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J. E. BOWEN

APPARATUS FOR PRODUCING PLASTIC COATED SHEET MATERIAL

Filed Dec. 24, 1921

Fig. 1

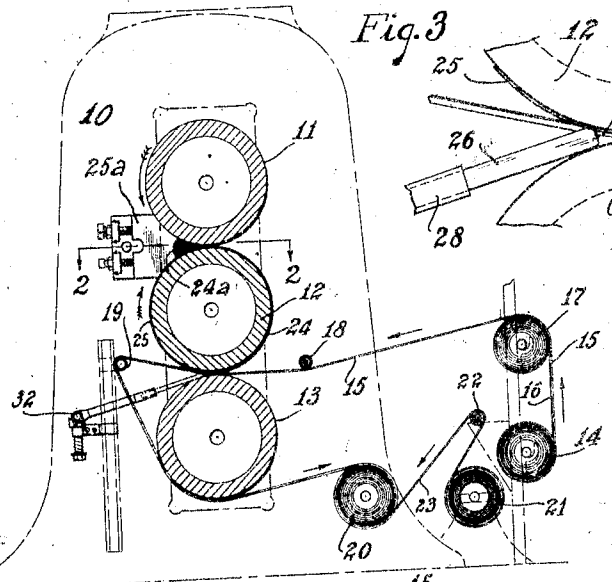



Fig. 3




Fig. 2

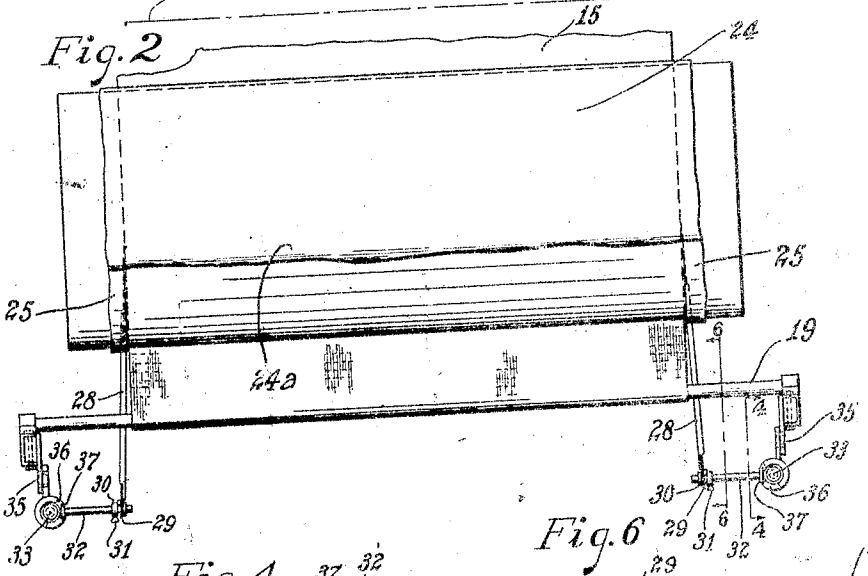



Fig. 4

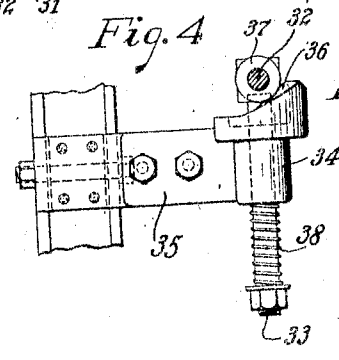



Fig. 5

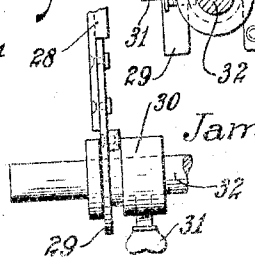
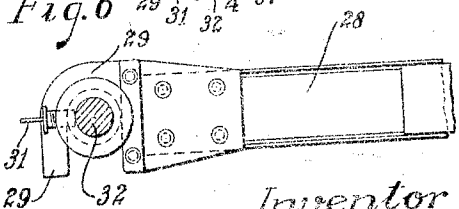



Fig. 6




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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR PRODUCING PLASTIC-COATED SHEET MATERIAL.

