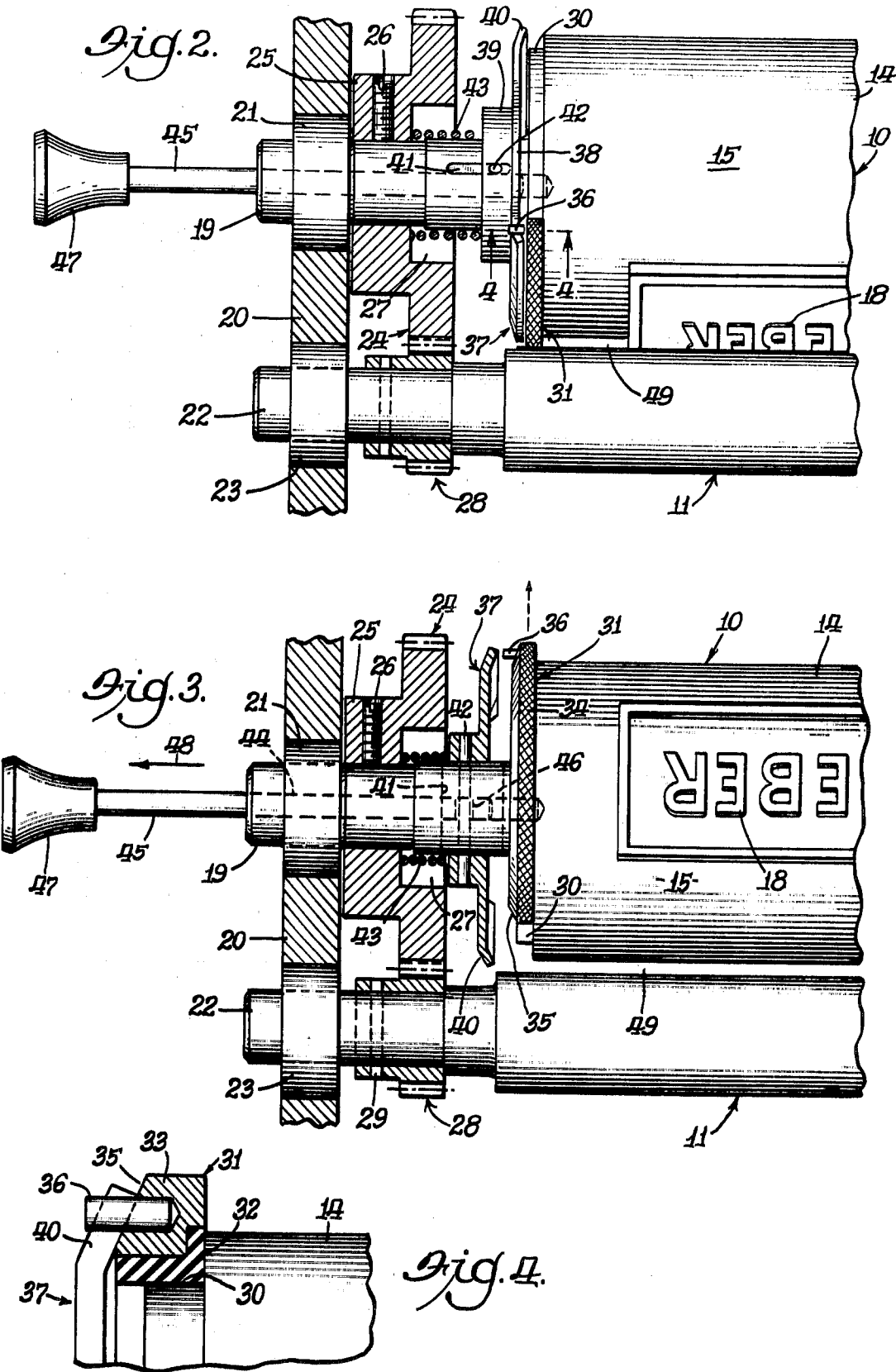
[57] **ABSTRACT**

A removably positioned tire ring on a printing roller in a label printer or the like having a slightly spaced apart cooperative platen roller. The tire ring imparts movement to a label stock fed between the cooperating printing and platen rollers to cause a feed out of the label stock a distance equal to the arcuate length of the tire ring which is made commensurate with the length of the indicia on the label being printed.

