United States Patent [19]

Fletcher

[11] **3,854,249**

[45] **Dec. 17, 1974**

[54] **DECKLE GRINDER**

[75] Inventor: **Wade D. Fletcher,** Hartsville, S.C.

[73] Assignee: **Sonoco Products Company,** Hartsville, S.C.

[22] Filed: **July 9, 1973**

[21] Appl. No.: **377,368**

[52] **U.S. Cl.** ..... **51/75,** 91/1 G

[51] **Int. Cl.** **B24d 7/00,** B24d 9/00

[58] **Field of Search** ..... 51/74–78, 110; 93/1 R, 1 G

[56] **References Cited**

UNITED STATES PATENTS

2,217,306 10/1940 Burrill 51/75

2,392,375 1/1946 Gardella 51/78

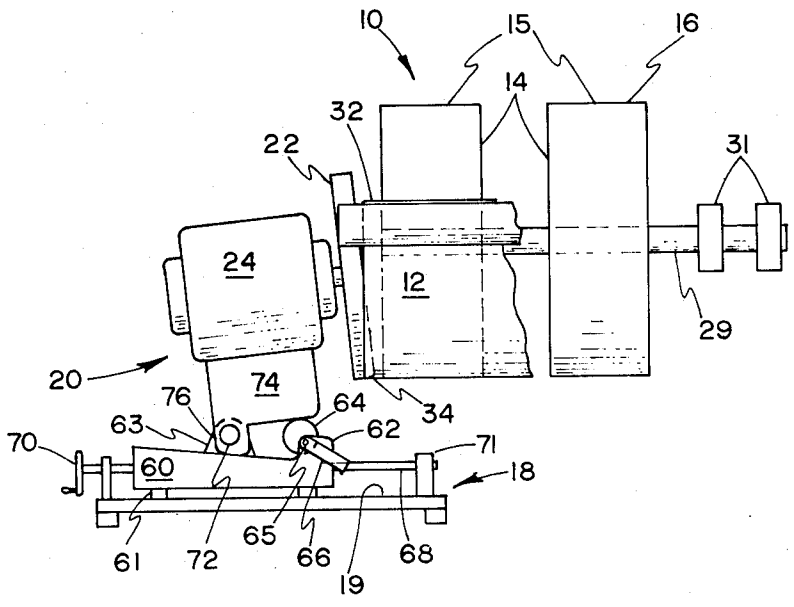
Primary Examiner—Othell M. Simpson

Attorney, Agent, or Firm—C. Gordon McBride

[57] **ABSTRACT**

Deckle grinding apparatus is described wherein a web of material, such as paper, is wrapped approximately 180° around a support drum so one or both edges overhang the drum. Tension is applied to the web to provide increased strength to permit a grinding wheel at an angle to the longitudinal axis of the drum to grind a deckle on the edge of the web.

