Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte JOSEPH J. HARDING, RICHARD O. RATZEL, THOMAS E. MANLEY, THEO CORTHOUT, ROGER P.M. RINKENS AND PIETER FENNEMA

Appeal No. 2002-1053
Application No. 09/702,981

HEARD: January 21, 2003

Before STAAB, McQUADE, and NASE, Administrative Patent Judges.

NASE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 34 to 41 and 118 to 125, which are all of the claims pending in this application.

We REVERSE.

BACKGROUND

The appellants' invention relates to a separator device, a constant-entry device, and/or a shaping member for use in a cushioning conversion machine or method (specification, p. 1). A copy of the claims under appeal is set forth in the appendix to the appellants' brief.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Wood	1,929,087	Oct. 3, 1933
Simmons	6,155,963	Dec. 5, 2000

Claims 34 to 41 and 118 to 125 stand rejected under 35 U.S.C. § 103 as being unpatentable over Simmons in view of Wood.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellants regarding the above-noted rejection, we make reference to the answer (Paper No. 11, mailed February 28, 2002) for the examiner's complete reasoning in support of the rejection, and to the brief (Paper No. 10, filed January 15, 2002) and reply brief (Paper No. 13, filed May 9, 2002) for the appellants' arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims, to the applied prior art references, and to the respective positions articulated by the appellants and the examiner. Upon evaluation of all the evidence before us, it is our conclusion that the evidence adduced by the examiner is insufficient to establish a prima facie case of obviousness with respect to the claims under appeal. Accordingly, we will not sustain the examiner's rejection of claims 34 to 41 and 118 to 125 under 35 U.S.C. § 103. Our reasoning for this determination follows.

In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a prima facie case of obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). A prima facie case of obviousness is established by presenting evidence that would have led one of ordinary skill in the art to combine the relevant teachings of the references to arrive at the claimed invention. See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988) and In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

The claimed subject matter

Claims 24 and 118, the independent claims on appeal, read as follows:

34. A cushioning conversion machine comprising a conversion assembly which converts a sheet stock material into a three dimensional cushioning product and a stock supply assembly which supplies the stock-material to the conversion assembly;

the conversion assembly including a forming assembly which inwardly turns lateral regions of the stock material as the stock material travels therethrough in a downstream direction;

the stock supply assembly including a stock-dispensing device which dispenses the multi-ply stock material from a continuous sheet thereof and a constant-entry device which determines an entry point of the stock material upstream of the conversion assembly;

the constant-entry device also temporarily functioning as a force dampening device during a high tension situation, moving from a normal operating position to a tension yielding position, and then automatically returning to its normal operating position once the high tension situation is resolved.

118. A cushioning conversion machine comprising a conversion assembly which converts a sheet stock material into a three dimensional cushioning product and a constant-entry device which determines an entry point of the stock material upstream of the conversion assembly; the constant-entry device biased to an operating position and movable between the operating position and a tension yielding position, thereby temporarily functioning as a force dampening device during a high tension situation and automatically returning to the operating position once the high tension situation is resolved.

The teachings of the applied prior art

Simmons

Simmons' invention relates generally to cushioning conversion machines and more particularly to improvements in the mechanisms for feeding material into such machines for conversion into a dunnage product. Figures 1-5 illustrate a cushioning conversion machine 10 including an infeed unit 12, a forming assembly 14, and a cut off (severing) unit 16.

The machine 10 is loaded with a roll 18 of sheet material 20. The sheet material 20 may consist of three superimposed webs 22, 24, and 26 of biodegradable, recyclable and reusable thirty pound Kraft paper rolled onto a hollow cylindrical tube 28. In use, the conversion machine 10 processes sheet material to form dunnage which may be used for packing or shipping purposes.

The infeed unit 12 may include various bars or rollers 32, 34 and 36 for separating the layers of sheet material 20 before being fed into the forming assembly 14. The infeed unit 12 includes a holder 40 which supports roll 18 of sheet material 20. The forming assembly 14 is disposed within a housing 50 having a base plate or wall 52, side plates or walls 54, and an end plate or wall 56 which collectively form a frame structure. The forming assembly 14 includes various components to shape the sheet material 20 as it passes through the forming assembly into a continuous three-dimensional strip of dunnage having portions of the sheet material overlapped along the central region of the strip. In the forming assembly the sheet material 20 is guided into gears 80 and 82 which form part of a feeding/connecting assembly 84. The feeding/connecting assembly 84 includes a drive motor 86 operatively connected to gear 82. The gear 82 meshes with gear 80 to define a nip through which the continuous strip of sheet material passes. When the motor 86 is turned on, the gears

80 and 82 draw the sheet material through the nip between the gears, simultaneously advancing the material through the forming assembly 14.

The infeed unit 12 is powered to provide sheet material without excessive tension acting on the sheet material and more preferably without any significant variations in tension, as may be caused by the stopping and starting of the feeding/connecting assembly 84 and/or inadvertent hindrance of the sheet material feeding. This reduces the amount of tearing and further promotes optimal formation of a dunnage product, e.g., cushioning pads.

The infeed unit 12 is supported by a frame 100 which is connected to the upstream end of the housing. The frame 100 includes the holder 40 which is composed of a pair of arms 102 (only one shown) that support opposite ends of an axle 104 on which the roll 18 of sheet material turns. The frame 100 also supports side panels 106 and 108. The side panels 106 and 108 each lie in a plane that is defined by one of the side plates 54 of the housing 50. The frame 100 also includes brackets 110 that rotatably support the opposite ends of the rollers 32, 34, and 36.

