June 9, 1925. 1,541,190

C. J. SMITH

SHEET CONTROLLING DEVICE

Filed Aug. 18, 1923 2 Sheets-Sheet 1

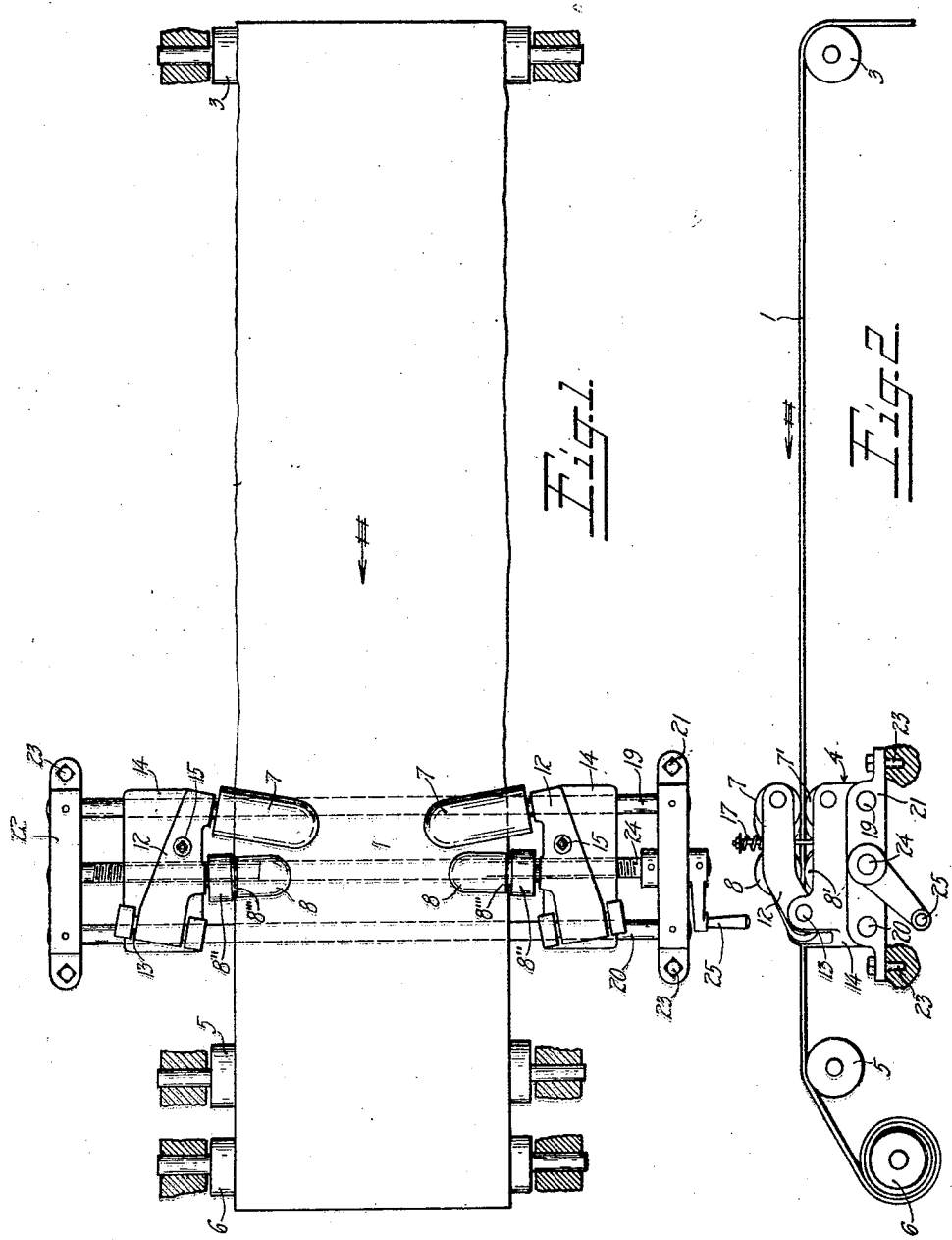


Fig. 1.

Fig. 2.

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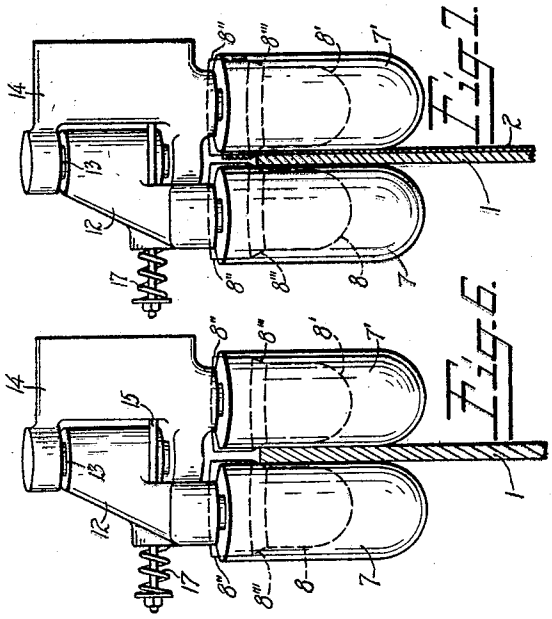


Fig. 7.

