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REELING OF WEB MATERIAL

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FIG. 1a

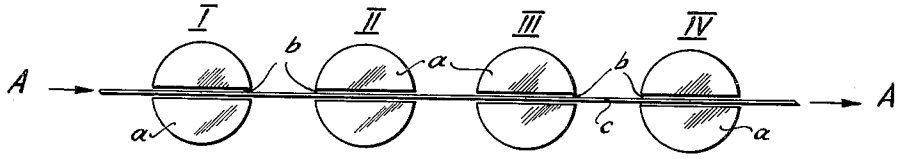


FIG. 1b

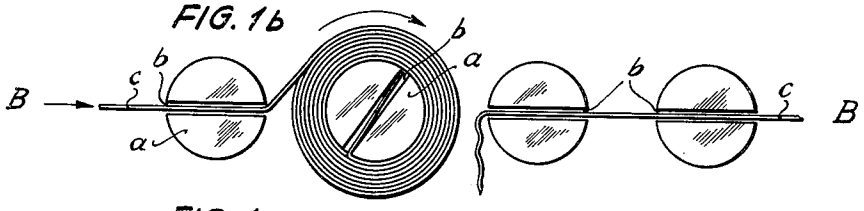


FIG. 1c

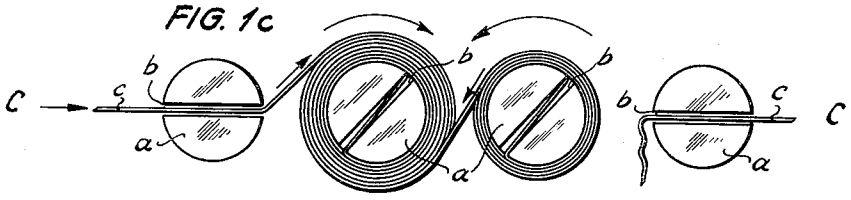


FIG. 1d

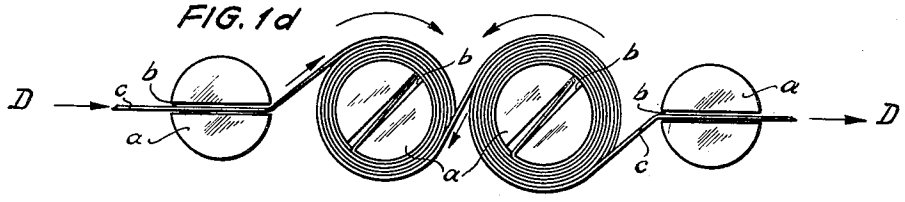


FIG. 1e

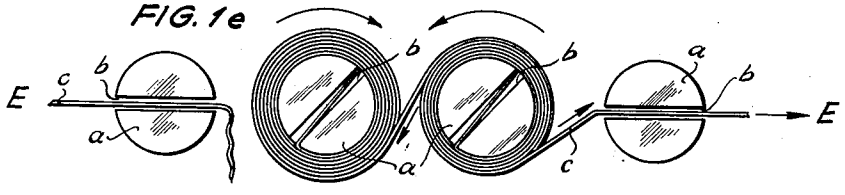
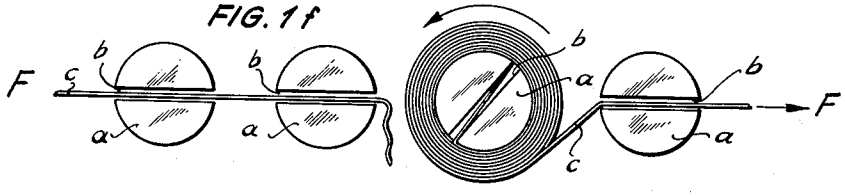