### 4 Claims, 4 Drawing Figures







## TIRE RING DRIVE FOR LABEL PRINTERS

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

Label printing machines have in the past employed cooperative printing and platen rollers to effect a printing of the indicia from the printing roller to the label stock and to simultaneously continuously feed the label stock as the rolls are driven. This means that for any given size set of rollers the label stock feed out will be identical regardless of the extent of the indicia printed on the label.

Still other prior label printers have been designed to make the label feed out a distance commensurate with the length of the label being printed and not dependent on the diameter of the printing roller.

It is in this latter specific field that applicant's invention resides — that is, labels may be repetitively imprinted on label stock with a minimum of wasted space between imprintings regardless of the arcuate extent of the printing indicia and regardless of the diameter of the printing roller.

## 2. Description of the Prior Art

The 1910 patent to Oehring U.S. Pat. No. 953,918 shows cooperative rollers for feeding strips, such as postage stamps. Oehring discusses a variable length feed-out of the strip on a complete revolution of the rolls. This is accomplished by a two part roll, both parts of which have a peripheral notch. One part is arcuately adjustable with respect to the other part to vary the effective length of the surface notch and thereby vary the feed-out of strip material being fed.

The Rouan U.S. Pat. No. 2,306,501 shows and describes an adjustable length arcuate drive member for a tape or web member. However, this adjustable length drive member is located at a position remote from the printing drum. A cam member engages a lever arm to effect engagement or disengagement of the adjustable length drive member with the web or tape to be fed. The device feeds the web forwardly and then subsequently retracts the web.

The Worth U.S. Pat. No. 2,988,990 shows a marking roller with raised type thereon. Worth employs full circumference rings at each end of a printing roller to thus insure constant feeding of label stock — not just for that part of the circumferential arc having printing indicia thereon. Worth employs a roll braking member as shown in FIG. 3 of the drawing to accomplish an intermittent feed.

The Peterson U.S. Pat. 3,058,641 shows and describes a punch press roll feed. Intermittent feeding of stock is accomplished in Peterson by a slot milled in the surface of one of the cooperative driving rolls.

The Sohn U.S. Pat. No. 3,099,212 shows and describes a means for feeding label stock solely by the printing area on a printing roller.

The Follis et al. U.S. Pat. No. 3,460,474 has a feed roll 9 which is provided with a raised rubber blanket which can have its arcuate extent varied by the operator to vary the amount of web feed-out as determined by the amount of printing to be applied to the label.

The Knudsen U.S. Pat. No. 3,603,250 shows a means for driving a web to be printed with a separate pair of cooperative rolls.

## SUMMARY OF THE INVENTION

A principal object of this invention is to provide a

novel means for printing various length labels on the same machine without wasting label stock between adjacent labels.

An important object of this invention is to provide a replaceable label stock moving device on a printing roller in a label printing machine so that the label stock will only be advanced a distance commensurate with the length of the indicia of the printing medium on the printing roller.

Another important object of this invention is to provide a novel tire ring for the printing rollers of label printing machines in which the tire ring comprises an inner rubber ring and an outer metal ring bonded to the inner rubber ring.

Another important object of this invention is to provide a novel arcuate segment tire ring for removable mounting near the end of a printing roller in a manner to prevent unwarranted radial separation from the printing roller or relative rotation with respect to the printing roller.

Still another important object of this invention is to provide a spring biased axially directed clamp to hold a replaceable tire ring onto a printing roller.

Other and further important objects and advantages will become apparent from the disclosures in the following specification and accompanying drawings.

## IN THE DRAWINGS:

FIG. 1 is a perspective exploded view of the tire ring label stock drive mechanism of this invention.