Fig. 6.

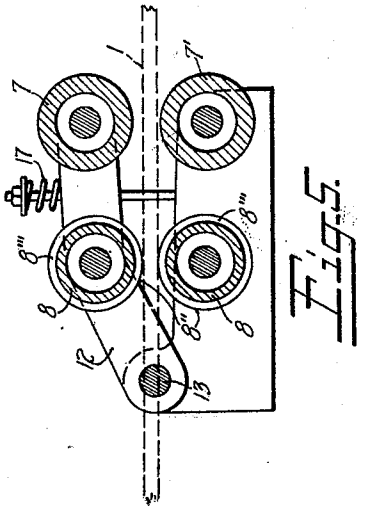


Fig. 5.

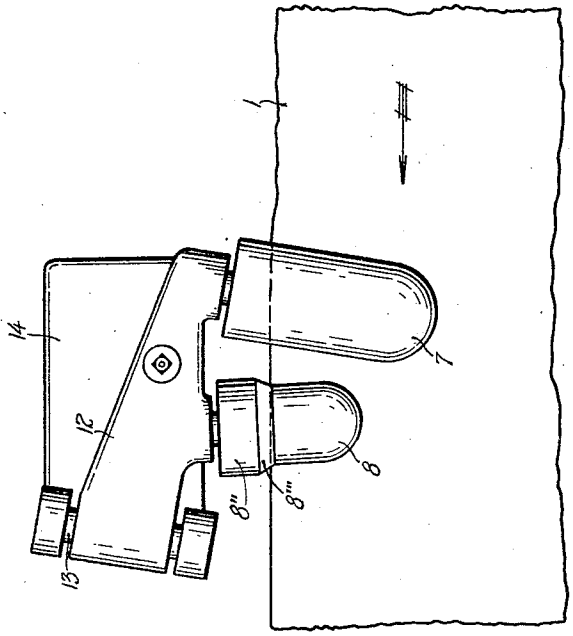


Fig. 3.

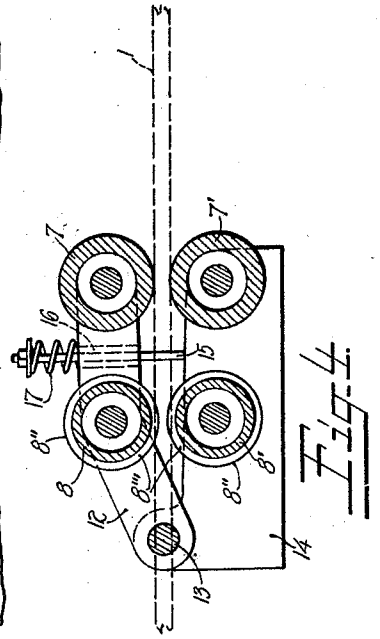


Fig. 4.

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Patented June 9, 1925. 1,541,190

UNITED STATES PATENT OFFICE.

CLYDE J. SMITH, OF DETROIT, MICHIGAN, ASSIGNOR TO MORGAN & WRIGHT, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

SHEET-CONTROLLING DEVICE.

Application filed August 18, 1923. Serial No. 658,191.

To all whom it may concern:

Be it known that I, CLYDE J. SMITH, a citizen of the United States, residing at Detroit, county of Wayne, and State of Michigan, have invented a certain new and useful Sheet-Controlling Device, of which the following is a full, clear, and exact description.

This invention relates to an attachment for controlling the travel of sheet material.

It is desirable in many branches of the industrial arts to direct the travel of sheet material with its margins following predetermined lines. This invention relates to such devices in general and in particular to a type thereof suited for controlling woven or unwoven fabrics with or without a rubber coating thereon, an all-rubber composition sheet or stock, or any sheet material.

While it has been variously attempted to govern the movement of webs of material, with such devices as oppositely threaded rods or a multi-section roller, for instance, none of them has been entirely satisfactory. Generally, these prior devices require either adjustment or attention from an operator.

The present invention aims to provide an appliance or attachment that is self-acting or automatic and reliable. It is of simple construction and durable. It not only insures the opposite edges of shaped material following pre-determined lines, but also maintains the fabric substantially uniform in width. Incidentally, it enables the material to be rolled up or reeled with its margins square or even.

