

June 19, 1934.

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1,963,179

APPARATUS FOR REELING RUBBER STOCK

Filed Jan. 2, 1931

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Fig. 1.

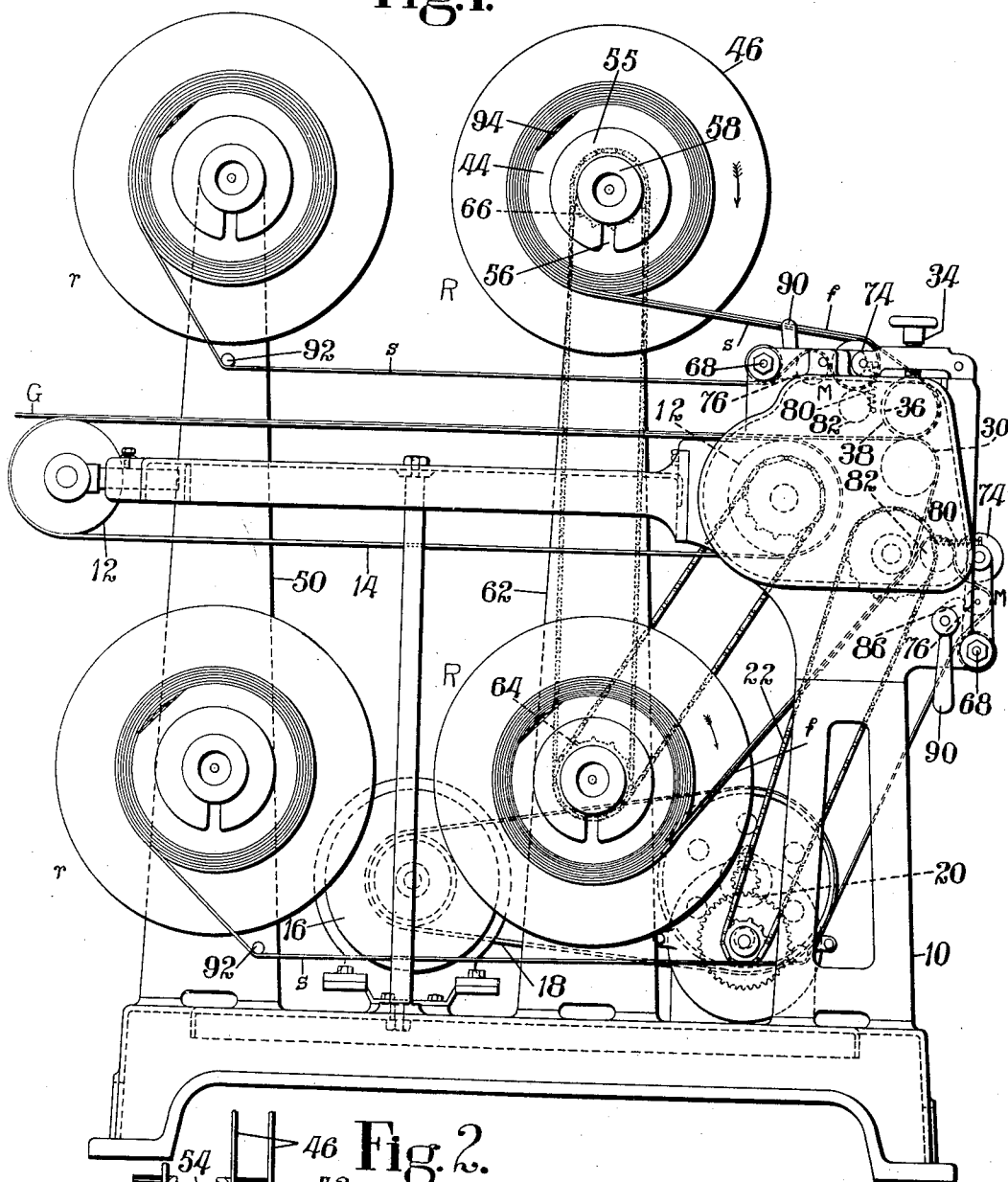
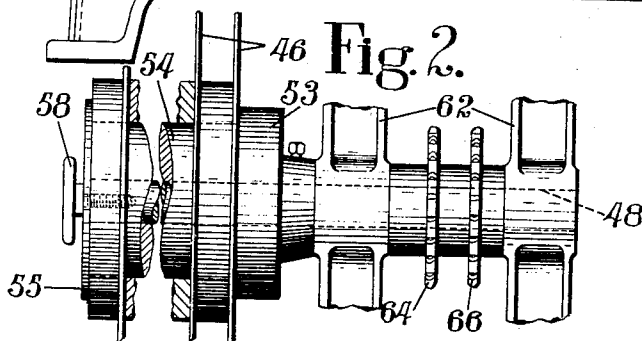


Fig. 2.