FIG. 2 is an end elevational view of the cooperative printing and platen rollers of the label printer of this invention.

FIG. 3 is an end elevational view similar to FIG. 2 but with the rollers moved relative to each other and the retaining clamp withdrawn from the tire ring.

FIG. 4 is an enlarged detail sectional view of the tire ring construction of this invention and taken on the line 4—4 of FIG. 2.

## AS SHOWN IN THE DRAWINGS:

The reference numeral 10 indicates generally a printing roller such as used in a label printing machine. A slightly spaced apart but cooperative platen roller 11 is disposed parallel to and beneath the printing roller. Label stock 12, which is preferably supplied in roll form (roll not shown) is fed between the printing and platen rollers as indicated in FIG. 1. After the label stock has passed through the rolls it has been imprinted and the labels so imprinted are shown at 13.

The printing roller 10 is provided in its central portion with a large cylindrical drum 14. A printing medium which may be any one of a number of types is mounted on the outer surface of the drum portion 14. In the device as shown the printing medium is a rubber mat. Clamp elements 16 and 17 extend across the drum portion 14 of the roller 10. The clamps are depressed to a position beneath the surface of the cylinder 14 and are used to hold the ends of the printing medium 15. The printing medium 15 is provided with indicia 18 which projects radially outwardly from the surface of the printing roller so that a reproduction thereof is caused to be transferred to the label stock as that stock moves beneath the rollers 10 and 11.

The printing roller 10 is further provided with an axial shaft 19 projecting outwardly from both ends of the drum portion 14. It is about this shaft 19 that the

roller rotates to effect the printing of the labels 13. As best shown in FIGS. 2 and 3 the label printer is provided with a housing side wall 20 in which the rolls 10 and 11 are supported in their printing operation. A bearing bushing 21 is mounted on the shaft 19 within the side wall 20. The platen roller 11 is similarly equipped with an axial shaft 22 which lies spaced from but parallel to the shaft 19. A bearing bushing 23 journally receives the shaft 22. The bushing 23 is carried within the side wall 20 of the label printer.

A gear 24 is mounted on the shaft 19 at a position inwardly of the side wall 20. The gear is equipped with a hub 25 for mounting of the gear on the printing roll shaft 19. A set screw 26 is radially disposed and threaded within the hub 25 and is employed when drawn up tightly to engage the shaft 19 and prevent relative movement between the shaft and the gear 24. The gear 24 is further provided with an annular recess 27 located adjacent the shaft 19 on the side thereof opposite the hub 25.

A smaller gear 28 is mounted on the platen roller shaft 22 and is disposed in alignment with and in meshing engagement with the larger printing roll gear 24. A pin 29 passing generally diametrically through the gear 28 and the shaft 22 acts to lock the gear to the shaft 22.

During operation of the label printer of this invention drive is imparted to one of the rolls 10 or 11. As the rolls are in direct geared engagement with each other they are driven in opposite directions so that label stock 12 fed between the rolls will be intermittently moved therethrough by means to be hereafter described.

The drum 14 of the printing roller 10 is equipped with an annular depressed shoulder on one end thereof for the purpose of receiving tire rings 31 of various arcuate lengths. The ring 31 is removably mounted on and against the shoulder 30. The tire ring is not a full annular ring but rather only an arcuate segment of a length just slightly longer than the arcuate length of the indicia 18 on the printing medium 15. The tire ring 31 is used to engage and feed out label stock during the label printing operation. It is the function of the tire ring to feed the label stock independently of any tendency of the indicia of the printing medium to move the label stock. Unless there is a relatively solid mass of printing indicia the label stock would not be effectively moved by that indicia. In contradistinction, the tire ring of this invention is spring urged against the label stock to thereby feed the stock a distance exactly equal to the arcuate length of the tire ring. The use of a tire ring to feed the label stock saves the printing medium from the excessive wear that would be imposed thereon if that medium were also required to feed out the label stock. With proper setting and adjustment the tire ring assumes all of the load of driving the label stock while the printing medium is used only to transfer the indicia thereon to the label stock.