8 Claims, 3 Drawing Figures



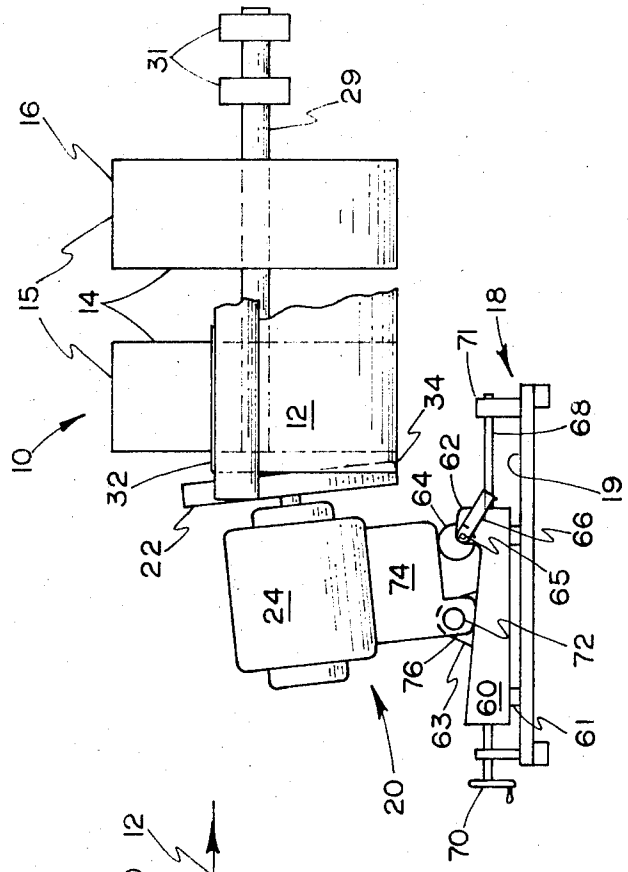


FIG. 1

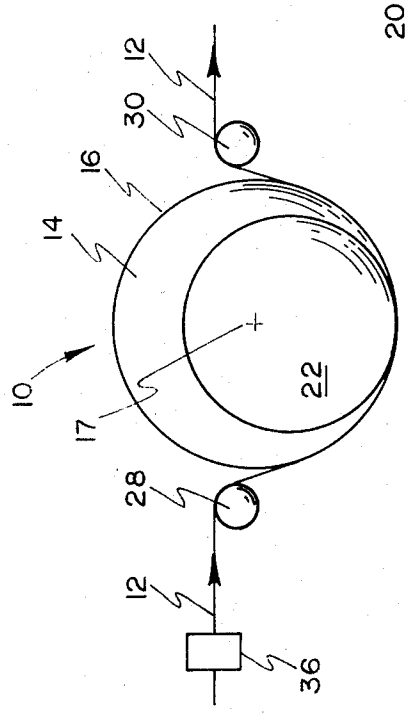


FIG. 2

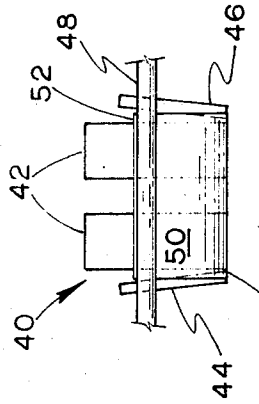


FIG. 3

DECKLE GRINDER

This application is directed to deckle grinding apparatus and more particularly to such apparatus for grinding the edge of a web of paper at a specific angle and dimension.

It has long been a problem in preparing webs of material such as paper which are to be used in production of spiral tubes or containers that the edge of the plies that overlap the next below ply have a substantial raised portion caused by the overlap. It has also been difficult to provide a butt joint that does not leave a space and thereby cause weakening of the tube or can body. In order to avoid these difficulties, it has been suggested that the edge of the ply or web be deckled or skived such that it is angled to the plane of the surface of the web of material.

Various apparatus has been suggested which can be utilized for this purpose. However, the known apparatus does not skive or deckle the edge of the paper such that there is a smooth, even outer edge and the equipment is quite cumbersome and expensive. Furthermore, the known equipment is difficult of use "in-line" with a relatively rapidly producing converting operation.

In order to overcome the above disadvantages, the instant invention contemplates the utilization of a drum around which the web of material is passed under tension. A powered grinding wheel is mounted at an angle such that the desired amount of angle and paper is removed during the grinding operation.

Reference is now made to the drawings wherein like numerals refer to the same or similar parts and wherein the invention may be best understood by reference to the following description taken in conjunction with the accompanying drawings in which:

FIG. **1** is a front view of the instant apparatus;

FIG. **2** is a diagrammatic side elevational view of the invention with portions removed for clarity; and

FIG. **3** is a front elevational view of a modification of the instant invention.

Referring now to the drawings and more specifically FIGS. **1** and **2** wherein deckle grinder **10** is shown in a position for deckling a web **12** of material such as paper. Support drum **14** is substantially cylindrical having circular outer surface **16.** Drum **14** is mounted on a framework **18,** a portion of which is omitted for clarity, including shaft **29** and bearings **31.** As best seen in FIG. **1,** drum **14** may have a pair of disk-like elements **15** for more accurate control and greater operational efficiency.

Grinder **20** includes grinding wheel **22** which is powered by conventional motor **24.** Motor **24** is adjustably supported from framework **18** by support elements or bearings **26** in an adjustable manner to permit the rotation of the grinding wheel **22** as observed in FIG. **1.** Web guide bars **28** and **30** on the supply and converting sides of drum **14,** respectively, are mounted adjacent to, but spaced from drum surface **16.** Generally it is preferable to have guide bars **28** and **30** mounted slightly above centerline **17** of drum **14.** This permits the appropriate location and maintenance of tension on web **12** as it passes around drum **14.**

As best seen in FIG. **1,** a portion of web **12** extends beyond the end of drum **14** to provide a web overhanging edge **32.** A portion of overhang **32** is ground away by grinding wheel **22** to provide deckled portion **34.**

Tension device **36** is provided between guide bar **28** and the web supply which is not shown, but may be of any conventional construction.