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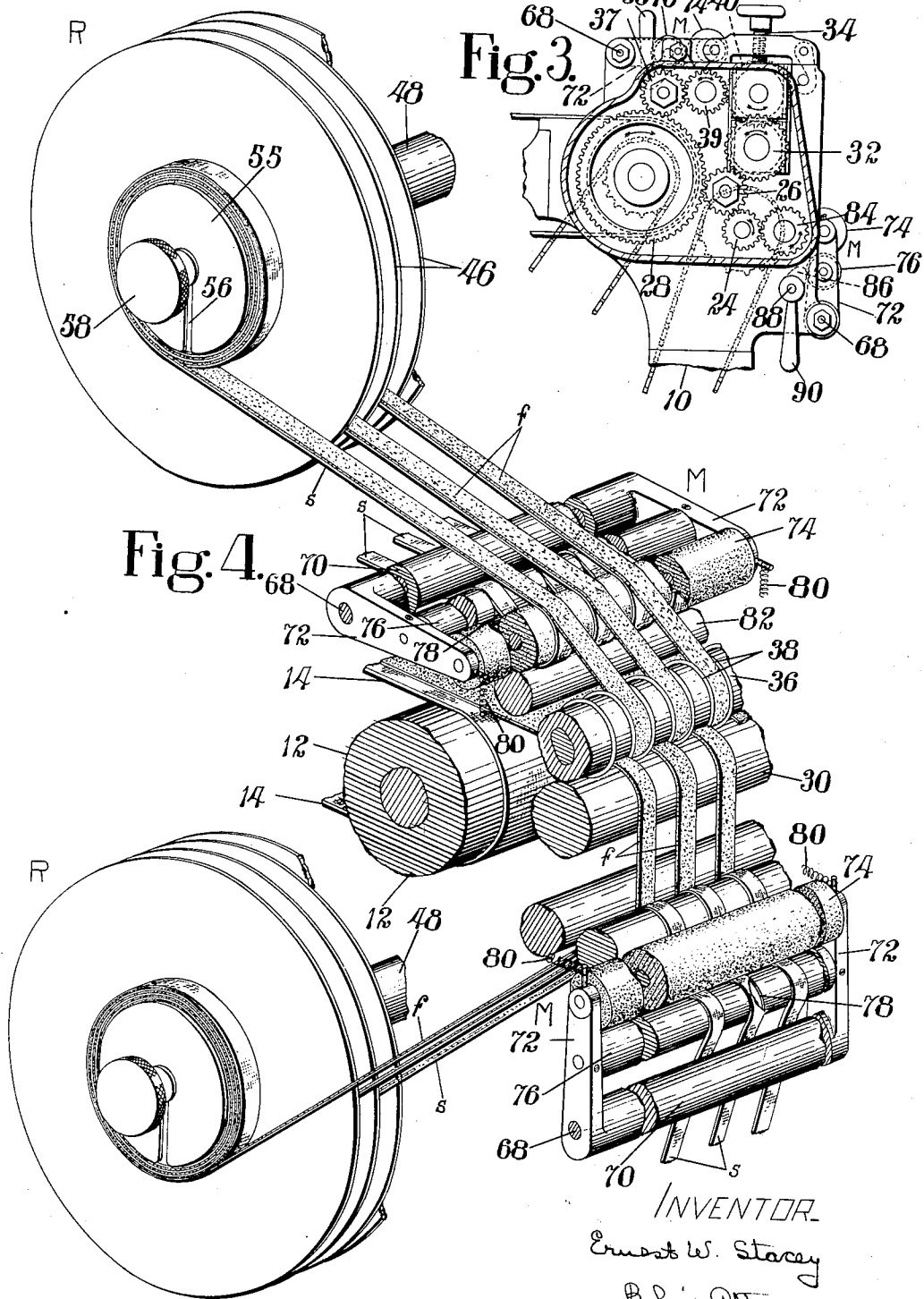
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Filed Jan. 2, 1931

2 Sheets-Sheet 2



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1,963,179

APPARATUS FOR REELING RUBBER STOCK

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Application January 2, 1931, Serial No. 506,034

18 Claims. (Cl. 164—65)

The present invention relates to apparatus by which rubber stock is formed in coils for use in the manufacture of footwear and the like, it being especially concerned with the winding upon reels of strips divided from a web of rubber. The coiling of strips of foxing-material furnishes an example of the work for which my improved apparatus is well adapted.

