Jan. 15, 1929. 1,699,489

A. P. LEWIS

CONVEYING SYSTEM

Filed Sept. 26, 1927 2 Sheets-Sheet 1

Fig.2.

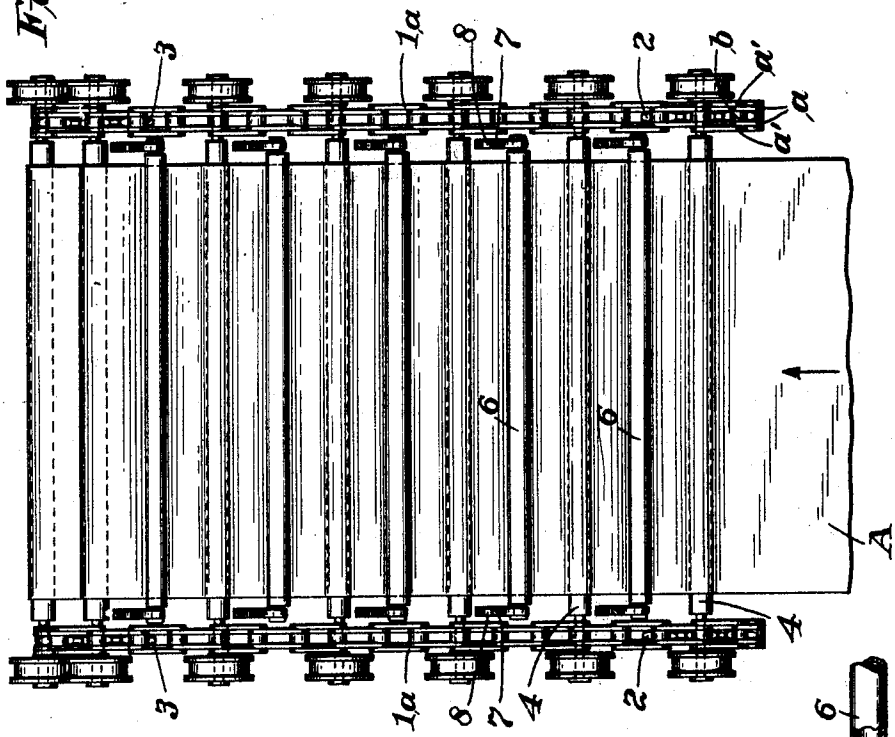


Fig.1.

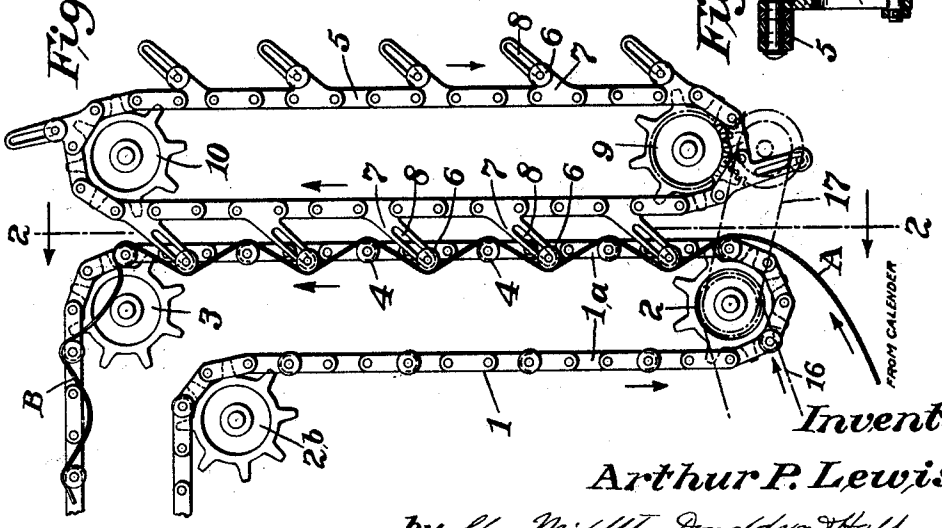
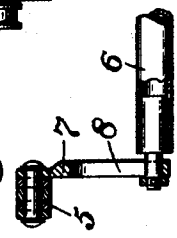


Fig.6.



