

J. S. GWOZDZ.
 APPARATUS AND METHOD OF CALENDERING RUBBER.
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1,402,160.

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Fig. 5. Fig. 4.

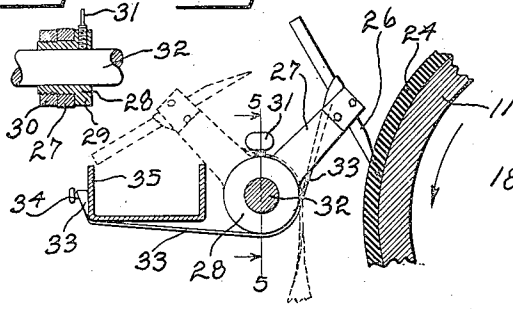


Fig. 1.

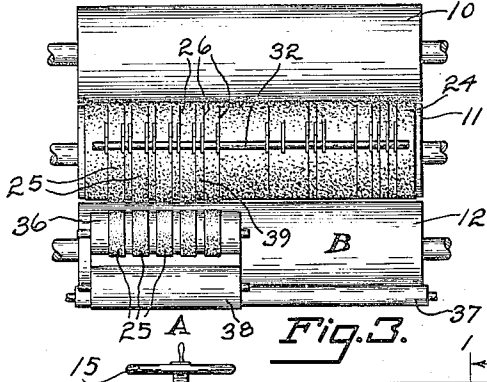
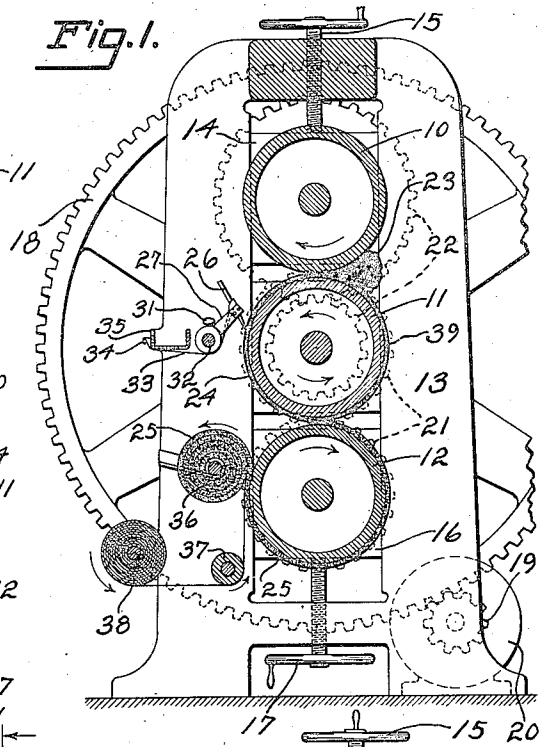


Fig. 3.

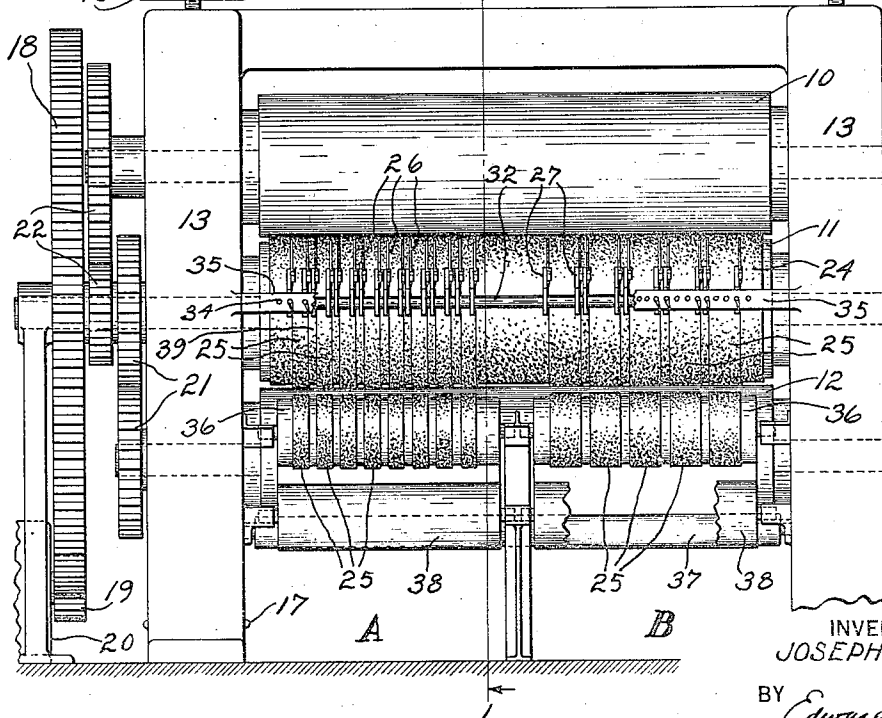


Fig. 2.

