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[54] **WEB SUPPORT TABLE**

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[52] **U.S. Cl.** **83/156,** 83/175, 83/424, 83/436, 83/500, 226/194, 242/56.2

[51] **Int. Cl.** **B23d 19/06**

[58] **Field of Search** 83/156, 424, 436, 83/500–503, 175; 226/109, 190–194; 242/56.2, 56.4–56.7

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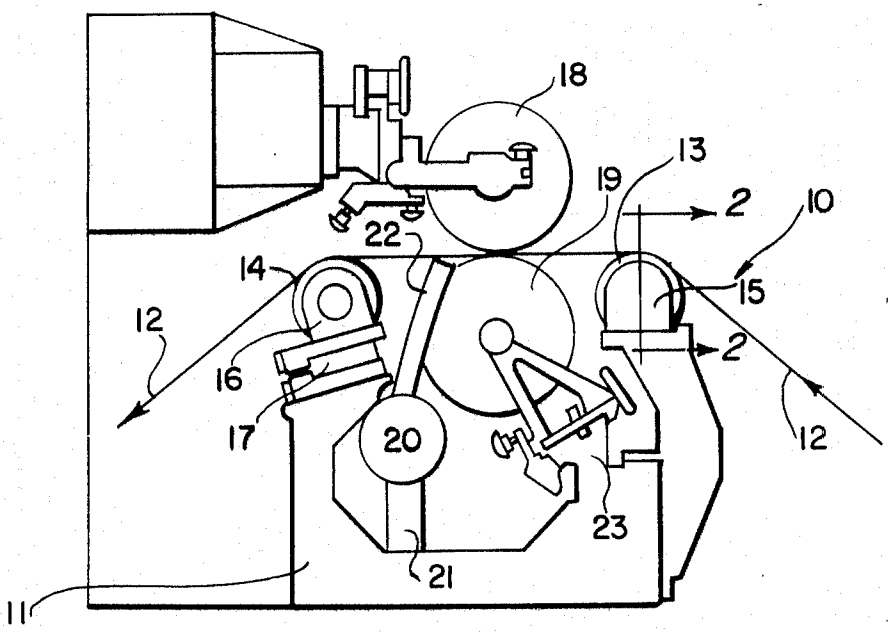
[57] **ABSTRACT**

A web conveying apparatus having a support "table" portion where the web is moved over two parallel rollers under tension to flatten the web between the rollers to treat the flattened portion of the web. At least one and preferably both of the rollers are made up in a plurality of longitudinally aligned sections with a spacing element, preferably of wear resistant material, located between and axially spacing adjacent sections of each roller. The two rollers are located at the top of the legs of a U-shaped frame and when the table portion is used with a slitting apparatus, the lower slitter and a trim removal pipe may be located in the space between the legs of the U.