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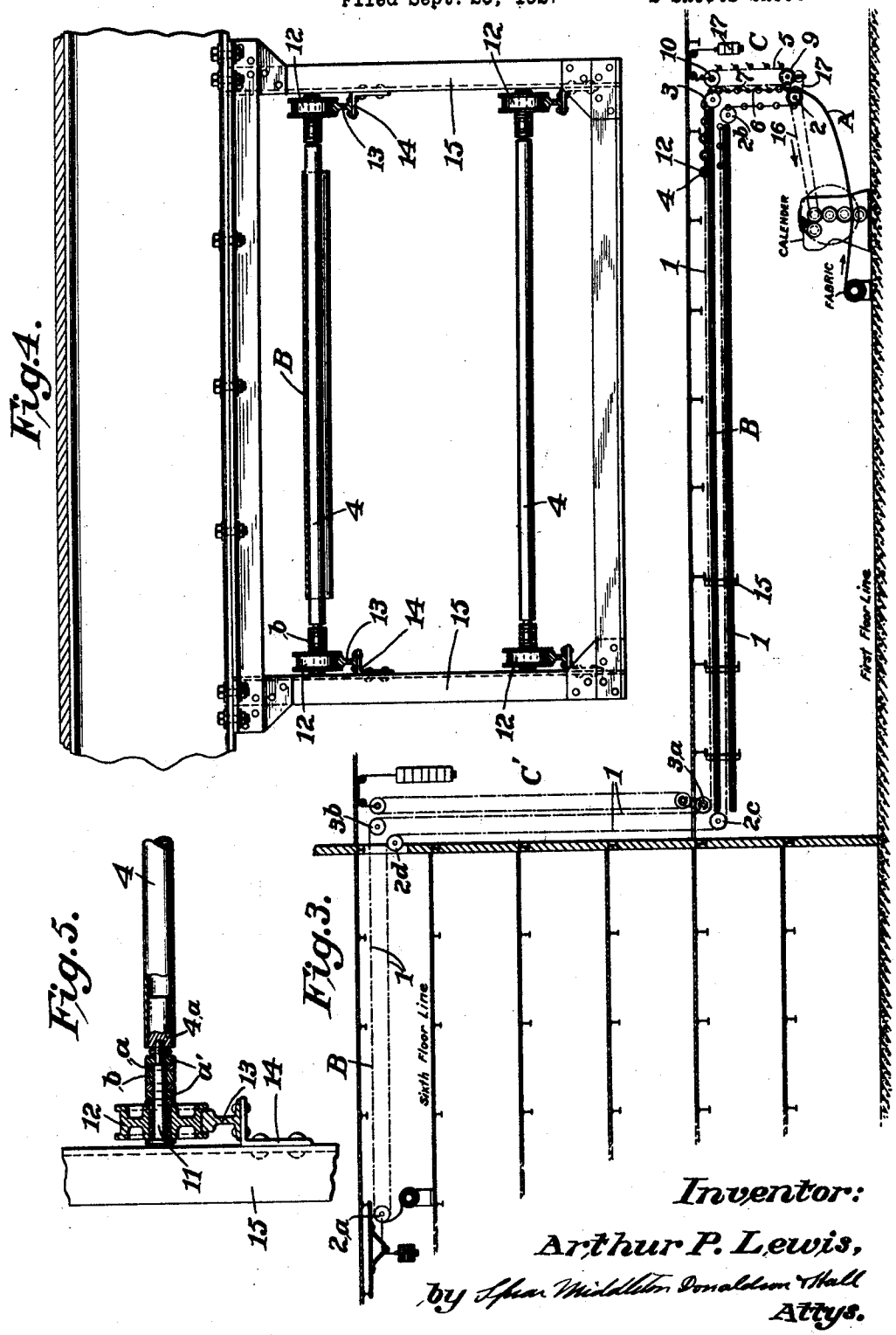
Attys.

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CONVEYING SYSTEM

Filed Sept. 26, 1927 2 Sheets-Sheet 2



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Patented Jan. 15, 1929. 1,699,489

UNITED STATES PATENT OFFICE.

ARTHUR P. LEWIS, OF AKRON, OHIO, ASSIGNOR TO THE MILLER RUBBER COMPANY, OF AKRON, OHIO, A CORPORATION OF OHIO.

CONVEYING SYSTEM.

Application filed September 26, 1927. Serial No. 222,127.

This invention relates to improvements in conveyers of sheet or strip material.

More particularly it relates to improvements in means for conveying frictioned and/or coated unvulcanized rubber fabric vertically.

An object of the present invention is to provide apparatus whereby a strip of fabric or like material may be effectively conveyed between two distant stations, and during such conveyance elevated vertically in a steady and uniform manner.

Another object is to insure vertical conveyance of the fabric without danger of slipping.

A further object is to convey the strip material vertically without producing undue stress thereon.

With these and other objects in view which will appear hereinafter, the invention includes the novel features of construction and arrangement and combination of parts hereinafter described, the invention being defined by the appended claims.

In the accompanying drawings which illustrate what I at present consider the preferred embodiment of the invention

Figure 1 is a side elevation of the elevating apparatus, the main endless conveyer being broken away.

Figure 2 is a section on the line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is a view of a diagrammatic nature showing a complete conveying and elevating system operating between two remote stations, as for example, a calender and an upper factory floor.

