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G. N. AUERBACHER

2,721,709

REEL STAND

Filed April 22, 1953

3 Sheets-Sheet 1

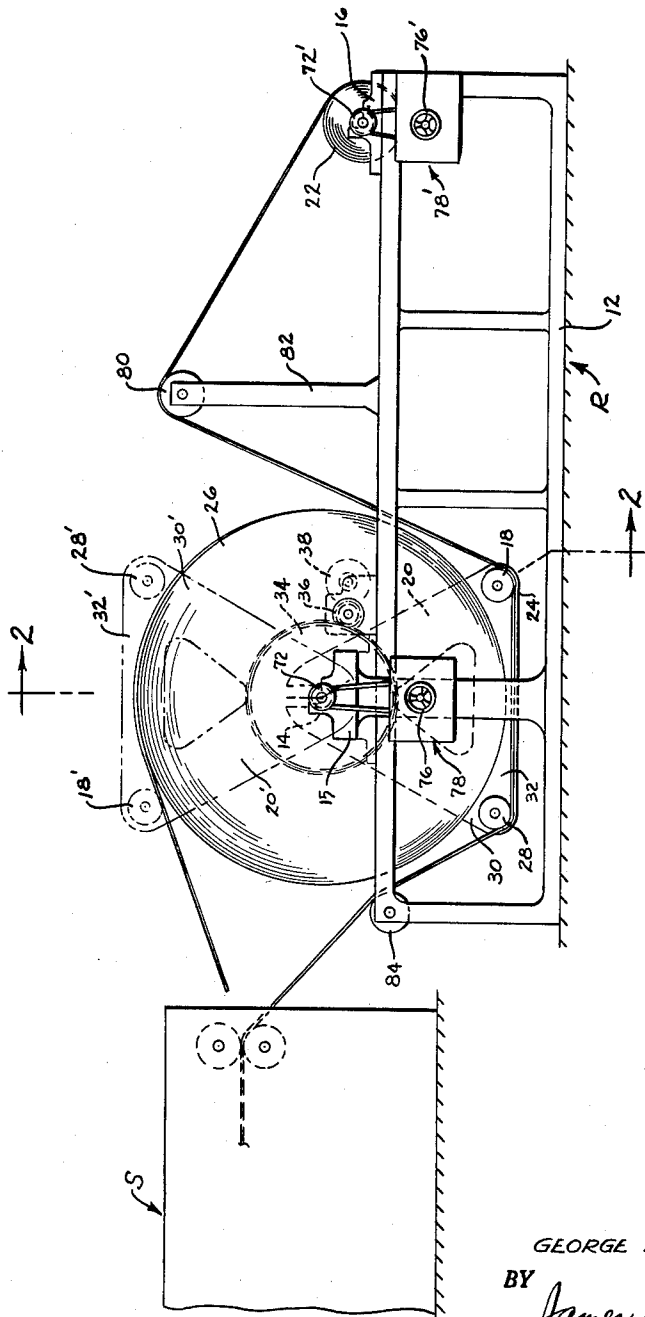


FIG. 1

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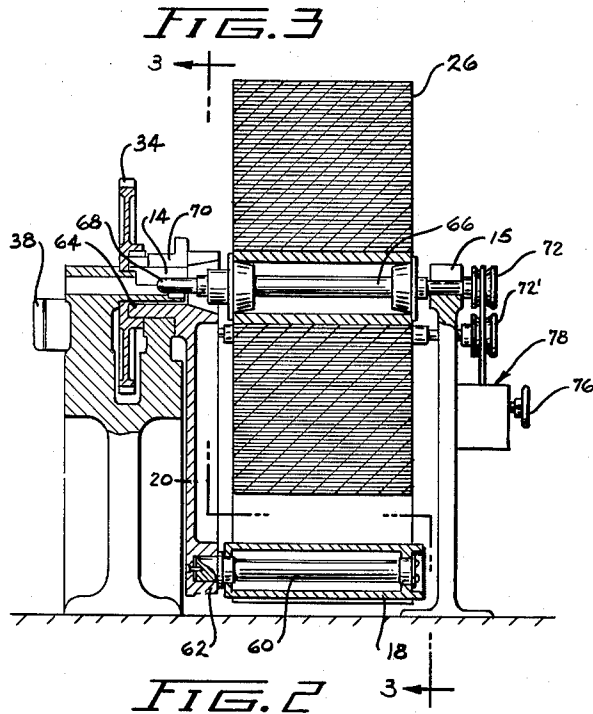
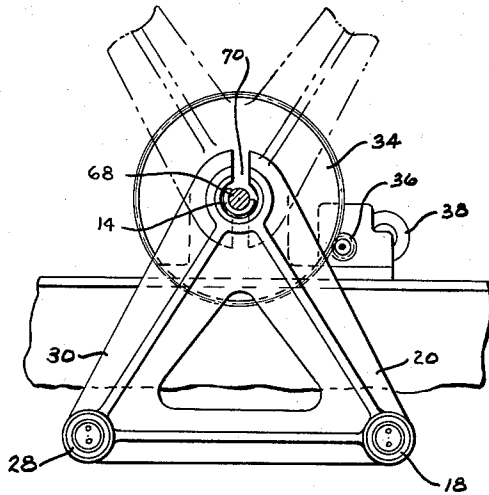
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3 Sheets-Sheet 2



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REEL STAND

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3 Sheets-Sheet 3

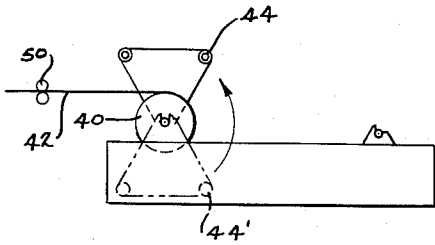


FIG. 4

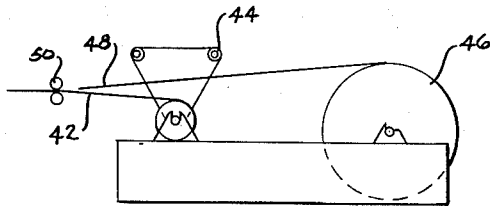


FIG. 5

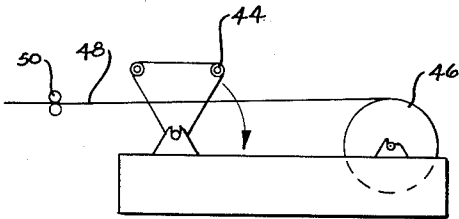


FIG. 6

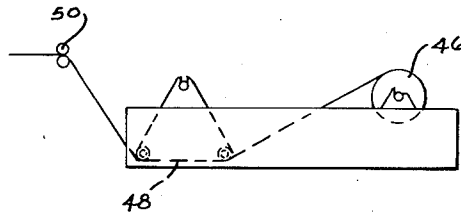


FIG. 7

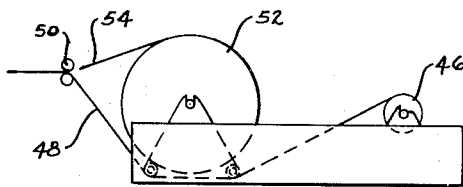


FIG. 8

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2,721,709

REEL STAND

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Application April 22, 1953, Serial No. 350,444

10 Claims. (Cl. 242—58)

This invention relates to reel stands, and more particularly to a reel stand adapted to handle new and old rolls in alternation to avoid interrupting the web supply. It is of particular value for use with splicing apparatus.

It is known to have a roll stand with two or three rolls carried by arms and revoluble about a common center, but when dealing with large heavy rolls such an arrangement requires great ceiling height and great strength. Each roll may, for example, be six feet in diameter.