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JOSEPH S. GWOZDZ, OF CHICOPEE FALLS, MASSACHUSETTS, ASSIGNOR TO THE FISK RUBBER COMPANY, OF CHICOPEE FALLS, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

APPARATUS AND METHOD OF CALENDERING RUBBER.

1,402,160.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH S. GWOZDZ, a citizen of the United States of America, residing at Chicopee Falls, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Apparatus and Method of Calendering Rubber, of which the following is a specification.

My invention relates to improvements in calendering and sheeting rubber stock and cutting the stock into a plurality of strips of definite widths. The object of my invention is to improve the efficiency of calenders of this type, to preserve the condition of the rubber stock during periods of adjustment of the strip cutting devices, and to greatly increase the output for a given installation.

The manner in which these objects are accomplished, as well as additional objects, will appear from the description of the invention which will now be given in connection with the accompanying drawings, in which,

Fig. 1 is a transverse section through a calender adapted for use with my invention, taken on line 1—1 of Fig. 2;

Fig. 2 is a front view of the same, looking from the left in Fig. 1;

Fig. 3 is a diagrammatic view illustrating the method of operating the calender during the period of adjustment of the knives;

Fig. 4 is a detail of the knives; and

Fig. 5 is a section on line 5—5 of Fig. 4.

I have illustrated a calender having three rolls 10, 11 and 12, which may have the usual steam and water connections for regulating their temperature. These connections, not forming part of my invention, have not been illustrated. These rolls are journaled in a frame 13, the middle roll 11 having fixed bearings, while the upper roll 10 has its bearings in blocks 14 controlled as by a screw and hand wheel 15, and the lower roll 12 has its bearings in blocks 16 controlled as by a screw and hand wheel 17. The shaft of the center roll 11 carries a gear 18 driven from a pinion 19 on the shaft of a motor 20. The center roll 11 and the bottom roll 12 are connected by gearing 21 so that they rotate in opposite directions at the same peripheral speed, and the center roll 11 and the top roll 10 are connected by gearing 22 so that they rotate in opposite directions with the top

roll rotating preferably at about two-thirds 55 the peripheral speed of the center roll.

The stock is sheeted between rolls 10 and 11 from a feed or bank 23 into a wide sheet 24, and the latter is severed into strips 25 of the desired widths by knives 26. Each 60 knife 26 is secured in a holder 27 freely rotatable about a bushing 28 and held against axial movement thereon by a flange 29 on one end of the bushing and a collar 30 screwed onto the other end. The series of 65 bushings supporting the knives are clamped individually, as by set-screws 31, upon a shaft 32 running transversely of the machine. The knives are individually urged 70 yieldingly against the calender roll by elastic bands 33 passing around the knives above the holder and looped over pins 34 on a bar 35. By disconnecting a band 33 from its 75 pin 34 the knife to which it is connected may be swung from the active position shown in full lines in Fig. 4 to the position shown in dotted lines without disturbing the longitudinal adjustment of the knives. The strips 25 pass around roll 12 (which is adjusted so as not to press the rubber stock 80 against roll 11) and are wound up on take-off spools 36 (the core of which is mounted to slide on upwardly slanting shelves as indicated) together with a suitable liner supplied over a guide roll 37 from spools 38. 85 The spools 36 are conveniently driven by friction from the lower calender roll 12. The stock 39 between the cut strips 25 passes back around the middle calender roll and re-joins the feed or bank 23. 90

I am aware that calenders have previously been operated by sheeting stock between the two upper rolls of a three roll calender, cutting it into strips on the middle roll, and winding up the cut strips after passing them 95 around the bottom roll. But in these prior methods of operating calenders much time was lost, particularly in changing from one kind of rubber stock to another, and in adjusting a large number of knives from one 100 width of strip to another across the whole face of the calender or such a large part of it as to materially interfere with taking off enough rubber from the calender in desired form to keep the bank or feed of 105 ber in good condition. If the same stock is repeatedly run around and between calender rolls it becomes too greatly heated for proper

calendering, it tends to scorch or partially cure with certain types of compounds, and tends to lose its fibrous strength giving structure. Of course if minor intermittent adjustments of the knives are necessary in the prior methods there is no difficulty in making them. The difficulties in the prior art which my invention avoids arise only when it is necessary or desirable to make a major change in the calendering operations as when a complete change in the stock being run is desired or a very substantial number or entire changes in the adjustments of the knives for different widths of strips is desired. On account of the difficulties in making such changes during the operation it has been customary to stop the calender while the changes are started and completed. These difficulties are avoided by the features of my invention which I will now describe.