Figure 4 is a transverse vertical section taken through the parallel runs of the main conveyor above the calender

Figures 5 and 6 are sectional details.

The invention contemplates the conveying, elevating and cooling of rubber fabric between the calendering operation and the bias cutting machines without the use of liners and is adapted to convey the treated fabric from the calender room to the bias cutting department on an upper floor.

The invention is particularly adapted for the handling of rubberized or friction cord fabric. Heretofore, so far as I am aware, it has been customary to wind up the fabric in a roll with an interposed liner as it issues from the calender at which time it is quite warm. In passing through the calender the frictioning process subjects the cords to considerable tension. When wound on a roll with the interposed liner, it proceeds to cool off, which tends to shrink the rubber, and the cords due to their elasticity tend to recover their initial condition, both of which are resisted by the fact that the fabric is wound in a solid roll. This results in a condition of fabric when unwound which is detrimental for its use for tire building purposes.

Attempts have been made to run such fabric as it comes from a calender to an upper floor by the use of an inclined belt, wider than the fabric, but such schemes have been found impracticable as the belts become dusty and the dust adheres to the fabric, and the fabric slips on the belt and becomes wrinkled due to its weight and for these and other reasons such attempts have been unsuccessful.

The present invention avoids the necessity of rewinding and enables the fabric to be conveyed continuously from the calender to an upper floor where it arrives in condition to be directly fed to the bias cutter, though if desired it can be wound in rolls without detriment due to its having had ample opportunity to cool and shrink.

Referring by reference characters to the drawings, 1 represents the endless conveyor proper which passes around terminal sprockets 2 and 2^a and intermediate guide sprockets 2^b, 2^c, 2^d, to produce one run of the conveyor and other intermediate guide sprockets 3, 3^a, and 3^b to provide the other parallel run.

The sprockets 2 are located adjacent the calender (shown conventionally and so designated, Figure 3) while the sprockets 2^a are located at the point where it is desired to deliver the stock, such as an upper floor of a factory building, also indicated conventionally in said figure, where the bias cutters may be located.

The conveyor proper 1 comprises a pair of chains 1^a connected together at space intervals by rigidly secured non-rotating bars 4, and passing over sprockets 2 and 3 etc. As the chains and sprockets at each side of the conveyor are duplicates of each other, the same reference characters are used for each side.

Each chain comprises pairs of inside and outside links a and a' connected by the pintles 11 bearing rollers b between the links for en-

gaging the teeth of the sprockets (see Figure 5).

The pintles are extended on the outsides of the chains to form axles for the wheels 12 running on rails 13 supported by brackets 14 carried by the frame parts 15 for supporting the horizontal runs or flights of the conveyor.

The cross bars 4 are preferably made of wrought iron pipe and provided with end plugs 4^a having axial recesses in which the reduced inner ends of the pintles 11 are rigidly secured in any desired manner.

The sprockets 2 (and hence conveyor 1) are driven from the calender in approximate unison therewith but essentially at a slightly slower speed, by means such as the belt gearing indicated conventially at 16, Figure 3.

When such a conveyor is supporting the fabric horizontally as at B the fabric will be supported in loops or festoons as shown at the top of Figure 1. This allows the fabric to do any amount of shrinking due to cooling without producing tension on the fabric. The problem is to elevate the fabric while it is cooling and shrinking and allow this shrinkage to take place without placing undue strain on the fabric. The material to be conveyed is of a very sticky nature and will stick to almost anything, but especially to itself. It can not be permitted to come in contact with itself or it would permanently stick together and spoil the fabric.

At points where it is necessary or desirable to elevate the fabric, as for example points C and C′, the invention provides for elevating it vertically by making use of a supplementary conveyor comprising a pair of identical chains 5 adapted to be driven from the same mechanism as the chains 1^a, and at the same speed, as for example, by belt gearing 17. Both sets of chains 1^a and 5 are driven in unison with each other and slightly slower than the calender or other machine supplying the fabric, the difference amounting to the amount of fabric taken up by the elevating conveyor and the shrinkage in cooling. This amount of fabric furnishes the festoons formed by the arms 7 of the elevator conveyor 5 and provides the festoons formed when the fabric is conveyed away horizontally at the top. Chains 5 pass over and are driven by pairs of sprockets 9 and 10, corresponding to sprockets 2 and 3, and are set opposite thereto. The chains 5 are each provided at intervals corresponding with the spacing of the bars 4 on the chains 1^a, with angularly disposed projecting arms 7 rigidly secured thereto. The arms 7 have angularly slotted apertures 8 which receive stub shaft ends of relatively light rollers 6 carried by chains 5. The slots incline downwardly on the side of the chain which is traveling in an upward direction so that the rollers 6 are urged by gravity to the outer lowermost ends of the slots. The upward runs of chains 1^a and 5 are located in such close proximity to each other that when the rollers 6 are in this position they will extend past and between the bars 4.