With the illustrated embodiment in mind but without intention to limit more than is required by the scope of the prior art, the invention consists, briefly, in an attachment preferably for each side of the sheet material comprising a pair of inclined spreader rolls, and in rear thereof, a pair of rolls inclined oppositely but to a less extent, an upper roll of each pair being mounted on a lever hinged to the support for the lower set of rolls. The lever is preferably automatically urged downward by a spring (or gravity). The spreader rolls act to stretch the sheet transversely, but where the width exceeds a limit pre-determined by the rear pair of rolls, these act to lift the lever and thereby the spreader rolls from contact with the sheet material, halting the spreading of the sheet. Thus, by what may be termed a "hunting" action, the edges of the sheet material are guided in pre-determined lines.

An embodiment of the invention is illustrated in the accompanying drawings in which:—

Figures 1 and 2 are plan and elevation, respectively, of one form of the invention;

Figure 3 is a plan view of one of the attachments on a large scale;

Figures 4 and 5 are sectional side elevations of one of the attachments, showing the different positions assumed by the sets of rolls in operation;

And Figures 6 and 7 are front elevations of the attachment, the strip material in the latter being shown supported on a liner.

In the drawings, the sheet material is indicated generally by the numeral 1. It may be unsupported or, if of a rubber composition, such as tread stocks, supported on a liner 2, as in Figure 7. The sheet material 1 may be any material that is to be calendered or frictioned, or merely wound up, or otherwise treated.

In the drawings, Figures 1 and 2, the invention is illustrated as applied, merely in uncoiling from a source of supply beyond a guiding-roll 3, from which it is passed in the direction of the arrow through the attachment 4 of the present invention to another guide-roll 5, and wound on reel 6. All of these parts, excepting the attachment 4, may be of any suitable construction, being well-known to the trade. Ordinarily, a certain amount of friction is applied to the supply-reel to maintain the strip material 1 under tension.

The attachment 4 comprises a pair of spreader rolls 7 and 7′, which may be inclined at any suitable angle to the fabric or sheet material, but preferably their axes make an acute angle of approximately 80° therewith. In rear of the spreader rolls 7 and 7′, are provided another pair of rolls 8 and 8′. These are also inclined to the travel of the fabric, but oppositely to the spreader rolls 7 and 7′. While the inclination of this second pair of rolls 8 and 8′ may be varied, it is preferably made very slight, the acute angle between the axes of these rolls and the edges of the strip material being approximately 87°. As to the inclination of both sets of rolls, it will be understood, of course, that their angles

may be varied to meet the requirements of the particular sheet material to be handled, whose characteristics may vary widely.

Both sets of rolls are made with rounded free ends or extremities, the spreader rolls 7 being preferably cylindrical throughout their extent while the controlling rolls 8 and 8′ are preferably stepped, or provided with enlarged supports 8″. A conical surface 8‴ preferably joins the cylindrical portion 8″ to the small end of the roll.

The upper of each of the two pairs of rolls is preferably journaled on a lever 12 which is fulcrumed on the pin 13 to a block 14 that supports the lower of each of the two pairs of rolls. A rod 15 anchored to the block 14 passes loosely through a hole 16 in the lever 12 above which it is encircled by a coil spring 17 which yieldingly urges the lever downward and thereby holds the upper of the two pairs of rolls yieldingly down upon the sheet material which passes between the rolls of each pair.

In Figure 4, the spreader rolls 7 and 7′ are shown engaging the sheet material 1, the enlarged portions 8″ of the control rolls 8 and 8′ being out of engagement therewith, the edge of the sheet material contacting only with the conical surface 8‴. In Fig. 5, the parts are shown in the position they assume after the spreader rolls 7 and 7′ have stretched the sheet material so as to pass its edge between the enlarged portions 8″ of the rear rolls 8 and 8′. This will, of course, result in the lever 12 being elevated and the upper spreader roll 7 being lifted out of contact with the sheet material. In this condition of the parts, the sheet material is freed of any spreading, i. e., transversely stretching on the part of the rolls 7 and 7′, and the sheet material consequently (either of its own weight or because of the longitudinal stretch exerted on it) narrows down and withdraws its margins from between the enlarged portions 8″ of the control rolls 8 and 8′. The condensing action of rolls 8 and 8′ also assists in this narrowing of the material. Thus the margins of the sheet material being guided are compelled to follow lines approximately passing through the conical portions 8″ of the control rolls. And thus the sheet material is not only guided in a pre-determined path, but is maintained substantially unform in width.

The blocks 14 may be supported in any suitable manner for adjustment laterally of the sheet material to accommodate different widths thereof. This may be done variously. A simple method is shown in the drawings. This comprises a pair of guide rods 19 and 20, on which blocks 14 are slidable. The ends of rods 19 and 20 are pinned in plates 21 and 22, which are permanently secured in any suitable manner, as indicated at 23, for instance. An oppositely threaded lead screw 24 with an operating handle 25 is preferably journaled in the plates 21 and 22 for shifting the blocks 14, threadedly engaged with the lead screw 24, to or from one another.