I have discovered that if stock is drawn off from one side of a calender the stock from the other side, instead of going around and around on its own side, will commingle with the stock on the whole width of the calender and will gradually move over to the side from which the rubber is being drawn off. The stock will therefore not remain on the calender for a sufficient length of time to be injured. In order to apply this principle to a calender such as is described above, I employ a relatively wide calender and arrange the knives and windup spools in two sets A and B longitudinally of the calender rolls. In the normal operation of the calender both sides are in operation, as shown in Fig. 2, that figure illustrating the two sides as delivering strips of different widths although of course strips of the same width can be made if desired. If now it is desired to change the width of stock that is being delivered on one side of the calender, the side B for example, the calender is kept running and delivery of stock kept up from side A. The strips that were passing around the lower roll on side B are severed and led around the middle roll back into the feed of rubber. The knives on side B may now be adjusted, or some of them thrown out of operation, until the strips that are passing around the middle roll on this side are of the widths desired. The strips are now severed from the sheet passing around the middle roll and again started around the bottom roll. During this period of adjustment the stock on side B will gradually merge with the stock being delivered from side A so that it will not remain on the calender for a long enough period to become injured. During this substantial number of adjustments the calender continues to deliver its product in useful form in a substantial proportion of its full capacity and no useless stock needs to be wound up with the liner on the take-off roll

as would be the case if the knives and take-off devices were not arranged and placed in operation by corresponding sets.

In changing from one compound to another a somewhat similar process may be employed. When the nature of the stock is changed the widths of strips delivered are usually also changed. In such a case the delivery of stock from the calender is restricted to one side, as A, and the knives on side B are set to give the new widths of stock. After the setting of the knives is completed the stock is allowed to run out and a new batch started. Side B is ready to commence the delivery of the new stock immediately and keeps the new batch of stock in condition during the adjustment of the knives on side A. The plan of changing the stock run can of course be followed by starting on either side A or B and the calender arrangement is thus made more flexible and susceptible to a more continuous calender operation all with benefit to the stock being run by the calender.

Having thus described my invention, I claim:

1. A calender of the type having two rolls between which rubber is sheeted, knives adjustably arranged adjacent the second roll and adapted to cut the stock into a plurality of strips, a third roll around which the strips are delivered, and means for receiving the cut strips from this roll; characterized by the arrangement of the knives and receiving means in a plurality of sets longitudinally of the calender rolls, and constructed and arranged for operation either simultaneously or independently, whereby the rubber may be maintained in condition during the period while one set of knives is being adjusted.

2. An apparatus for sheeting and cutting rubber on a calender comprising a calender of the type having two rolls operable at different speeds and between which the rubber is sheeted out of a rubber bank in a bight of the rolls, two sets of adjustable cutting devices and calender take-off devices operable independently or simultaneously to take off the cut and calendered sheeted rubber strips fed from the whole width of said rubber bank whereby the calender may continue its operations during an adjustment of the cutting or takeoff devices or a change in the bank of rubber in the bight of the rolls without injury to the rubber.

3. An apparatus for sheeting and cutting rubber on a calender comprising a calender of the type having two rolls operable to sheet rubber between them from the whole width of a bank of rubber in the bight of the rolls, two sets of adjustable strip cutting knives operable across the face of the calendered sheet together or independently and a calender take-off device for each set

of knives operable when its set of knives is operated, the respective sets of knives and take-off devices being operable together or independently of each other, all constructed and arranged to feed rubber from the whole width of the bank of rubber whenever either or both sets of knives is in operation, for the purpose described.

4. An apparatus for sheeting and cutting rubber on a calender comprising a calender of the type having two rolls operable at different speeds and between which the rubber is sheeted out of a rubber bank or feed in the bight of the rolls, a series of adjustable cutting device operable across the face of the calender roll on the sheet of rubber and two calender take-off devices operable simultaneously or independently to take off enough rubber strips cut from the sheet to prevent excessive reworking of the rubber

between the rolls, all constructed and arranged so that major changes in the calender operation can be effected by alternating the operation of the two calender take-off devices during such changes while continuing the operation of the calender. 25

5. The method of operating calendars upon which the rubber is sheeted and cut into strips, comprising providing two sets of cutting and delivering instrumentalities spaced longitudinally of the calender rolls, restricting the delivery of stock to one set while supplying stock in a feed the width of both sets, adjusting the cutting means of the second set while the delivery is so restricted, and resuming the delivery of rubber strips from the second set after the adjustment has been completed. 30 35

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