FIG. 1f

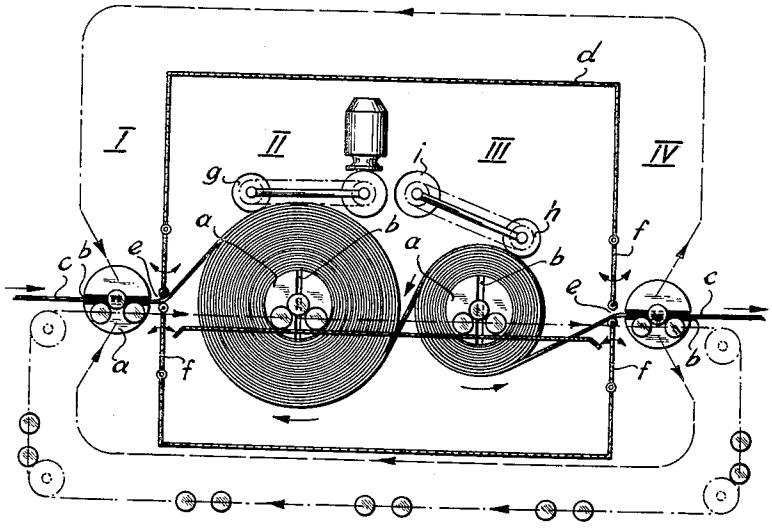


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REELING OF WEB MATERIAL

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FIG. 2



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REELING OF WEB MATERIAL

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6 Claims. (Cl. 242—55.16)

The invention relates to the reeling of web materials, and relates more particularly to methods of and means for the continuous reeling, for instance, for storing or transportation of smooth spread out webs of fabric or of synthetic or other materials. The invention is particularly suited for the wet treatment of web material, such as dyeing, bleaching, de-sizing, or the like, as well as for the dry handling of such material.

It is among the principal objects of the invention to provide for reeling of web material in a roll train in such a manner that the web is wound onto a roller in a double layer.

Double layer rolling has been practiced in the past, but was characterized by the need for an artificial fold.

It is therefore a further object of the invention to provide for double layer winding without the need for any artificial fold, thereby simplifying the methods and machinery required for the purpose.

Broadly speaking, this is accomplished by providing a group of rollers, each slotted or otherwise formed for the threading through the rollers of the web, and each roller is positionable among a plurality of stages within the roll train. The instant invention offers the advantage of storing the web substantially for any length of time simply by the control of the reeling speed.

Further objects and advantages of the invention will be set forth in part in the following specification and in part will be obvious therefrom without being specifically referred to, the same being realized and attained as pointed out in the claims hereof.

In the accompanying drawings,

Fig. 1 is a schematic view of a roll train for the winding process; Fig. 1 is divided into a plurality of steps A, B, C, D, E, and F, the step A illustrating the material passing through the rollers unwound, the step B showing one roller winding material, the steps C and D showing all the rollers moved to the right for one stage, one roller winding and the previously wound roller unwinding, the steps E and F showing the reeling after the end of the web has been reached; and

Fig. 2 is a schematic view illustrating a specific exemplification thereof.

In accordance with the invention, as diagrammatically illustrated in Fig. 1, there is provided a series of rollers *a* each positionable among a plurality of stages, such as for instance four stages designated I, II, III, and IV. The various phases of the process, and the function of the rollers during the process, are shown in separate steps designated A, B, . . . F. The four rollers *a* are disposed in the stages I . . . IV. Each roller *a* is provided with a slot *b* which forms a guide for the web *c* of material and which causes winding up of the web on the external surface of the roller when the roller is turned. The slots *b* may be formed, for instance, by making the roller of two parts.

The row of rollers *a* of the first step A of Fig. 1 shows the roll train with the web *b* threaded through all the rollers and suspended substantially straight. The

stage II is the turning stage for all the steps, so that any roller when it is positioned in the step II may be turned by any suitable means.

For winding, the web will be severed between the stages II and III, and the roller of the stage II be energized for rotation whereupon the material will be wound onto the external surface of the roller of stage II (as shown in step B). After a desired amount of material has been wound onto the roller, all of the rollers will be transferred, each to the next higher stage (to the right, in Fig. 1). Such transfer may be done mechanically or by hand, and the return of the rollers later on to the original stages may also be done by hand.

After the rollers have been moved for one stage, an empty roller will again be placed in the stage II. The roller in the stage II will be turned, thereby winding material onto its external surface, drawing the material not only from the supply (from the left of Fig. 1), but also by unwinding material from the roller that is now in the stage III, as shown in step C. After a desired amount of material has been wound in double layer form onto the roller that is in the stage II, all the rollers will again be moved, to the right, to the next stage (as shown in step D); in the step D, an empty roller will be placed in the stage II which will be wound with a double layer, namely drawing material from the roller of stage I and unwinding material from the roller of stage III; the free leading end of the web of the roller in stage IV is transported away to the right. In this manner, there will be wound onto each successive roller at the stage II a double layer of web material, without need for any special means for the double layer formation (steps C and D).