In producing the foxing employed in attaching rubber soles to shoes of the sneaker type, the strip foxing-material is cut from a thin extended sheet or web of rubber, the strips being coiled separately for convenient use by the operator who applies the soles. An object of my invention is to provide for the formation of such strip-material as foxing and its arrangement upon reels by an apparatus which will be simple, compact and convenient to operate. In attaining this object, I have, in a novel manner, combined with stock-advancing means, as a conveyor-belt, stock-dividing means, which may consist of cutters, means for directing the divided stock rearwardly from the dividing mechanism to opposite sides of the advancing stock, and receiving reels for the strips of divided stock situated at opposite sides of the stock as it advances, said reels being rotatable to wind the strips. There results a compact structure, occupying relatively little floor-space, yet with the elements readily accessible. With each receiving reel I prefer to associate a reel arranged to supply a separator to the stock-strips. This bringing together of the source of separator with stock-advancing, dividing and receiving elements is believed to be patentable, whatever the direction in which the divided stock passes to the receiving reels. By this organization, oppositely directing the divided strips, adhesion between their edges is prevented prior to reeling, and ample space is given between the strips to admit such reel-elements as supporting cheeks or flanges. The interposed separator guards against the adhesion of the successive convolutions of stock upon the receiving reels. As shown, all the reels are arranged in series, permitting a separate handling of the strips. The separator-reels preferably correspond in series-arrangement and in number to the receiving reels. The separators are drawn from their reels by such means as co-operating feed-rolls and pressure-rolls, and the mounting of the latter permits them to be separated from the companion rolls to facilitate the initial introduction of the strips. Means, appearing herein as a grooved roll associated with each separator-drawing means, guides the separator-strips into registration with the divided

stock, so the two strips will be symmetrically positioned with respect to each other upon a reel.

A particular embodiment of this invention appears in the accompanying drawings, in which Fig. 1 is a side elevation of my improved reeling apparatus;

Fig. 2, an enlarged broken detail in side elevation of a reel-mounting;

Fig. 3, a side elevation of the cutting mechanism, with the immediately associated elements operating upon the stock, and their driving means; and

Fig. 4, an enlarged perspective view of said operating elements and the reels for the combined stock- and separator-strips.

In a frame 10, above the base thereof, are journaled rolls 12, 12, over which operates a horizontal conveyor-belt 14. The belt is driven from a motor 16, supported near the bottom of the frame, through a chain of elements which include a belt 18, reduction-gearing 20, sprocket-gearing 22, a pinion 24, an idle pinion 26 and a gear 28 on the shaft of the forward roll 12, so the upper run of the belt travels to the right, as the apparatus is viewed in Fig. 1 of the drawings. At the left, the belt receives a web G of material, as gum-rubber-stock for the foxings of shoes, which web may come directly from unillustrated calender-rolls. To divide the web into a number of strips each of a width suitable for foxing, it passes over a horizontal bed- or abutment-roll 30 journaled in the frame just in advance of and below the conveying surface of the belt. This roll 30 is rotated in the direction of the arrow (Fig. 3) by a gear 32 meshing with the pinion 26. Journaled above the roll 30, in bearings adjustable by screws 34 with respect to the bed-roll, is a cutter-roll 36. Spaced along the roll, at distances corresponding to the width of the foxing-strips to be produced, are circular knives 38 operating in contact with the periphery of the bed-roll. The cutter-roll receives power from the gear 28 through an idler 37, a pinion 39, having another function to be later referred to, and a gear 40.