12 Claims, 2 Drawing Figures



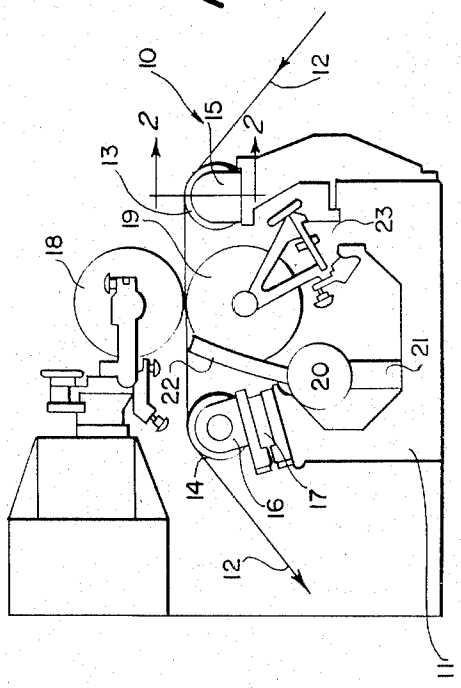


FIG. 1

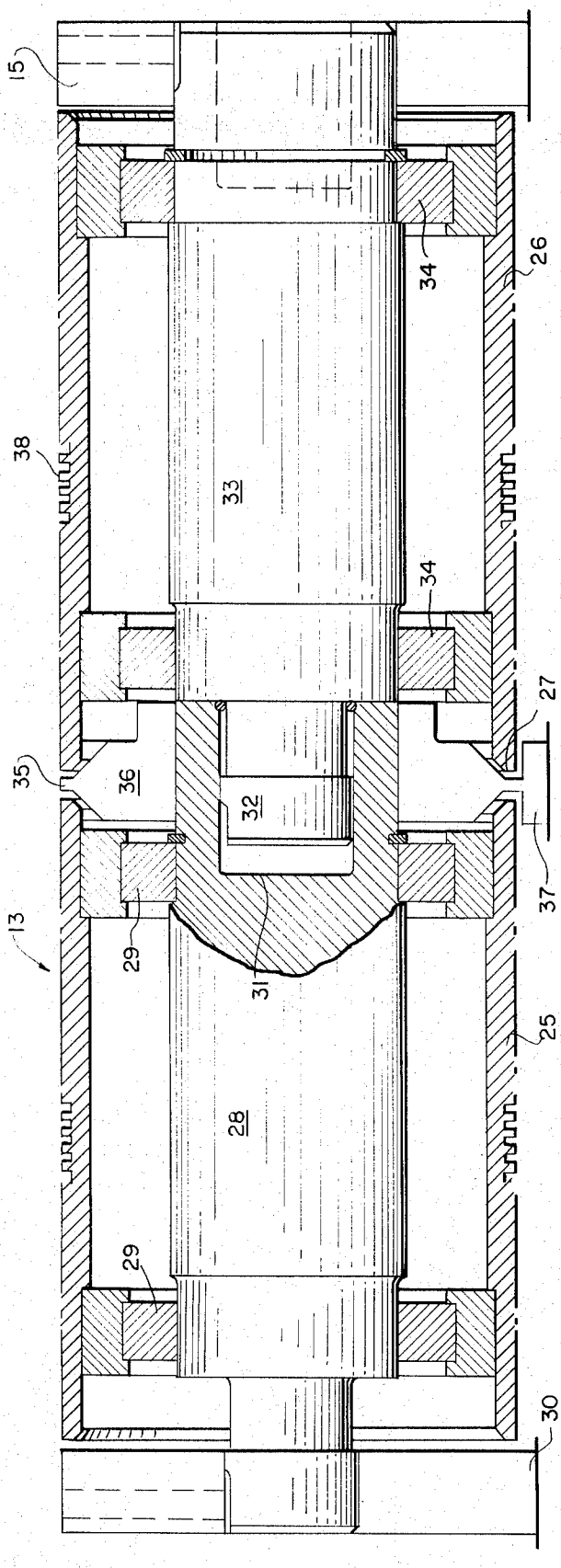


FIG. 2

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WEB SUPPORT TABLE

BACKGROUND OF THE INVENTION

This invention relates to conveying and treating of web materials; and in particular it relates to a new and improved web support table for flattening a length of a travelling web of material.

In the treatment of web material, such as in the lengthwise slitting of a travelling web of paper, a means must be provided to flatten a length of the travelling web to stabilize the same for action thereon by the slitters. This flattening means normally comprises a pair of parallel rollers over which the paper passes under tension so that the paper remains flat between the rollers. In a slitting assembly, this portion is referred to as the "slitting table".

However, disadvantages exist in present slitting tables. The distance across the table in the direction of travel of the web, commonly referred to as "draw" should be minimal. The larger the draw , the less stable is the paper material between the rollers. In a paper slitting assembly a large draw could result in flutter of the paper, varying paper widths and poor steering of the slit portions to their respective wind up drums. To summarize, large draw tends to reduce the stability of the paper at the slitting station. However, paper slitting and winding apparatus is normally quite large, for example 200 inches across the direction of travel of the web. For a machine of this size, very large diameter rolls must be used in view of the basic stress and weight requirements. Thus, these rollers must be very large in diameter and consequently, they must be spaced a reasonably large distance apart, thereby resulting in a large draw with its attendant disadvantages. Thus, there exists a need for a new and improved web support table which will provide stability even for very wide machines, but wherein the draw may be reduced to a minimum.

SUMMARY OF THE INVENTION

It is a purpose of the present invention to provide a new and improved web support table which overcomes the disadvantages of web support tables known heretofore.

In accordance with the present invention, a web support table of high stability is provided wherein the draw may be held to a minimum. Each of the two rollers of the support table are constructed in a plurality of relatively short sections. For a wide machine the sections are arranged end to end for rotational movement about a common axis, the individual sections being spaced apart by suitable spacing elements. Consequently, even for machines having a very large dimension across the direction of travel of the web, the outer diameter of the rollers which form the web support table may be kept very small, and hence the draw may be reduced to a minimum.