The tire ring comprises an inner ring 32 of rubber or other elastomer material and an outer ring 33 of a harder material such as metal or plastic. The outer hard ring is bonded to the base rubber ring and together the composite tire has the wearing quality of the hard ring and the spring urging quality of the rubber to push the tire ring against the label stock for positive feeding. In addition the rubber inner ring provides a self adjusting quality for the tire ring so that it may accommodate to various misalignments of parts or the various discrep-

ancies of thickness of the label stock being fed. One acceptable outer ring material is bronze. The label engaging surface of the outer hard ring of the tire is roughened with cross scratched grooves to insure good frictional engagement of the label stock and its positive feeding movement of the label stock as the tire turns thereagainst. The rubber inner ring is preferably L-shaped as shown in FIG. 4. The rigid outer ring is preferably bonded to the inside angle of the L-shaped rubber ring. The outside radial wall of the outer ring 33 is inclined as shown at 35. This is the wall disposed opposite to the L-shaped leg which also defines one radial wall of the tire ring. A short pin 36 is affixed in and near one end of the tire ring 31. The pin extends in an axial direction away from the drum portion 14 of the printing roller 10.

A spring biased disc shaped clamp is generally designated by the numeral 37. The clamp 37 is provided with a notch 38 in the circumference thereof and it is the edge of this notch that acts to cooperate with the short pin 36 of the tire ring to prevent relative rotational movement of the tire ring to the drum 14.

The disc shaped clamp 37 is provided with an integral hub 39 which is adapted for axial slidable movement on the shaft 19. The outer annular ring portion 40 of the disc is inclined toward the tire ring 31. The inclination of the rim 40 is substantially the same as the inclination of the outer wall surface 35 of the tire ring 31. This means that in the closed position of the clamp 37 against the tire ring as shown in FIG. 2 the clamp holds the tire ring from separating radially from the roller 10 because of the locking effect of the cooperatively engaging inclined surfaces 35 and 40.

The shaft 19 is provided with an elongated slot 41 at a position beneath the hub 39 of the clamp 37. A cross pin 42 in the hub 39 passes through and is free to have longitudinal axial movement through the length of the slot 41. A spring 43 surrounds the shaft 19 and has its inner end abutting the outer end of the hub 39. The outer end of the coil spring abuttingly engages the inner wall of the annular recess 27 of the gear 24. The gear 24 thus acts as a fixed abutment or reacting surface for the spring 43 to normally urge the clamp 37 axially against the tire ring as shown in FIG. 2.

The shaft 19 is provided with an axial or longitudinal passageway 44 to receive a small diameter rod 45 for axial sliding movement therein. The rod 45 is provided with a transverse opening spaced just inwardly of the end thereof which extends into the passageway 44. In that position the cross pin 42 of the clamp hub 39 passes through the rod opening 46 to thereby lock the rod to the clamp 37. A hand engaging knob or handle 47 is attached, such as by a threaded engagement, to the other end of the rod 45 and provides the means for manually pulling the rod and thus the clamp in an axial direction against the action of the spring 43. The arrow 48 indicates the direction of the pulling force to be applied on the knob 47 and the resultant position of the clamp and its appurtenances is as shown in FIG. 3.

The primary purpose of the present invention is to provide a positive drive means for label stock in a label printing machine which can be readily interchangeable to accommodate various lengths of labels. For example, one label being printed may have indicia of a 1 inch length. It would then be desirable to insert a tire ring in the machine of a length of approximately 1½ inches so that each label would be 1½ inches long with the 1

inch indicia thereon centered between the edges thereof thus leaving a one-quarter inch space on the top and bottom of the completed label. Now, if it is desired to print a label having indicia 2 inches in length the tire ring would be changed to one having a length of approximately  $2\frac{1}{2}$  inches so that again the indicia could be centered and still have a short unprinted border on its top and bottom. It is desirable to employ a tire ring label stock drive member which is commensurate in length to the length of the indicia on the printing medium.