In this manner, each roller will thereby be wound with a double layer of web material in succession, and thereafter again be unwound.

The empty rollers may then be brought back to the original position at the entrance of the roll train, or there may be used a large number of rollers for the successive progress through the stages of the roll train.

After the end of the web *c* has been reached, it will be sewn, for instance by hand, onto the end of the next adjoining web. In this manner there may be accomplished a series of windings without standstill, and the length of time of the winding in the two winding stages II and III may largely be regulated by controlling the speed of rotation.

In Fig. 2 there is shown a practical embodiment of the invention, wherein the winding stage II and the unwinding stage III are positioned in a closed casing *d* in order to subject the web to treatment by liquids, vapors, or the like. The casing *d* is provided on both opposite sides each with a slot for the passage of the web, and with a door structure such as opposite removable flaps *f* to permit the movement of the rollers among the stages.

The drive for the roller in stage II is accomplished by means of a frictional driving mechanism such as a driven frictional tiltably journalled driving cylinder *g*.

In order to brake the speed of rotation of the roller in stage III during the unwinding, there is provided a brake mechanism such as a tiltable journalled roller *h* which abuts against the outer surface of the windings of the material, and which is driven by the material and is connected by a flexible means such as a belt to a brake *i*. The brake *i* controls by means of the belt the speed of rotation of the roller *h*, and thereby, in turn, the roller *h* controls the unwinding speed of the roller *a* in the stage III.

The stepwise shifting of the rollers from stage to stage can be carried out mechanically or by hand. The return of the rollers from the stage IV may be carried out by hand. In the case where the roller is made of two parts,

the roller may be taken apart in the stage IV and the parts transported separately to the stage I and be reassembled in stage I.

We wish it to be understood that we do not desire to be limited to the exact details of construction shown or described, for obvious modifications will occur to a person skilled in the art.

Having thus described the invention, what we claim as new and desire to be secured by Letters Patent, is as follows:

1. A method for the continuous storing and transporting, respectively, of a web of material by means of a train of more than two slotted rollers, all the rollers of the train being adapted to be simultaneously shifted for positioning among successive aligned stages including a drive stage wherein each roller in succession will be rotated, the steps comprising, threading the web through the rollers, severing the web between two successive rollers in the train one being positioned in a drive stage and the other after the drive stage, winding one portion of the web onto the roller in the drive stage, thereafter shifting said rollers to the next succeeding stage and rotating the roller which has been shifted to the drive stage whereby the roller in the drive stage will wind onto its exterior surface a second portion of the web and will unwind the said first portion of web off the roller positioned in the stage after the drive stage, thereby winding the material in a double layer.

2. In a method as claimed in claim 1, the step comprising transporting the free leading end of the web away after it has been unwound from the roller of the last among said successive stages.

3. In a machine, for use in continuously storing and respectively transporting a web of material fed thereinto, the combination of a roller train including a plurality of rollers located in a series of more than two successive stages each spaced apart from all the other stages, and all the stages being aligned, and including a drive stage wherein a roller is rotated, each roller having suspension means for threading therethrough the web for web suspension, and all of said rollers being simultaneously shiftable in one direction between successive stages, means operable for rotating the roller positioned in the drive stage, the roller in the stage following the drive stage being turnable, whereby the roller in the drive stage will wind one portion of the infed web material and unwind another portion of the web material from the roller in the stage following the drive stage, and thereby will wind said one and other portions in the drive stage into a double layer.

4. In a machine, as claimed in claim 3, said suspension means including a slot formed in each roller.

5. In a machine, as claimed in claim 3, including a casing structure surrounding the drive stage and the stage following the drive stage and including means normally closed, and yieldable for passing said rollers to and from the interior of the housing, and having slots open at all times for passing the web.

6. In a machine as claimed in claim 3, including means for braking the roller positioned in the stage following the drive stage.

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