From the rolls 30 and 36 emerge the divided foxing-strips *f*, passing alternately up and down to opposite sides of the path of the web of stock, to be wound upon two series of reels *R*, *R*, together with intermediate separator-strips *s*, which prevent the adhesion of the convolutions of coils of foxing to one another. The separator-strips are taken from series of reels *r*, *r*. Each reel of both the series *R* and *r* consists of a core 44, in which is an axial opening of considerable diameter, and a flange or cheek 46, which supports or

positions the side of the reeled coil at one extremity of the core. The reels *r* are mounted side by side upon two spindles 48 projecting horizontally, respectively above and below the belt, from a divided standard 50 rising from the frame-base at the rear of the stock-cutting means. Except that the spindles of the rolls *r* are fixed and those of the rolls *R* rotated, their structure and mounting are the same and may be seen in Figs. 1 and 2 of the drawings, the latter particularly illustrating the arrangement of one of the reels *R*. Each spindle 48 is enlarged in diameter, over the portion which is to receive the reels, by a sleeve 54 secured to it. The sleeve so fits the reel-openings as to permit the rotation of the reels, resisted only by their frictional engagement. Each series of reels is normally retained on its spindle-enlargement, against a flange 53 thereon, by a plate 55, which may be circular in form, of a diameter greater than that of the reel-openings and slotted radially at 56 to receive a screw 58 threaded into the outer end of the spindle. When the screw-head is forced against the plate, this is clamped in place, and the entire series of reels upon the spindle is held against displacement but free to rotate. When it is desired to remove empty reels and supply those having the separator wound upon them, a mere loosening of the screw enables the operator to slip off the retaining plate. Then, since the screw-head is of less diameter than the reel-openings, the way is clear for the change.

As previously stated, alternate foxing-strips leave the rolls 30 and 36 of the cutting mechanism in opposite directions and are wound upon separate series *R*, *R* of receiving reels. These reels *R* are carried by their spindles 48 upon a second frame standard 62, and, as previously pointed out, these spindles and the roll-retaining means may be identical with those of the reels *r*, except, in the present instance, the spindles for the reels *R* are rotated, the lower by sprocket-gearing 64 from the forward conveyor-roll 12, and the upper from its companion by sprocket-gearing 66. Separation of the adjacent strips by opposite delivery to upper and lower rolls gives space to receive the reel-flanges 46, so the edges of the soft gum will not be mutilated by contact with them, and avoids the adhesion of said edges to one another. Between the cutting mechanism and each of the reels *R* is a feeding mechanism *M* for the strips of separator. These mechanisms, except for their location, may be in every essential particular the same, and a description of one will serve for both. About a spindle 68 of each mechanism *M*, said spindle being fixed horizontally in the frame, turns a sleeve 70, from the opposite extremities of which project parallel arms 72, 72. Journalled in the arms, at the ends opposite the sleeve, is a pressure-roll 74, which preferably has a yieldable surface, as of rubber. Rotatable upon the arms between the pressure-roll and the pivotal axis is a roll 76, in which is a uniformly spaced series of grooves 78, of such width and depth as to receive and guide the separator-strips. The edges of the grooves are so alined with the knives 38 that the separator-strips may be delivered in registration with the cut foxing-strips, the edges of the latter not projecting outside the former. Springs 80, connecting the arms 72 to the frame, draw the pressure-roll 74 into cooperation with a feed-roll 82 journalled in fixed bearings in the frame. The roll 82 of the lower mechanism *M* has fast with it a pinion 84 meshing with driven pinion 24, so it is, in turn,

driven. The roll 82 of the upper mechanism *M* carries upon its shaft the pinion 39, so it is also rotated, the peripheral speed of the feed-rolls being, in each instance, equal to the rate of advance of the belt 14 and to the peripheral speed of the rolls of the cutting mechanism, so the cut stock and separator, when brought together, may move in synchronism.