The primary object of the present invention is to generally improve reel carriers. A more particular object is to provide a reel carrier for use with splicing apparatus or other apparatus in which it is desired that the leading end of a new web be placed on top of the trailing end of an expiring web. A more specific object is to provide a reel carrier adapted for use with the splicing apparatus disclosed in a copending application of Lawrence H. Haskin, Jr. and the present inventor, Serial No. 326,648, filed December 18, 1952, and entitled "Automatic Butt Splicer."

To accomplish the foregoing general objects, and other more specific objects which will hereinafter appear, my invention resides in the reel carrier elements, and the relation of one to another, as are hereinafter more particularly described in the following specification. The specification is accompanied by drawings, in which:

Fig. 1 is a side elevation of a reel carrier embodying features of my invention;

Fig. 2 is a section taken approximately in the plane of the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary view taken approximately in the plane of the line 3—3 of Fig. 2, that is, with the roll omitted; and

Figs. 4—8 are schematic views explanatory of the operation of the invention.

Referring to the drawing, and more particularly to Fig. 1, the reel carrier is generally designated R, and supplies material in web form to a web splicer generally designated S. This may be a splicer of the type disclosed in the copending application Serial No. 326,648 aforesaid, or any other apparatus in which it is desired that the leading end of a new web be placed over the trailing end of an expiring web.

The reel carrier comprises a base 12, the sides of which are spaced apart enough to receive the widest web required. The base carries forward bearings 14, 15 for a forward roll, and rear bearings 16 for a rear roll. The apparatus further comprises a shift roller 18, and a means to shift the same from a lower position shown at 18' to an upper position shown at 18'', or vice versa. In the machine here illustrated this means is an arm 20 which may be swung about the axis of bearing 14. It is turned from the broken line position 20' to the solid line position 20 when the expiring roll is the rear roll 22, and it then serves to depress the expiring web 24 to a position so low at the forward bearing 14, as to clear the way for lowering of a new forward roll 26. It will be seen that the bearings 14 and 15 are preferably open at the top, so that conven-

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tional support spindles, previously passed through the rolls, may be lowered with the rolls from above into the bearings. It will be understood that the plant ordinarily has an overhead lift or rail and travelling hoist, not shown in the present drawing, to help handle these large rolls.

In the specific form of the invention shown, I preferably provide two shift rollers 18 and 28, which are disposed generally parallel to the axis of the bearings 14, 15, and which are disposed approximately equi-distant from the axis by an amount greater than the maximum radius of the roll 26 to be carried by the reel carrier. The shift rollers 18 and 28 are spaced apart so that their axes, together with the roll axis, form a triangle. The arm 20 carrying roller 18 is supplemented by an arm 30 carrying roller 28, and if desired the arms 20 and 30 may be connected as shown at 32, so that they move together as a unit.

In the specific structure here shown the arms 20 and 30 oscillate about the axis of bearings 14, 15. Their movement between the upper and lower positions is obtained by means of a relatively large gear 34, meshing with a pinion 36, which is itself driven through a train of step-down gearing by an electric motor 38. This is convenient though not essential, for the gearing might be turned manually by means of a crank or handwheel, and indeed other means than the particular gearing here shown might be used to shift the shift rollers between their upper and lower positions.

The general ideas underlying the present reel carrier may be explained with reference to the small schematic Figs. 4—8. In Fig. 4 the forward roll 40 has been supplying a web 42. During the unwinding of the roll 40, and at any time prior to expiration of the same, the shift rollers 44 are turned from the bottom position 44' shown in broken lines to the top position shown in solid lines. A new roll 46 is moved over and lowered onto the rear bearings, as shown in Fig. 5. When the expiring web 42 is almost gone, the leading end 43 of the new web is passed beneath the shift rollers 44, and supplied to the rollers 50 of the splicer. The web is then supplied from the roll 46, as shown in Fig. 6. At any time prior to expiration of the roll 46 the shift rollers 44 are swung downward from their upper position shown in Fig. 6 to their lower position shown in Fig. 7. This depresses the expiring web 48 to a position so low beneath the forward bearings as to clear the way for the lowering of a new forward roll at the forward bearings. This is shown in Fig. 8, in which a new forward roll 52 has been lowered into position. When the roll 46 is nearly expired, the leading end 54 of the new web from the forward roll 52 is fed to the initial rollers 50 of the splicer.