Application filed December 24, 1921. Serial No. 524,629.

This invention relates to apparatus for producing plastic-coated sheet material and more particularly to the trimming of surplus coating material such as rubber from the edges of a strip of fabric or similar material which has been coated, as in a calender.

Heretofore, so far as I am aware, in the manufacture of rubberized tire fabric, for example, the surplus rubber extending beyond the edges of the fabric have been removed in a separate operation from that of applying the rubber, by tearing one or more threads from the fabric after it has issued from the calender.

The general object of my invention is to provide improved apparatus for producing plastic-coated sheet material. A more specific object is to save labor in removing excess rubber from the edges of rubberized fabric. A further object is to avoid waste of materials.

Of the accompanying drawings:

Fig. 1 is a transverse section of a frictioning calender equipped with a preferred form of my improved trimming attachment.

Fig. 2 is a horizontal section on line 2—2 of Fig. 1, with parts removed.

Fig. 3 is a fragmentary elevation from one end of the calender rolls, showing the work in place and one of the trimming knives in its relation thereto.

Fig. 4 is a section on line 4—4 of Fig. 2.

Fig. 5 is a plan view of a part of the supporting means for the trimming knife.

Fig. 6 is a section on line 6—6 of Fig. 2.

Referring to the drawings, 10 (Fig. 1), represents generally a frictioning calender of usual construction, comprising three rolls 11, 12, 13, arranged in a vertical tier. 14 is a fabric supply roll, on which the fabric 15 is interwound with a liner 16 in case the fabric has been previously coated on one side, and 17 is a liner re-winding roll, over which the fabric passes, leaving the liner 16 thereon, as the fabric passes to the calender. 18, 19 are guide rollers for directing the fabric through the calender, the latter being so positioned as to lead the fabric slightly upward as it leaves the calender. 20 is a fabric re-winding roll, 21 is a liner supply roll, and 22 is a liner-guiding roller for guiding a liner 23 from the liner supply roll to the fabric rewinding roll, to be interwound thereon with the fabric. Any preferred or suitable mechanism (not shown) may be used for driving the fabric re-winding roll 20 and braking the fabric supply roll 14, to assure proper tension in the reach of fabric between the two. 24 is the sheet of rubber which is formed from a bank of rubber $24^a$ and applied to the fabric in the calender, and 25, 25 (Fig. 2) are the margins thereof which extend beyond the edges of the fabric and require to be trimmed off. $25^a$ (Fig. 1), is one of a pair of guides or dams, which may be of the usual form, for preventing the bank of rubber $24^a$ from spreading too far toward the ends of the calender rolls.

My trimming attachment as here shown comprises a pair of chisel-like knives, one of which is shown clearly at 26 in Fig. 3, said knives being positioned one at each edge of the fabric strip 15 and held, by yielding means presently to be described, in the angle between the calender rolls between which the rubber sheet 24 is applied to the fabric strip, at the delivery side thereof. The knives terminate in a transverse cutting edge 27, and are held at an angle to the edges of the fabric strip, as viewed in plan in Fig. 2, their angle being there clearly shown.

Each knife is slidably seated in a sleeve-like holder 28, the latter being provided at its rear end with an open-slotted hinge member 29 (Figs. 5 and 6) seating on the waist of a grooved collar 30 adjustably secured by a thumb screw 31 upon a horizontal arm 32, the latter being secured to the top of a vertical pivot-pin 33 mounted in a bearing member 34 on the end of a bracket 35 extending from the frame of the calender. The bearing member 34 is formed at its top with an inclined, concentric cam-surface 36 co-acting with a cam roller 37 journaled on the horizontal arm 32 and held down against said cam-surface by a helical compression spring 38 upon the lower part of the pivot-pin 33, between the bearing member 34 and a nut 39 upon the lower end of said pivot-pin. Said spring, through the action of the cam surface 36 and the roller 37 is thus adapted to urge the horizontal arm 32 toward the calender rolls, and thus to wedge the knife 26 between the rolls of the calender. The knives preferably are tilted upward at their cutting ends, in non-

tangent relation to the roll 12, as shown clearly in Figs. 1 and 3, so that the cutting edge of the knife forms an angle less than a right angle with the surface of the roll 12.