In putting the apparatus of this invention into use, the arms 72 are swung temporarily outward to separate the pressure-rolls from the feed-rolls, this rendering it easy to introduce the separator-strips *s* between them, by cams 86 projecting from horizontal spindles 88 and turned by hand-levers 90. The strips *s* are drawn from their reels *r* beneath guide rods 92 projecting from the standard 50 and past the sleeves 70, which may also serve as guides in addition to supporting the arms 72. Then the strips proceed over the guide-rolls 76 at one side and the pressure-rolls 74 at the other. They thus pass through the bite of the pressure- and feed-rolls. The rubber stock *G* is conveyed from the calender-rolls by the belt 14 and carried between the bed-roll 30 and the knife-roll 36 of the cutting mechanism, being there divided into the foxing-strips *f*. Sets of alternate strips are associated with corresponding separator-strips and connected, respectively, to flattened portions 94 of the upper and lower series of receiving reels *R*, *R*. Then, upon starting the apparatus in operation, the feeding mechanisms *M* draw off the sets of separator-strips from the respective series of reels *r*, *r*, and these, with the registering foxing-strips *f*, are gradually wound about the reels *R*, *R* until these have been filled. In this operation, the reels *r* are rotated by the pull of the separator-strips against their frictional resistance upon the spindles, while the receiving reels *R* are rotated by their gearing initially at the speed necessary to coil the combined strips as they are received, without leaving slack between said reels and the feeding mechanism; and thereafter, as the coils accumulate, the reels *R* slip on their spindles to compensate for the increasing diameter of the coils. Since all the reels are rotatable upon their spindles independently of the associated reels, differences in tension of the strips produce no evil effect. The loosening of the screws 58 and the slipping aside of the retaining plates 55 allow all the filled reels *R* to be withdrawn from their spindles 48 for separate distribution.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, receiving reels for the divided stock, means for rotating the reels to wind the divided stock, a separator-supplying reel associated with each receiving reel, and means acting upon the separator from each supply-reel to draw it from said supply-reel and deliver it to the divided stock between the dividing mechanism and the corresponding receiving reel.

2. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, series of receiving reels for the divided stock, means for rotating the reels to wind the divided stock, a series of reels for separator-strips, there being one separator-reel for each receiving reel, associated with each series of said receiving reels to supply the separator-strips to the stock, and means acting

upon the strip of separator from each supplying reel to draw it from said reel and deliver it to the divided stock.

3. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, a series of receiving reels for the divided stock, means for rotating the reels to wind the divided stock, a series of reels for separator-strips to supply the separator-strips to the stock, and means arranged for separate engagement with the opposite edges of each separator-strip for guiding said separator-strips laterally into registration with the divided stock with which they are to be wound upon the receiving reels.

4. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, series of receiving reels for the divided stock situated at opposite sides of the stock as it advances to the dividing mechanism, means for rotating the reels to wind the divided stock, a series of reels for separator-strips, there being one separator-reel for each receiving reel, associated with each series of said receiving reels to supply the separator-strips to the stock, means acting upon the strip of separator from each supplying reel to draw it from said reel and deliver it to the divided stock between the dividing mechanism and the corresponding receiving reel, and guiding means for the separator-strips associated with each separator-drawing means.

5. In an apparatus for reeling rubber stock, a conveyor-belt arranged to advance a web of rubber stock, a roll carrying a plurality of cutters and an abutment-roll co-operating with the cutter-roll, between which rolls the conveyor delivers the web, receiving reels for the cut web situated in series respectively above and below the conveyor, and means for rotating the receiving reels.

6. In an apparatus for reeling rubber stock, a conveyor-belt arranged to advance a web of rubber stock, a roll carrying a plurality of cutters and an abutment-roll co-operating with the cutter-roll, between which rolls the conveyor delivers the web, receiving reels for the cut web, means for rotating the receiving reels, and a reel associated with each receiving reel and arranged to supply a separator to the cut web between the cutting mechanism and the receiving reels.

7. In an apparatus for reeling rubber stock, a conveyor-belt arranged to advance a web of rubber stock, a roll carrying a plurality of cutters and an abutment-roll co-operating with the cutter-roll, between which rolls the conveyor delivers the web, a rotatable spindle mounted upon opposite sides of the conveyor, means for rotating the spindle, series of reels carried upon each spindle to separately receive strips of cut web, a fixed spindle associated with each rotatable spindle, a series of reels for separator-strips carried by each fixed spindle and corresponding to the receiving reels, and means for guiding the separator-strips into contact with the web-strips.

8. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, receiving reels for the divided stock, means for rotating the reels to wind the divided stock, a reel associated with each receiving reel and arranged to supply a separator-strip to divided stock, a feed-roll contacting with the separator, and a pressure-roll arranged to force the separator against the feed-roll.

9. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, receiving reels for the divided stock, means for rotating the reels to wind the divided stock, a reel associated with each receiving reel and arranged to supply a separator-strip to divided stock, a feed-roll contacting with the separator, a pressure-roll arranged to force the separator against the feed-roll, and means arranged to separate the pressure- and feed-rolls.

10. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, receiving reels for the divided stock, means for rotating the reels to wind the divided stock, a reel associated with each receiving reel and arranged to supply a separator-strip to divided stock, a feed-roll contacting with the separator, arms pivoted adjacent to the feed-roll, a pressure-roll rotatable upon the arms and co-operating with the feed-roll, and means contacting with the arms for separating the rolls.

11. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, a series of receiving reels for the divided stock, means for rotating the reels to wind the divided stock, a series of reels arranged to supply separator-strips to the divided strips of stock, feed-rolls between which the separator-strips pass, and a guide member associated with the feed-rolls and provided with grooves to receive the separator-strips.

12. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, series of receiving reels for the divided stock, means for rotating the reels to wind the divided stock, a series of reels for separator-strips, there being one separator-reel for each receiving reel, associated with each series of said receiving reels to supply the separator-strips to the divided strips of stock, a feed-roll contacting with the separator-strips from each series of separator-reels, arms pivoted adjacent to each feed-roll, pressure-rolls rotatable upon the arms and co-operating with the feed-rolls, and guide-rolls journaled in the arms and having grooves to receive the separator-strips.

13. In an apparatus for reeling rubber stock, stock-advancing means, dividing mechanism to which the stock is delivered, series of receiving reels for the divided stock, means for rotating the reels to wind the divided stock, a series of reels for separator-strips, there being one separator-reel for each receiving reel, associated with each series of said receiving reels to supply the separator-strips to the divided strips of stock, a feed-roll contacting with the separator-strips from each series of separator-reels, arms pivoted adjacent to each feed-roll, pressure-rolls rotatable upon the arms and co-operating with the feed-rolls, guide-rolls journaled in the arms and having grooves to receive the separator-strips, and means for moving the arms to separate the pressure-rolls from the feed-rolls.

14. In an apparatus for reeling rubber stock, means for advancing a web of rubber stock, spaced cutters arranged to divide the web into strips, a series of rotatable reels arranged to receive the strips, a series of reels for separator-strips, means for feeding the separator-strips into co-operation with the web-strips, and a guide-roll associated with the feeding means and provided with grooves for the separator-strips, said grooves being aligned with the cutters.

15. In an apparatus for reeling rubber stock, a frame, dividing mechanism carried near one extremity of the frame, means for advancing the stock through the frame to the dividing mechanism, means for directing the divided stock rearwardly from the dividing mechanism to opposite sides of the advancing stock, receiving reels for the divided stock supported at the rear of the dividing means and at opposite sides of the advancing stock, and means for rotating the receiving reels to wind the divided stock. 80
16. In an apparatus for reeling rubber stock, a frame, dividing mechanism carried near one extremity of the frame, means for advancing the stock through the frame to the dividing mechanism, means for directing the divided stock rearwardly from the dividing mechanism to opposite sides of the advancing stock, receiving reels for the divided stock supported at the rear of the dividing means and at opposite sides of the advancing stock, means for rotating the receiving reels to wind the divided stock, and a series of reels for separator-strips situated at the rear of each receiving reel at opposite sides of the advancing stock. 85
17. In an apparatus for reeling rubber stock, a frame, dividing mechanism carried near one extremity of the frame, means for advancing the stock through the frame to the dividing mechanism, means for directing the divided stock rearwardly from the dividing mechanism to opposite sides of the advancing stock, receiving reels for the divided stock rotatable near the upper and lower portions of a standard adjacent to the dividing mechanism, a series of reels for separator-strips rotatable near the upper and lower portions of a standard at the rear of that upon which the receiving reels are mounted, guiding means for the stock extending between the upper and lower reels at the dividing mechanism, and means for rotating the receiving reels to wind the divided stock. 90
18. In an apparatus for reeling rubber stock, a frame having a base and a plurality of standards rising therefrom, dividing mechanism carried by the frame near one extremity, receiving reels for the divided stock rotatable near the upper and lower portions of a standard adjacent to the dividing mechanism, a series of reels for separator-strips rotatable near the upper and lower portions of a standard at the rear of that upon which the receiving reels are mounted, guiding means for the stock extending between the upper and lower reels at the dividing mechanism, and means for rotating the receiving reels to wind the divided stock. 95
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