The operation of the attachment has already been made clear. It will be noted that it is extremely simple, is entirely automatic in action and to those skilled in the art, will be seen to be useful for a variety of purposes, particularly in connection with the rubberizing of fabric or filamentary material in the manufacture of rubber goods.

It is obvious that many changes may be made in the details of construction without departing from the principles of the invention and reference should therefore be made to the appended claims for an understanding of its scope.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:—

1. A device for guiding sheet material comprising two pairs of rolls for engaging both faces of a sheet at one side thereof, the axes of one pair of said rolls being inclined to the axes of the other pair of rolls, and common means supporting two of the rolls engaging one face of the sheet for insuring their automatic operation in alternation, each of said rolls being adapted to govern the movement of the common supporting means therefor.

2. A device for guiding sheet material comprising a pair of rolls for spreading sheet material in combination with a second pair of rolls for rendering the spreading rolls ineffective at a predetermined width, said two pairs of rolls being operatively supported so as to be effective automatically in alternation by their direct contact with the sheet material.

3. A device for guiding sheet material comprising in combination, means for spreading the material, means in rear of the spreading means for narrowing the fabric at a slower rate than it is spread, and means operatively connecting the two first-mentioned means for preventing spreading of the fabric beyond the limit pre-determined by the second-mentioned means.

4. A device for guiding sheet material and maintaining it at a substantially predetermined width comprising in combination, pairs of rolls arranged at different angles to the travel of the sheet material and at a substantially constant inclination to each other at least one of which rolls tends to move an edge of the sheet material beyond a pre-determined line of travel and at least one other of which rolls throws the first-mentioned one out of contact with the material when it is stretched beyond said pre-determined line of travel.

5. A device for guiding sheet material and maintaining it at a substantially pre-determined width comprising in combination, a pair of parallel spreader rolls, a pair of parallel control rolls, the axes of the rolls of one pair being fixedly inclined to a roll of the other pair which engages the same side of the sheet material, and means operatively connecting one roll of each pair engaging the same side of the sheet material for rendering the pair of spreader rolls inactive on the sheet material when an edge thereof is moved outwardly beyond a pre-determined line.

6. A device for guiding sheet material and maintaining it at a substantially predetermined width comprising in combination, a spreader roll, a control roll in rear of said spreader roll, means co-operating with said rolls for engaging the opposite sides of the fabric and means operatively supporting said rolls and insuring their automatic operation in alternation through the direct engagement of said rolls with the sheet material, the axes of said spreader and control rolls being substantially invariable relative to the general direction of movement of the sheet material.

7. A device for guiding sheet material and maintaining it at a substantially predetermined width comprising in combination, a pair of spreader rolls mounted at an angle to the line of travel of an edge of the material, a pair of control rolls in rear of the spreader rolls at a different angle, a fulcrumed lever supporting a roll of each pair with a spreader roll in advance of the control roll and at a greater distance from the fulcrum of said lever, and means automatically urging the pairs of similar rolls together.

8. A device for guiding sheet material and maintaining it at a substantially predetermined width comprising in combination, a pair of spreader rolls mounted at an angle to the line of travel of an edge of the material, a pair of control rolls in rear of the spreader rolls at a different angle, a fulcrumed lever supporting a roll of each pair with a spreader roll in advance of the control roll and at a greater distance from the fulcrum of said lever, and a spring urging said lever in a direction to bring together the similar rolls of each pair.

9. A device for guiding sheet material and maintaining it at a substantially predetermined width comprising in combination, a spreader roll, a control roll, the axes of said spreader and control rolls being non-coincident and arranged at a fixed inclination to each other, means for operatively connecting them together for rendering the former inactive on the sheet material when an edge thereof is moved outwardly beyond a pre-determined line, and means for adjusting the rolls laterally to accommodate sheet material of different widths.

10. A device for guiding sheet material and maintaining it at a substantially predetermined width comprising in combination, a pair of rolls operatively supported for engagement with one side of the sheet material marginally, one of said rolls being inclined to the line of travel of the sheet, the other being inclined oppositely and to a less extent, said last-named roll having faces of different diameter adapted to engage the sheet material on opposite sides of one of its edges, a second pair of rolls similar to the two before mentioned, means for supporting the second pair of rolls in co-operative relation with the first-mentioned pair of rolls including mechanism insuring alternate operation of the identical rolls engaging its opposite faces.

Signed at Detroit, county of Wayne, and State of Michigan, this 14th day of August, 1923.

CLYDE J. SMITH.