In the operation of the device, the collars 30 are secured in such positions upon the horizontal arms 32 that when the cutting ends of the knives are at the edges of a fabric strip of the particular width to be trimmed the knives will be positioned at an angle to said edges substantially as shown in Fig. 2. As the fabric is drawn through the calender, the springs 38 wedge the knives into the posterior crevice of the calender, and the lowest calender roll, 13, in contact with the lower edge of the knife, holds the knife forcibly against the calender roll 12 at approximately the point where the fabric leaves the latter roll, this being made possible, notwithstanding the substantial vertical width of the knife, by reason of the guide roller 19 giving an upward direction to the fabric as it leaves the latter roll, causing it to contact with the roll 12 beyond its line of contact with the roll 13. The upward tilting of the cutting end of the knife causes it to bear with greater force against the calender roll 12, by reason of the tendency of the work to turn the knife about the arm 32, and a further advantage of such positioning of the knife is that since the cutting edge of the knife forms an angle less than a right angle with the roll surface with which it coacts, the force of the cutting action is directed toward the roll, and not in a direction merely tangent thereto, the work thus passing the cutting edge obliquely and being held against the roll by the cutting action itself although the fabric leaves the roll tangentially at the cutting point, which gives the fabric a greater area of contact with the side face of the knife, for positioning the latter, than it would have if the fabric continued in contact with the roll after passing said cutting point, and provides the clean cutting, saw effect of a knife edge disposed obliquely with relation to the direction of relative movement of the work.

The on-coming rubber sheet, which is progressively cut by the end edge of the knife, constantly crowds the latter against the edge of the fabric strip, due to the angular position of the knife. The tendency thereby given to the knife to cut deeper into the margin of the rubber sheet is resisted by the edge of the fabric, which slides along in contact with the side face of the knife. Thus the cutting edge of the knife is automatically held in position to cut the rubber precisely along the edge of the fabric. The severed margins 25 of rubber are free from fibrous material and continue around the roll 12 to the bank of stock $24^a$, into which they are directed by the guides $25^a$.

Waste of fabric is avoided by eliminating the necessity of trimming the edges thereof. The knife-holders 28 may be readily removed from their supports for sharpening or changing the knives, which latter also may readily be slipped from their holders.

Details of construction may be modified without departing from the scope of my invention, and I do not wholly limit my claims to the specific construction shown.

I claim:

1. In combination with a calender adapted to apply a coat of rubber to a strip of fabric, a trimming knife having a sharpened, beveled cutting edge, and means for so holding said knife in trimming relation to the fabric at the delivery side of the nip of the calender rolls at which the fabric is coated as to trim excess rubber from the edge of the fabric by a line of cut precisely following said edge, notwithstanding variations in the width of the fabric and without distorting the fabric.

2. In combination with a calender adapted to apply a coat of rubber to a strip of fabric, a guide for the fabric so positioned as to draw the latter partly around one of the calender rolls, a knife terminating in a transverse cutting edge, and means for yieldingly holding the cutting end of said knife in a posterior crevice of the calender.

3. In combination with a calender, guiding means adapted to hold sheet material being coated therein in contact with one of the calender rolls beyond its line of contact with the adjacent calender roll, a knife, and means for holding said knife against the first mentioned calender roll in position to trim excess coating material from an edge of said sheet material in the arc of contact of the sheet material with said roll.

4. In combination with a calender, guiding means adapted to hold sheet material being coated therein in contact with one of the calender rolls beyond its line of contact with the adjacent calender roll, a knife, and means for holding said knife in position to trim excess coating material from an edge of said sheet material in the latter's arc of contact with the first-mentioned roll, the angle of said knife being such as to cause its cutting edge to be pressed against the edge of said sheet material by the movement of the work.