By comparing Fig. 5 and Fig. 8 it will be seen that the leading end of the new web is always supplied on top of the trailing end of the expiring web, which is the condition desired.

Considering the apparatus in greater detail, and referring now to Figs. 2 and 3, it will be seen that the roller 18 is rotatable on a coaxial support spindle 60 fixedly secured at 62 in the arm 20. The latter is carried at its upper end by a hub portion 64, which in turn is keyed or otherwise secured to the large gear 34 previously referred to.

The forward roll is carried on a support spindle assembly 66 which may be of conventional character. Such a spindle is passed through a new roll and constitutes a means for supporting the same in the reel carrier. It is usually passed through the roll before lifting the same for transport over and into the reel carrier. The spindle assembly may be of any conventional design including appropriate journal portions outside the roll and tapered hub portions inside the roll, as shown. In the usual arrangement the assembly is simply lowered from above

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until the journal portions are received in the open-sided bearings of the reel carrier. In the present case the open bearing at one side is shown at 14 and at the other side is shown at 15.

The hub portion 64 of the shift roller arms is cut away or slotted to receive the end or journal portion 68 of the spindle assembly. This slot, marked 70 in Figs. 2 and 3, is disposed upward when the shift rollers are in downward position, as shown in Fig. 3, for it is only at that time that a new roll will be lowered into the forward bearings.

In Fig. 2 it will be noted that secured on spindle 66 there is a brake wheel or pulley 72, which cooperates with a brake unit schematically indicated at 78 and controlled by a handle 76. This brake unit may be entirely conventional and serves the purpose of restraining the roll against unwinding too freely, or, in other words, of placing the web under some tension as it is unwound from the roll. The brake unit is fully openable, and does not interfere with adding or removing the spindle assembly, each of which preferably includes its own brake wheel. It will be understood that there is a brake unit of similar character associated with a rear bearing 16 as well as with a forward bearing 15, this being suggested at the numerals 76' and 78' in Fig. 1.

The slotted bearing arrangement shown at 14 in Figs. 2 and 3 may seem somewhat complex, but this arises from a number of factors. One is that the shift rollers swing about the axis of the forward roll, which is not essential, and indeed the arms 20 and 30 may have a common pivot, or even separate pivots, displaced from the roll axis. A single arm and roller may be used, pivoted rearwardly of the roll axis. Moreover, it is not essential that pivoted arms be used, for a shift roller might be raised or lowered on a vertical line along vertical guide tracks, in which case it would be moved up and down at a point rearward of the forward roll, that is, between the forward and rear bearings. Of course, it would be sufficient to clear the rear of the forward roll after the roll is small or nearly expired. The preferred arrangement shown is more convenient because the roller position may be changed at any time. The use of two spaced shift rollers forms a spread within which the new forward roll may be lowered or "cradled."

Reverting to Fig. 1, there is an extra idler roller 80 carried on pedestal bearings 82, and over which the web from the rear roll is carried. This extra guide roller is convenient but not essential, and has been omitted in the schematic diagrams of Figs. 4-8. The same applies to roller 84 in Fig. 1.

It is believed that the construction and operation, as well as the advantages of my improved reel stand, will be apparent from the foregoing detailed description. It will also be apparent that while I have shown and described my invention in a preferred form, changes may be made without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising a base carrying forward bearings for a forward roll, rear bearings for a rear roll, a shift roller, an oscillatable arm carrying said shift roller, said arm being pivoted on the axis of the forward bearings and having a length greater than the maximum radius of the roll to be carried by said reel carrier, step-down gearing connected to said arm for oscillating the same between a top position and a bottom position, said shift roller being swung from its top position to its bottom position when the expiring roll is the rear roll in order to depress the expiring web to a position so low at the forward bearings as to clear the way for lowering of a new forward roll at the forward bearings.

