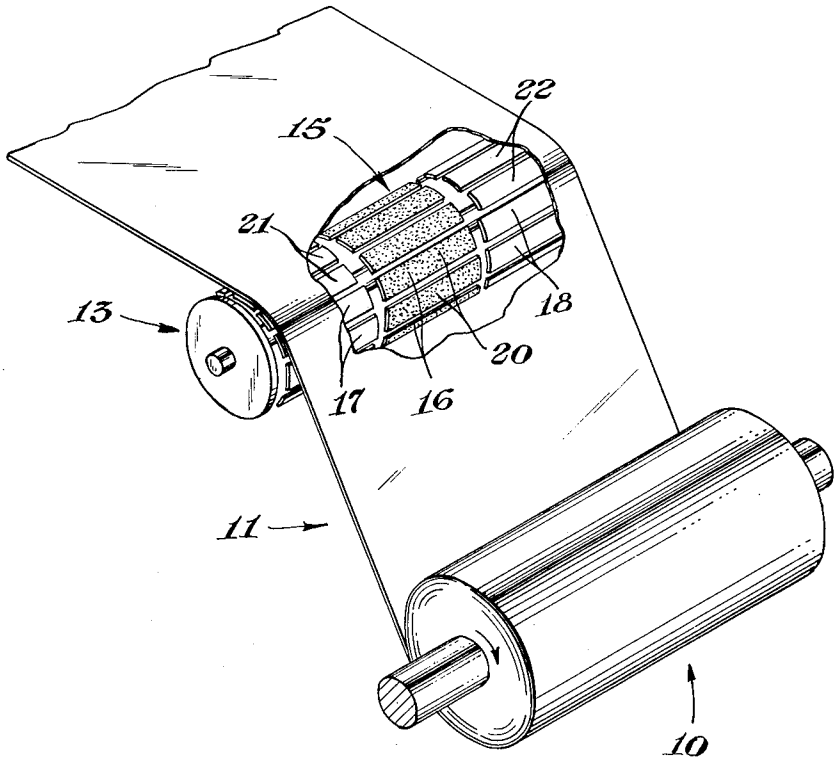
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SLAT EXPANDER ROLL

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SLAT EXPANDER ROLL

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This invention relates to a method and apparatus for the handling of smooth thermoplastic resinous film. It more particularly relates to an improved expander roll for the handling of such webs, in coating machinery, slitting equipment and the like.

Advantageously, a wrinkle free web is obtained by passing the web over a roll having a plurality of movable slats or bars on its surface and so constructed and arranged that each slat is divided into at least three portions, a centrally positioned fixed portion and 2 portions which move outwardly at least on part of the rotating cycle. Such a roll is described in United States Letters Patent 2,969,578. When a slat expander roll is employed to handle smooth thermoplastic webs such as films prepared from polystyrene, polyethylene and saran and the like, there is a marked tendency for the web to wander to one side or the other of the roll and adequate tracking is not maintained unless under constant manual or automatic control. Such a condition is generally unsatisfactory and results in considerable expense as well as unnecesary complicated equipment.

It is an object of this invention to provide an improved slat expander roll for the handling of thermoplastic webs.

It is a further object of this invention to provide an improved surface configuration for a slat expander roll.

It is yet another object of this invention to provide a slat expander roll which will cause improved tracking of thermoplastic webs.

These benefits and other advantages are obtained by providing in a slat expander roll for a web comprising a plurality of slats peripherally disposed about and parallel to the axis of said roll, each of said slats comprised of at least a centrally disposed fixed portion and movable portions disposed at opposite ends of said fixed portion, said movable portions adapted to move toward and away from said central fixed portion as said roll is rotated, said motion being in a direction generally parallel to the axis of rotation, the improvement which comprises said central fixed portion of each said slat having a roughened surface, and said movable portions of each of said slats having an exposed less rough surface than said roughened surface, the difference in roughness being sufficient to maintain tracking of said web on said roll.

Further features and advantages of the invention will become more apparent in view of the following specification and drawing wherein:

The FIGURE schematically depicts the handling of a web in accordance with the invention. A pivotally mounted supply roll **10** provides a supply of transparent thermoplastic web **11** to a slat expander roll generally indicated by the reference numeral **13**. The pivotally mounted slat expander roll **13** has peripherally affixed thereto a plurality of slats **15**. Each slat **15** is comprised of a fixed central portion **16** and movable end portions **17** and **18**. The fixed central portion **16** is provided with a roughened surface **20**, whereas the slat portions **17** and **18** have smoother surfaces **21** and **22**. The slat portions **17** and **18** are caused to move away from the central portion **16** while in contact with film **11** by a cam mechanism within the roll (not shown).