When the present invention is employed as a slitter table, the rollers may be provided at the top of a conveniently constructed U-shaped frame and both the lower slitter blade and a trim exhaust tube may be conveniently and compactly located in the space between the legs of the U.

Thus, it is an object of this invention to provide a new and improved web support table which overcomes disadvantages of previous web support tables.

It is another object of this invention to provide a new and improved web support table wherein draw is held to a minimum, even for a machine having a very large dimension across the direction of travel of the web.

It is another object of this invention to provide a new and improved slitting table having minimum draw, even for a very wide slitting apparatus, whereby web stability at the slitting table is maximized.

It is another object of this invention to provide a new and improved web slitting table having a U-shaped frame for both supporting the rollers of the slitting table and supporting therein the lower slitter blade and possibly also a trim exhaust pipe.

It is still another object of this invention to provide a roller for a web support table which is made up of a plurality of axially aligned sections spaced apart by suitable spacing elements.

Other objects and the attendant advantages of the present invention will become apparent from the detailed description to follow, together with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

There follows a detailed description of the invention together with the accompanying drawings. However, it is to be understood that the detailed description and the drawings are provided only to illustrate a preferred embodiment of the invention.

FIG. 1 is a side elevational view of a web support table being used as a web slitting station.

FIG. 2 is an enlarged sectional view of a roller of FIG. 1 and is taken along line 2—2 of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the figures, like numerals represent like elements throughout the two views.

Referring to FIG. 1, the web support table, in this case the slitter table **10** comprises a generally U-shaped frame **11.** A web **12** to be slit passes over leading and trailing rollers **13** and **14** mounted atop the "legs" of the U-shaped frame. End roller supports **15** and **16** are visible in FIG. **1.** The rollers **13** and **14** extend for a suitable distance perpendicular to the direction of travel of the web **12** and supports similar to supports **15** and **16** are provided at the opposite ends of the rollers. A tension load measuring device **17** may be provided on the trailing roller **14.**

As a slitting table, the apparatus would include upper and lower slitter blades **18** and **19.** In a preferred arrangement of the invention, these slitter blades would be 8 inches and 8.5 inches in diameter respectively. It will be noted that the lower slitter blade **19** is conveniently located in the center of the U-shaped frame. The dovetail support **23** extends for the full width of the apparatus and the slitter assembly **19** may be slid transversely across the machine to any selected position.

In slitting, it is also necessary to slit the edges of the web so that the resultant products will have clean neat non-ragged edges. For this purpose, one slitter assembly is normally provided adjacent each edge of the web passing therethrough. The slit trim is then removed by a high powered suction means acting through a trim chute **22** (one of which will be located at each side of the web). These chutes will lead to a common discharge manifold **20** which is mounted on a suitable support means **21.** A feature of the invention is that this discharge manifold **20,** which would extend for the full

width of the apparatus, may be compactly and conveniently located adjacent the lower slitting blade in the space between the legs of the U-shaped frame **11.**

A typical roller is illustrated in FIG. **2.** The roller **13** of FIG. **2** is identical to the roller **14** except for the addition of the latter of the tension loading measuring device **17.**

In accordance with a feature of the invention, this roller **13** is constituted by a plurality of individual rollers **25** and **26** having similar outer dimensions and axially aligned with each other. The drawing shows only two sections. However, any number of sections may be provided. In preferred embodiments of the invention, these rollers may be approximately 4 or 4½ inches in diameter and forty inches in axial length. Such dimensions would be suitable for use with upper and lower slitter blades of 8 and 8½ inch diameters, respectively. For such an arrangement the draw, that is the distance between the centers of the rollers **13** and **14** may be approximately sixteen inches. In another preferred embodiment the individual sections may be 6 inches in diameter and extend for an axial length of approximately 80 inches. In this case the draw may be extended up to 25 inches. However, it should be noted that because of the sectional construction of the rollers, it is possible to provide even very long rollers with 4 or 6 inch diameters. Thus, contrary to the prior art, rollers of the present type may be used in a very wide machine without increasing the draw of the web support table.