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2. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising a base carrying forward bearings for a forward roll, rear bearings for a rear roll, said bearings being open at the top so that support spindles passed through said rolls may be lowered with the rolls from above into the bearings, a shift roller, an oscillatable arm carrying said shift roller, said arm being pivoted on the axis of the forward bearings and having a length greater than the maximum radius of the roll to be carried by said reel carrier, step-down gearing connected to said arm for oscillating the same between a top position and a bottom position, said shift roller being swung from its top position to its bottom position when the expiring roll is the rear roll in order to depress the expiring web to a position so low at the forward bearings as to clear the way for lowering of a new forward roll at the forward bearings.

3. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising a base carrying forward bearings for a forward roll, rear bearings for a rear roll, said bearings all being open at the top so that support spindles passed through said rolls may be lowered with the rolls from above into the bearings, a shift roller, an oscillatable arm carrying said shift roller, said arm being pivoted on the axis of the forward bearings and having a length greater than the maximum radius of the roll to be carried by said reel carrier, motor driven step-down gearing connected to said arm for oscillating the same between a top position and a bottom position, said shift roller being swung from its top position to its bottom position when the expiring roll is the rear roll in order to depress the expiring web to a position so low at the forward bearings as to clear the way for lowering of a new forward roll at the forward bearings, the hub portion of said arm being cut away or slotted to receive one end of the roll support spindle, and said slot being disposed upward when the arm is in its downward position.

4. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising a base carrying forward bearings for a forward roll, rear bearings for a rear roll, a pair of shift rollers disposed generally parallel to the axis of the forward bearings and removed from said axis by an amount greater than the maximum radius of the roll to be carried by said reel carrier, oscillatable arms carrying said shift rollers, means connected to said arms for oscillating the same in unison between a top position with the shift rollers above the forward bearings and a bottom position with the shift rollers below the forward bearings, said shift rollers being swung from top position to bottom position when the expiring roll is the rear roll in order to depress the expiring web to a position so low beneath the forward bearings as to clear the way for the lowering of a new forward roll at the forward bearings.

5. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising a base carrying forward bearings for a forward roll, rear bearings for a rear roll, said bearings all being open at the top so that support spindles passed through said rolls may be lowered with the rolls from above into the bearings, a pair of shift rollers disposed generally parallel to the axis of the forward bearings and disposed approximately equi-distant from said axis by an amount greater than the maximum radius of the roll to be carried by said reel carrier, oscillatable arms carrying said shift

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rollers, said arms being pivoted on the axis of the forward bearings, means connected to said arms for oscillating the same in unison between a top position with the shift rollers above the forward bearings and a bottom position with the shift rollers below the forward bearings, said shift rollers being swung from top position to bottom position when the expiring roll is the rear roll in order to depress the expiring web to a position so low beneath the forward bearings as to clear the way for the lowering of a new forward roll at the forward bearings.

6. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising a base carrying forward bearings for a forward roll, rear bearings for a rear roll, said bearings all being open at the top so that support spindles passed through said rolls may be lowered with the rolls from above into the bearings, adjustable friction brake mechanism associated with a forward bearing and with a rear bearing, a pair of shift rollers disposed generally parallel to the axis of the forward bearings and disposed approximately equi-distant from said axis by an amount greater than the maximum radius of the roll to be carried by said reel carrier, said shift rollers being spaced apart so that the three axes are located at the corners of a triangle, oscillatable arms carrying said shift rollers, said arms being pivoted on the axis of the forward bearings, step-down gearing connected to said arms for oscillating the same in unison between a top position with the shift rollers above the forward bearings and a bottom position with the shift rollers below the forward bearings, said shift rollers being swung from top position to bottom position when the expiring roll is the rear roll in order to depress the expiring web to a position so low beneath the forward bearings as to clear the way for the lowering of a new forward roll at the forward bearings.

7. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising a base carrying forward bearings for a forward roll, rear bearings for a rear roll, said bearings all being open at the top so that support spindles passed through said rolls may be lowered with the rolls from above into the bearings, a pair of shift rollers disposed generally parallel to the axis of the forward bearings and disposed approximately equi-distant from said axis by an amount greater than the maximum radius of the roll to be carried by said reel carrier, said shift rollers being spaced apart so that the three axes are located at the corners of a triangle, oscillatable arms carrying said shift rollers, said arms being pivoted on the axis of the forward bearings, motor driven step-down gearing connected to said arms for oscillating the same in unison between a top position with the shift rollers above the forward bearings and a bottom position with the shift rollers below the forward bearings, said shift rollers being swung from top position to bottom position when the expiring roll is the rear roll in order to depress the expiring web to a position so low beneath the forward bearings as to clear the way for the lowering of a new forward roll at the forward bearings, the hub portion of said arms being cut away or slotted to receive one end of the roll support spindle, and said slot being disposed upward when the shift rollers are in their downward position.

8. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising substantially permanently fixed forward bearings for a forward roll, rear bearings for a rear roll in substan-

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tially fixed spaced relation with respect to said forward bearings, a shift roller, and means to shift the same upward and downward for a distance greater than the diameter of a new roll, between an upper position above the web coming from a new rear roll, and a lower position lower than the bottom of a new forward roll for guiding a web beneath the new forward roll when said forward roll is placed in position, said shift roller being used in its lower position as a web guide roller when the expiring roll is the rear roll, in order to depress the expiring web to a position so low at the forward bearings as to clear the way for lowering of a new forward roll into the said forward bearings, there being no obstacle to depression of said web by said shift roller when there is no forward roll in the forward bearings.

9. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising substantially permanently fixed forward bearings for a forward roll, rear bearings for a rear roll in substantially fixed spaced relation with respect to said forward bearings, said bearings all being open at the top so that support spindles passed through said rolls may be lowered with the rolls from above into the bearings, a shift roller, and means to shift the same upward and downward for a distance greater than the diameter of a new roll between an upper position above the web coming from a new rear roll, and a lower position lower than the bottom of a new forward roll for guiding a web beneath the new forward roll when said forward roll is placed in position, said upward and downward shift being at a point between the forward and rear bearings, said shift roller being used in its lower position as a web guide roller when the expiring roll is the rear roll in order to depress the expiring web to a position so low at the forward bearings as to clear the way for lowering of a new forward roll into the said forward bearings, there being no obstacle to depression of said web by said shift roller when there is no forward roll in the forward bearings.

10. A reel carrier for receiving successive rolls of material in web form, arranged so that the leading end of the web from a new roll may be fed on top of the trailing end of the web from an old roll, said apparatus comprising substantially permanently fixed forward bearing for a forward roll, rear bearings for a rear roll in substantially fixed spaced relation with respect to said forward bearings, a shift roller, an oscillatable arm carrying said shift roller, said arm being about as long as or longer than the radius of the new rolls to be carried by said reel carrier, means for oscillating the same upward and downward between a top position with the roller above the web coming from a new rear roll, and a bottom position with the roller lower than the bottom of a new forward roll for guiding a web beneath the new forward roll when said forward roll is placed in position, said arm being pivoted at a height between said top position and said bottom position, said shift roller being swung from its top position to its bottom position at a point between the forward and rear bearings when the expiring roll is the rear roll, in order to act as a web guide roller to depress the expiring web to a position so low at the forward bearings as to clear the way for lowering of a new forward roll into the said forward bearings, there being no obstacle to depression of said web by said shift roller when there is no forward roll in the forward bearings.

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