5. In combination with a calender for rubberizing material, means for drawing the rubberized material therefrom, a knife having a sharpened, beveled cutting edge, and means for holding said knife in trimming engagement with an edge of the rubberized material as it is being drawn from the calender by said first mentioned means, said knife being positioned posterior to the calender nip at which the material is rubberized and said knife being mounted for play such as to permit it accurately to maintain

close trimming engagement with material of varying width without distorting the material.

6. In combination with a fabric-coating calender, a trimming device comprising fabric-guiding means adapted to hold the fabric in contact with one of the calender rolls beyond its line of contact with the adjacent calender roll, a knife terminating in a transverse cutting edge, and means for holding said knife against the approaching side of the first mentioned calender roll in non-tangent relation thereto and at an angle to the edge of the fabric.

7. In combination with a fabric-coating calender, a trimming device comprising fabric-guiding means adapted to hold the fabric in contact with one of the calender rolls beyond its line of contact with the adjacent calender roll, a knife terminating in a transverse cutting edge, means for holding said knife against the first mentioned calender roll in non-tangent relation thereto and at an angle to the edge of the fabric, and means for wedging said knife between said calender rolls.

8. In combination with a calender, means for drawing coated sheet material from the calender, a knife, and means for holding said knife in trimming engagement with an edge of said sheet material as the latter passes from the calender, and at such an angle as to be pressed against the edge face of said material by the movement of the work.

9. In combination with a calender, a trimming device comprising a horizontal arm pivoted to swing from and toward the rolls of said calender, a slidable member mounted on said arm, means for securing said slidable member in adjusted positions on said arm, and a knife pivotally mounted on said slidable member and terminating in a transverse cutting edge.

10. In combination with a calender, a trimming device comprising a horizontal arm pivoted to swing from and toward the rolls of said calender, a slidable member mounted on said arm, means for securing said slidable member in adjusted positions on said arm, a knife-holder pivotally mounted on said slidable member, and a knife seated in said holder and terminating in a transverse cutting edge.

11. In combination with a calender, a trimming device comprising a vertical bearing member formed with a cam surface, a pin mounted therein, a horizontal arm mounted on said pin, a cam roller journaled on said arm in position to co-act with said cam surface, a spring adapted to hold said cam roller in contact with said cam surface, and a knife mounted on said arm and terminating in a transverse cutting edge.

12. In apparatus of the character described, the combination of a set of calender rolls adapted to form a sheet of rubber from a bank of stock and apply it to a strip of fabric, a knife, means for holding said knife against one of said calender rolls in position to progressively trim the excess of rubber from the edges of the fabric as the latter passes from the calender, and a guide member adapted to return said excess to the bank of stock.

13. Trimming apparatus for rubberized fabric, said apparatus comprising means for longitudinally feeding a strip of said fabric, a knife, means for holding said knife in trimming relation to an edge of the fabric as the latter is so fed, with the cutting edge of the knife disposed, obliquely with relation to the fabric, in a plane which is substantially perpendicular to the fabric, and with the knife at such an angular position about an axis perpendicular to the fabric as to act against the edge face thereof with a chisel-like effect, and means for preventing the fabric from being crowded from its normal plane by the engagement of the work with the obliquely disposed cutting edge.

14. In combination with a calender for rubberizing material, means for drawing the rubberized material therefrom, a trimming knife, and means for holding the knife in position, in the posterior crevice of the calender, to coact with one of the rolls of the calender to trim excess rubber from the margin of the material.

15. In combination with a calender for rubberizing material, means for withdrawing the rubberized material therefrom, a trimming knife, and means for holding the knife, in trimming relation to the material, at substantially the innermost position at which it is susceptible of being held, in the posterior crevice of the calender.

16. In a calender for coating fabric with a sheet of rubber, the combination with a calender roll, of means for trimming the rubber selvage without removing the edge of the fabric, the said trimming means comprising a knife arranged to bear upon the surface of the roll and guided by the edge of the fabric, a carrier for the knife, a support located adjacent the roll, and a swivel connection between the carrier and the support.

In witness whereof I have hereunto set my hand this 21 day of December, 1921.

JAMES E. BOWEN.