Referring again to FIG. **2,** the section **25** includes an inner shaft **28** separated from **25** by suitable roller bearings **29** so that the outer section **35** can rotate freely about its axis. The righthand end of **28** (as viewed in FIG. **2**) includes a recessed portion **31** which is engaged by a projection **32** on the adjacent shaft **33** of the section **26.** This shaft **33** is separated from outer sections **26** by suitable roller bearings **34.**

It is important that the plurality of sections be accurately but flexibly aligned in an axial direction. This is accomplished by the cooperating elements **31** and **32.**

Adjacent ends of the sections **25** and **26** will be spaced apart by a suitable distance which may be approximately 0.3 inches. This space must be filled by a suitable spacing element, preferably of a wear resistant material such as nylon, high density polypropylene, a ceramic material or the like. This space between the adjacent ends of **25** and **26,** which is referred to as **27** in FIG. **2,** is filled by a suitable spacing element **36** having a projection **55** which extends to the outer circumference of the sections **25** and **26.** The outer dimension of this element **35** in the area where the rolls are contacted by the paper is relevant. If the radial outer surface of **35** is too far above or too far below the surface of the roller sections **25** and **26,** the web will wrinkle. Best results have been obtained by locating the outer circumference of this element **35** 0.002 inches to 0.005 inches below the outer surface of sections **25** and **26.** The portion of element **36** below the rollers whereat the rollers are not engaged by the paper extends downwardly to form a support portion **37.**

The outer surfaces of section **25** and **26** may be constructed with vent grooves **38,** only a few of which are shown in FIG. **2,** to permit air flow between the rollers and the web passing thereover without lifting the web from the surface of the rollers.

Thus, there is provided an arrangement which optimizes web stability by reducing draw to a minimum, even for a very wide machine, and thereby reducing the tendency of the web material to flutter as it passes over the web support tables. In addition, this stability assures constant web width and provides good steering of the slit portions of the web after the slitting station so that the portions move smoothly to their respective wind-up drums without bumping each other, raising dust or causing slitter overlap.

Although the invention has been described in considerable detail with respect to the preferred embodiment thereof, it will be apparent that the invention is capable of numerous modifications and variations apparent to those skilled in the art without departing from the spirit or scope of the invention.

We claim:

1. In an apparatus for conveying a web of material of indefinite length, a table portion for maintaining a length of the traveling web in a flattened condition for acting on the web, said table portion comprising a leading roller and a trailing roller, said rollers being parallel to each other, the web being adapted to be directed under tension over said rollers such that the web is maintained flat between said rollers, at least one of said rollers being made up of a plurality of separate cylindrical sections, which sections are positioned end to end and aligned with each other, a spacing element located between and spacing apart adjacent sections, means for supporting each end of said one roller and intermediate support means for supporting the said one roller at all points along its length where the cylindrical sections abut each other, whereby the deflection of said one roller in a direction perpendicular to its axis is reduced by the said intermediate support means along its length.

2. An apparatus according to claim **1,** wherein the axial distance between facing ends of the external surfaces of adjacent sections is approximately 0.3 inches.

3. An apparatus according to claim **1,** wherein the said spacing element is cylindrical and has an outside radius of between 0.002 inches and 0.005 inches less than the outside radius of the roller sections.

4. An apparatus according to claim **1,** wherein both of said rollers are made up in said sections.

5. An apparatus according to claim **1,** including a frame which is generally U-shaped as viewed transverse to the direction of travel of the web, and wherein the said rollers are located at the top of the legs of said U-shaped frame.

6. An apparatus according to claim **5,** including a web slitting assembly for slitting the web at the table portion, said assembly including an upper slitter blade and a lower slitter blade, said lower slitter blade being mounted on the frame between the legs of the U-shaped frame.

7. An apparatus according to claim **6** including trim chutes extending downwardly from the web for receiving edge trim slit from the web, and a trim pipe mounted to receive trim from the chutes and convey the same transversely away from the apparatus, said trim pipe being located in the space between the legs of the U-shaped frame.

8. An apparatus according to claim **1,** wherein each section is approximately four inches in diameter and approximately forty inches long.

9. An apparatus according to claim **1,** wherein each section is approximately 6 inches in diameter and approximtely 80 inches long.

10. An apparatus according to claim 1, wherein said rollers include circumferential vent grooves in their outer surfaces.

11. An apparatus according to claim 1, said one roller comprising a fixed shaft supported at its ends, the cylindrical sections constituting hollow tubes rotatably mounted on said shaft for rotation relative thereto, said spacer fixed to the said shaft and extending outwardly between said sections, said intermediate support means comprising means for engaging the spacer to support the roller at that point.

12. An apparatus according to claim 11, said cylindrical sections being freely rotatable on the shaft and freely rotatable relative to each other.

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