Referring now to FIG. **3,** an alternative arrangement of the instant invention is shown as having a narrow drum **42** which is of less longitudinal length than the width of web **50.** A pair of grinding wheels **44** and **46** are mounted similarly to wheel **22** shown in FIG. **1** to grind overhangs **52** of web **50** and thereby provide deckles on each side of web **50.** Guide bar **48** is shown in a position similar to that for guide bar **30** in FIG. **2.**

The adjustable mechanism for mounting grinding wheel **22** and its drive motor **24** are shown in FIG. **1.** Supporting framework **18** includes a flat horizontal surface **19** on which is mounted slide **60.** Slide **60** has feet **61** which slide along surface **19.** Extending upwardly from slide body **60** are arms **62** receiving pivot projections **65.** Near the other end of slide body **60** are located upright projections **63** for receiving pivot bars **72** for mounting of motor mount **74.** Motor mount **74** includes downwardly directed legs **76** which also receive pivot bar **72** to permit motor mount **74** and motor **24** to pivot about bar **72** in the plane of the drawing as viewed in FIG. **1.**

Arms **62** receive pivot projections **65** which extend from eccentric shaft **64.** Handle **66** permits the rotation of shaft **64** to raise or lower motor mount **74** which contacts one surface of shaft **64.** A pair of support legs **71** extend upwardly from support frame **18** to receive threaded shaft **68** which has handle **70** attached to one end. This construction permits rotation of handle **70** to move slide **60** to the right or left as viewed in FIG. **1.** This adjustment permits the movement of grinding wheel **22** toward or away from drums **14** or **42.** Rotation of handle **66** raises or lowers grinding wheel **22** and, in conjunction with handle **70,** permits an accurate location of grinding wheel **22** to provide for the deckling of a proper amount of web **12.**

In operation, web **12** passes from the supply location through tension device **36,** around guide bar **28** onto surface **16** of drum **14** around which it is wrapped approximately 180°. Web **12** then passes over guide bar **30** and to the converting operation or a rewind apparatus, not shown. As web **12** passes over drum **14,** it is put into an arcuate position to thereby provide strength and rigidity to the web such that grinding wheel **22** may grind a portion of overhang **32** to form the deckle **34.** It is noted that grinding wheel **22** is of a dimension less in diameter than the diameter of support drum **14** to permit only a portion of grinding wheel **22** to encounter overhand **32.** As web **12** passes grinding wheel **22,** a portion is removed to form deckle **34.**

Thus it is seen that the instant apparatus provides an economical, simple and compact apparatus for deckling the edge of a web of material such as paper. The apparatus is capable of use "in-line" with various pieces of equipment such as spiral winding machines. Utilization of the easily controlled tension device **36** and modification of the angle of grinding wheel **22** provide the desired thickness and angle for the deckle. The instant apparatus avoids the use of a back-up plate with the attendant wear and potential damage to web **12** and also provides a smooth linear edge on web **12.**

What is claimed is:

1. A deckle grinder comprising: means for supporting a moving web of material in an arcuate configuration; grinding means for removing a portion of the edge of

the arcuate section of the web to provide a deckle; said grinding means mounted at an angle to said supporting means and within said arcuate section of said web, whereby a portion of the web may be removed by the grinding means to provide a uniform and properly angled deckle on the edge of the web.

2. The deckle grinder of claim **1** wherein said support means includes a drum around a portion of the exterior surface of which is passed a moving web of material.

3. The deckle grinder of claim **1** wherein said grinding means is of less radial dimension than that of said support means.

4. The deckle grinder of claim **1** wherein said support means comprises a cylindrical drum and said grinding means comprises a grinding wheel mounted for contact with the edge of the web which overhangs the end of said drum.

5. The deckle grinder of claim **4** wherein said grinding wheel is of less diameter than the drum.

6. A deckle grinder comprising a cylindrical drum adapted to support a moving web of paper around a portion of its exterior surface; a grinding wheel; means for rotating said grinding wheel; said grinding wheel of less diameter than said drum and mounted at an angle to the longitudinal axis and end thereof; and means for supporting the web as it approaches and departs from said drum, whereby a portion of the web overhangs the end of said drum and contacts the edge of said wheel such that a portion of the overhanging web is removed.

7. The deckle grinder of claim **6** wherein are provided supporting means for the web as it approaches and departs from said drum; and said supporting means adjacent to and spaced from the exterior surface of said drum.

8. The deckle grinder of claim **6** wherein said supporting means comprise a pair of guide bars; at least one of said bars being adjacent but spaced from the exterior surface of said drum to support the web prior to the latter encountering said drum; and another of said guide bars adjacent to but spaced from said drum approximately 180° around said drum from said first guide bar.

* * * * *