In the operation of the label printer of this invention the operator must apply a printing medium with indicia thereon to the drum 14 of the printing roller 10. This is done by utilizing the transverse clamps 16 and 17 to securely hold the ends of the medium snugly against the drum surface. The operator then selects a tire ring having an arcuate length somewhat longer than the indicia to be printed. At this point the operator pulls the knob 47 outwardly in the direction of the arrow 48 which causes the disc shaped clamp 37 to be pulled axially away from the shoulder 30 of the drum 14 permitting the operator to conveniently place a tire ring 31 onto the shoulder 30 and in generally horizontal alignment with the printing indicia. The knob 47 is then released whereupon the clamp is spring urged against the tire ring 31 to hold it securely on and axially against the shoulder 30. As previously explained the mating inclined surfaces 35 and 40 of the ring and clamp respectively prevent the tire ring from moving radially outwardly of the shoulder 30. Also, the tire ring is constrained against relative rotational movement by its pin 36 engaging the clamp notch 38.

Now the device is ready to be used in printing labels or the like. The printing indicia substantially fills the slight space 49 which normally exists between the printing and platen rollers. Thus when label stock 12 is delivered to the junction between the rollers the printing indicia causes a transfer of the indicia to the label stock as it passes therethrough. The tire ring 31 has substantially the same radial extent as the printing indicia so that it too engages and presses against the label stock. It is thus a frictional engagement of the tire ring with the label stock that causes movement of the label material through the printing machine. This engagement of the printing indicia and the tire ring with the label stock is clearly shown in FIG. 2. When the printing is completed and the tire ring moves past the juncture of the rollers 10 and 11 the machine is in the position as illustrated in FIG. 3. Here it will be seen that the space 49 between the roll surfaces does not bring the label stock into engagement with any cooperatively engaging surfaces and thus the label stock stops moving. This means that the label stock is only intermittently moved although the printing and platen rollers are continuously driven and as previously explained rotate in opposite directions because of their direct gear drive one to the other. Of course this provides that the mating surfaces of the rollers act to move the intermediate label stock in the same direction.

Various details of construction may be changed without departing from the principles disclosed herein and I do not propose limiting the patent granted hereon otherwise than as necessitated by the appended claims.

What is claimed is:

1. In a printing apparatus in which there is included a printing roller having printing indicia to be repro-

duced mounted on the surface thereof, a cooperative platen roller positioned close to the printing roller for effecting a printing of sheet material interposed between the printing roller and the cooperative platen roller, a tire ring, means removably positioning said tire ring concentrically with and at one end of the printing roller, said tire ring having a circumferential length slightly greater than the extent of the printing indicia, said tire ring engaging and imparting drive to said interposed sheet material for movement of that material a distance equal to the circumferential length of the tire ring and independently of the printing indicia whereby the printing indicia is saved from the excessive wear that would be caused by the printing indicia driving the interposed sheet material, said means removably positioning said tire ring comprising a clamp at the outer end of said printing roller, a spring normally urging said clamp in a direction axially of the printing roller axis and against said tire ring, said clamp having a concentric ring portion inclined from a right angle with respect to the axis of rotation of the printing roller, and said tire ring having an inclined outer portion, and said inclined concentric ring portion of said spring biased clamp abuttingly engaging said inclined outer portion of said tire ring, said spring biased clamp including a disc, said disc having a circumferentially notched cut-out portion, and said tire ring including an axially extending pin adjacent one end thereof whereby said pin cooperatively engages the edge of said notched cut-out of the disc to prevent arcuate shifting of said tire ring.