In operation a roll in accordance with the invention, is often employed immediately after unwinding from a supply roll such as is illustrated in FIGURE 1 intermediate another operation performed on the web, for example, in feeding a coating apparatus or a printing press. Advantageously, where the web is to be processed through a variety of operations it is often advantageous to incorporate a slat expander roll in accordance with the invention at any stage or location where there is a tendency for the generation of wrinkles in the web or tendency to generate wrinkles through curling, shrinkling or stretching. Rolls in accordance with the invention may be installed as idler rolls, that is, being driven by the friction of the web passing thereover or ultimately the roll may be driven to provide tension and a forwarding action thereon.

The surface **20** of the fixed central portion **16** of each slat in accordance with the invention must be rougher than the corresponding surfaces **21** and **22** of the movable slat portions **17** and **18**. The precise degree of roughness required will depend upon the particular material being handled. An extremely rough surface **20** on the central portion **16** would tend to perforate or mark the web being handled whereas if it is excessively smooth the beneficial effects will be lost. With an excessively smooth surface **20** on the central portion **16** when compared to the finish of the surfaces **21** and **22** proper tracking will not be obtained. Advantageously, for many thermoplastic webs a finish on the surface **20** advantageously is between about 20 and about 700 microinches as defined in American Standard ASA B46.2—1952, whereas the outer movable surfaces **21** and **22** advantageously are provided with a surface finish having a roughness up to about 300 microinches. Generally the finish in microinches of the central portion **20** should be about twice the numerical value of the finish in microinches of the movable surfaces **21** and **22**. However, beneficially no lower limit usually exists for the finish of the movable surfaces **21** and **22** although in cases where handling certain thermoplastic webs which tend to have a slightly oily surface such as certain of the saran and vinyl chloride polymer compositions it is often beneficial to employ a finish no smoother than about 5 microinches.

By way of further illustration, a roll in accordance with the invention was prepared which had a closed length, that is, with the movable slats in their closest relationship to the fixed central portion, of 17 inches. The roll had a diameter of 6 inches and ten three-piece slats extended the entire length thereof. The slats disposed about the circumference were equally spaced about the periphery of the roll. The central portion of the slats were sandblasted to a finish of about 60 microinches and the movable portions of the slats had a roughness of about 20 microinches. These finishes were determined by comparison with a sample finish specimen as specified in American Standard ASA B46.2—1952. This roll was incorporated into a coating apparatus and employed to smooth a web of oriented polystyrene film about 1 mil in thickness coming from a supply roll. After several months of operation, no tendency was observed for the web to wrinkle or to wander to either side of the roll. By way of contrast, a similar roll having a uniform finish of about 50 microinches on the surface of the fixed and movable slat portions in the same equipment required the constant attention of an operator to maintain tracking and manually correct severe wrinkling.

Substantially similar beneficial results are achieved when a roll in accordance with the invention is employed with other thermoplastic webs such as polyethylene, polypropylene, polyvinyl chloride, saran, polyester film such as mylar and the like.

The apparatus of the invention may be embodied with various alterations and modifications which may differ particularly from those that have been described in the

preceding specification and description. For this reason, it is to be fully understood that all of the foregoing is intended to be merely illustrative and is not to be construed or interpreted as being restrictive or otherwise limiting of the present invention, excepting as it is set forth and defined in the hereto appended claims.

What is claimed is:

1. In a slat expander roll for a web comprising a plurality of slats peripherally disposed about and parallel to the axis of said roll, each of said slats comprised of at least a centrally disposed fixed portion and movable portions disposed at opposite ends of said fixed portion, said movable portions adapted to move toward and away from said central fixed portion as said roll is rotated; said movement being in a direction generally parallel to the axis of rotation, the improvement which comprises providing said central fixed portion of each said slat with an exposed roughened surface, and said movable portions of each of said slats with an exposed less rough surface, the difference in roughness being sufficient to maintain tracking of said web.

2. The roll of claim 1, wherein said central fixed portion is provided with an exposed surface having a surface roughness having a value at least twice the numerical value of the roughness of said less rough surface.

3. The roll of claim 2, wherein the exposed surface of said central portion has a surface roughness between about 20 and 700 microinches.

4. The roll of claim 3, wherein each of said slats are composed of one central fixed portion and two movable portions.

5. The roll of claim 4, wherein each said fixed portion has a surface roughness of about 60 microinches and said movable portions a surface roughness of about 20 microinches.

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