The fabric coming from the calender is passed between the chains 1^a and 5 as they pass upward around sprockets 2 and 9, and the rollers 6 will engage with the fabric and being free to rotate and slide can roll into position forcing the fabric past the plane of the bars 4. As the bars 4 cannot rotate the fabric will be spread over them into a zig-zag course, Figure 1, and held by the rollers 6 sufficiently to keep the fabric from slipping thereon. It is intended that the rollers 6 shall yieldably press the fabric between the bars 4 on the conveyor proper, but not enough to put any strain on the fabric, should shrinkage occur.

The invention is not limited to the exact structure herein described, but changes may be made therein within the scope of the invention. Any means of yieldably supporting the rollers 6 in outer position may be employed, the invention not being confined to the slot construction herein described. Nor is the invention limited to the conveying of friction or rubberized fabric, as any sufficiently tenacious, stick material, in sheet form, may be handled thereby.

The upper sprockets 10 are preferably yieldably supported as by counterweight means, indicated at 17, Figure 3.

I claim:

1. A conveyor apparatus for sheet material for conveying the sheet vertically, comprising a pair of juxtaposed chain conveyors placed face to face, one of said conveyors having horizontally disposed spaced bars upon which the sheet is adapted to be carried, and the other conveyor having projecting arms extending into the spaces between said bars and beyond the same, and rollers yieldably mounted at the outer ends of said arms and adapted to bear against the sheet to prevent slippage of the sheet in the conveyor apparatus.

2. A sheet elevator comprising an endless conveyor proper for receiving the sheet, said conveyor proper having apertures disposed at intervals throughout its length, and a supplementary endless conveyor member disposed adjacent to said conveyor proper and having projections thereon adapted to engage said sheet and to register with said apertures and to extend therethrough while bearing against the sheet, to prevent slipping movement of the sheet in the elevator.

3. A sheet elevator comprising an endless conveyor proper for receiving a sheet, said conveyor proper having a series of apertures therein, and a supplementary endless conveyor member disposed adjacent to said conveyor proper and having a series of projections thereon adapted to engage said sheet and to register with said apertures and to extend therethrough while bearing against the

sheet to hold the sheet on said conveyor proper, said projections being yieldably mounted on said supplementary conveyor member so as to yieldably press against the sheet.

4. A sheet elevator comprising an endless conveyor proper for receiving a sheet, said conveyor proper having a series of apertures therein through its length and having a vertical path of travel for a portion of its length, and a supplementary endless conveyor member disposed adjacent to said conveyor proper and having a vertical path of travel in close juxtaposition to the vertical path of travel of the conveyor proper, and also having a series of yieldably mounted projections thereon adapted to yieldably bear against said sheet and to extend through said apertures while bearing against the sheet to hold the sheet on said conveyor proper.

5. A sheet elevator comprising a pair of juxtaposed endless chain conveyors placed face to face, one of said conveyors comprising a pair of spaced chains connected by horizontally disposed spaced non-rotatable bars upon which the sheet is adapted to be carried, and the other conveyor comprising a pair of spaced chains each having a series of projecting arms, said arms being inclined downwardly on the upward travel of the conveyor and having slots therein, said arms being adapted to extend into the spaces between said bars and beyond the same, and horizontally disposed rollers movably mounted in the slots in said arms and joining the opposite arms of the spaced chains of said other conveyor, said rollers being adapted by their own weight to remain in the lower ends of the slots and to yieldably bear against the sheet to prevent slippage thereof in the elevator, and means for driving and controlling said chain conveyors.

6. Means for conveying sheets from a continuously operating sheet producing apparatus to a distant elevated point comprising a main endless conveyor having one end located adjacent said sheet producing apparatus and having vertical and horizontal runs, said conveyor comprising pairs of spaced chains carrying cross bars, and a supplemental endless conveyor cooperating with the vertical run of said main conveyor and having yieldable presser elements arranged in staggered relation to said cross bars.

7. In conveying apparatus for sheet material a pair of contiguous conveyor elements having coacting sheet engaging means disposed in staggered relation, the sheet engaging means on one element intersecting the path of the means on the other element whereby the sheet is held in sinuous form during such conveyance.

8. In sheet conveying apparatus a pair of endless conveyor elements having juxtaposed parallel runs, said conveyor elements having sheet engaging members, the members of one element being out of line with the members of the other and the members of one element overlapping the members of the other element whereby the sheet is held in sinuous form while being conveyed by said elements.

In testimony whereof, I affix my signature.

ARTHUR P. LEWIS.