2. In a printing machine for labels comprising a roll of label stock, a printing roller, a label printing medium carrying indicia to be printed removably positioned on a part of the cylindrical surface of said printing roller, a platen roller disposed close to and parallel to said printing roller, means imparting rotational drive to said printing roller and said platen roller in opposite directions during the printing operation, the closely disposed surfaces between the printing roller and the platen roller adapted to receive an end of the label stock so that the label printing medium on the printing roller causes an imprinting on the label stock with the platen roller as a back-up, a tire ring member, means removably mounting said tire ring member on said printing roller near one end thereof, said tire ring member being of an arcuate length somewhat in excess of the arcuate length of the indicia of the printing medium, said tire ring member disposed in arcuate alignment with the indicia and its outer surface lying at a radial extent substantially equal to the radial extent of the printing medium, whereby the tire ring member imparts independent movement to the label stock through its full arcuate extent thus saving the indicia of the printing medium on the label stock from wear that would be caused thereto if the printing medium were used to drive or assist in driving the label stock, and whereby the label stock is intermittently moved a distance equal to the length of the removably mounted tire ring which length is made commensurate with the arcuate extent of the indicia on the printing medium, said means removably mounting said tire ring comprising a clamp at the outer end of said printing roller, a spring normally urging said clamp in a direction axially of the printing roller axis and against said tire ring, said printing roller including an axial shaft, and said axially spring biased clamp being disc shaped and including a hub journally mounted for axial slidable movement on said printing

roller shaft, said disc shaped clamp having an outer annular ring portion inclined inwardly toward said printing roller and its tire ring, said tire ring having a similarly inclined outer surface whereby the cooperative engagement of the inclined surfaces of the clamp and the tire ring act to prevent radial separation of the tire ring from the printing roller, a rod journally mounted within said printing roller shaft and having a cross pin at its inner end for engagement with the hub of the clamp, said shaft having an axially extending elongated slot through which the cross pin may have axial movement, a spring surrounding the printing roller shaft and arranged to abut the clamp at its inner end and having a fixed abutment at its outer end, and a handle on the outer end of said rod, whereby the spring normally urges said clamp against said tire ring but may be overcome by pulling outwardly on the handle against the action of the spring to separate the clamp from the tire ring.

3. A device as set forth in claim 2 in which said disc shaped clamp is provided with a circumferential notch, said tire ring having a short pin extending axially adjacent one end thereof, whereby said tire ring pin engages the circumferential notch of the clamp to prevent relative rotation of the tire ring with respect to the printing roller.

4. In a printing machine for labels comprising a roll of label stock, a printing roller, a label printing medium carrying indicia to be printed removably positioned on a part of the cylindrical surface of said printing roller, a platen roller disposed close to and parallel to said printing roller, means imparting rotational drive to said printing roller and said platen roller in opposite directions during the printing operation, the closely disposed

surfaces between the printing roller and the platen roller adapted to receive an end of the label stock so that the label printing medium on the printing roller causes an imprinting on the label stock with the platen roller as a back-up, a tire ring member, means removably mounting said tire ring member on said printing roller near one end thereof, said tire ring member being of an arcuate length somewhat in excess of the arcuate length of the indicia of the printing medium, said tire ring member disposed in arcuate alignment with the indicia and its outer surface lying at a radial extent substantially equal to the radial extent of the printing medium, whereby the tire ring member imparts independent movement to the label stock through its full arcuate extent thus saving the indicia of the printing medium on the label stock from wear that would be caused thereto if the printing medium were used to drive or assist in driving the label stock, and whereby the label stock is intermittently moved a distance equal to the length of the removably mounted tire ring which length is made commensurate with the arcuate extent of the indicia on the printing medium, said tire ring comprising an L-shaped rubber inner ring and an outer metal ring bonded to the interior angle of said L-shaped rubber ring, whereby the rubber inner ring spring urges the tire ring into positive frictional engagement with the label stock, and said means removably mounting said tire ring comprising a clamp at the outer end of said printing roller, a spring normally urging said clamp in a direction axially of the printing roller axis and against said tire ring, whereby the clamp abuttingly engages the tire ring on the side opposite the radially disposed leg of the L-shaped rubber ring.

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