The infeed unit 12 is powered by a motor 112 that is mounted to side panel 106. The motor 112 drives a shaft 116 which carries two power rollers 118 and 120. The connection between the motor 112 and the shaft 120 is by any suitable means such as the belt drive shown, or a gear drive, chain drive or other connection means may be used. The power rollers 118 and 120 preferably are smooth steel cylinders, and they are driven by rotation of shaft 116 with a surface speed that is slightly greater than the speed with which the gears 80 and 82 advance the web through the forming assembly 14.

The infeed unit 12 is constructed to bring the sheet material 20 into contact with the power rollers 118 and 120 in order to maintain a steady supply of sheet material to the forming assembly 14. To this end, the infeed unit 12 includes a pair of idler rollers 122 and 124 located below and above the power rollers 118 and 120. The idler rollers span the width of the machine 10 and are rotatably mounted to the side panels 106 and 108. The sheet material is fed from the roll 18 around the left side of roller 122 and over the top of roller 124. From there the web of sheet material moves downward past the powered rollers 118 and 120, forming a loop 126 before extending to a constant entry roller 128. From constant entry roller 128, the web is separated into its three layers by the separator rollers 32, 34 and 36.

A pair of pressure rollers 134 and 136 are mounted to bring the sheet material 18 into contact with the power rollers 118 and 120 in response to demand for sheet material from the forming assembly 14. A shaft 138 extends between the side panels 106 and 108. A pair of brackets 144 and 146 are mounted to the shaft 138. The brackets 144 and 146 support a respective one of the pressure rollers 134 and 136, respectively, for free rotation about an axis that is parallel to the shaft 116 and the power rollers. The pressure rollers 134 and 136 are located in opposition to the power rollers 118 and 120, and on the opposite side of the sheet material 20. The brackets 144 and 146 are proportioned so that when the shaft 138 rotates in a counterclockwise direction (as viewed in Figure 2), the pressure rollers 134 and 136 press the sheet material 20 against the power rollers 118 and 120.

The brackets 144 and 146 also each support a dancer arm 148 and 150, respectively. The two dancer arms 148 and 150 are similar and only the dancer arm 150 will be described in detail. Referring to Figures 4 and 5, the dancer arm 150 extends downward from the bracket 146 toward the loop 126. The dancer arm 150 is preferably formed of sheet metal (or other suitable material), and its lower end is curved at 152 to make a smooth glide surface for the sheet material 20 to bear against. The dancer arm 150 moves between the positions illustrated in Figures 4 and 5 in response to movement of the sheet material loop 126. When the gears 80 and 82 begin to advance sheet material through the forming assembly, the loop 126 may sag slightly between the rollers 124 and 128, and the sheet material desirably is free of driving contact or engagement with the power rollers 118 and 120. This is assured because a biasing spring 154 wraps around a pulley 156 which is secured to the shaft 138 and biases the shaft in a clockwise direction, as viewed in Figure 2.

Because the gears 80 and 82 are pulling initially from the slightly sagging (or even free-hanging loop 126), there is little drag on the sheet material and little chance that the gears will tear the sheet material as they start to rotate or will cause tearing upstream of the gears. As the sheet material advances, the loop 126 is taken up against the dancer arms 148 and 150. As this continues, the dancer arms 148 and 150 are forced to rotate from the position shown in Figure 4 toward the position shown in Figure 5. This counterclockwise rotation causes the pressure rollers 134 and 136 to squeeze the sheet material against the power rollers 118 and 120 whereupon the power roller drivingly engage the sheet material and pull it from the sheet roll. Because power rollers 118 and 120 are driven with a surface speed that is greater than the speed at which the feeding/connecting assembly 84 draws material through the forming assembly 14, if the pressure rollers 134 and 136 press the sheet material against the power rollers 118 and 120 firmly enough that there is no slippage between the material and the power rollers, the loop 126 will grow in size. However, as the loop grows in size, the pinch force acting on the sheet material will be reduced and slippage may occur between the sheet material and the power rollers, thereby effectively reducing the feed rate at which the incoming sheet material is advanced by the power rollers.

In a steady state of operation, an equilibrium would be reached with some slippage occurring between the sheet material 20 and the power rolls 118 and 120. In addition, in a steady state, there would be some tension in the web downstream of the power rollers 118 and 120. The amount of the tension can be controlled by the tension in the spring 154, which can be made adjustable by any suitable means. As illustrated, there is a series of holes in the side panel 106 which can be used to secure the end of the spring.

During start up, the infeed unit 12 will dampen the tension acting on the sheet material which arises from having to overcome the inertial of the stationary sheet roll. Most likely, the dancer arm will initially oscillate to some extent. However, whenever the tension in the web of sheet material 20 rises above a preset level (determined by the setting of the spring 154), the dancer arms 148 and 150 bring the pressure roller 134 and 136 into contact with the power rollers 118 and 120 to quickly feed sheet material into the loop 126 and attain a steady state feeding condition.

In order to dampen the system and keep the roll 18 of sheet material 20 from over running, a friction roller assembly 160 preferably is used to provide a constant resistance to rotation to the roll 18, or another type of braking device may be used. The friction roller assembly 160 includes a roller 162 mounted to a swing arm 164 which is pivotally secured to the arms 102. Spring 166 pulls the roller 162 against the surface of the roll 18 to provide a continuous and preferably constant drag. Any suitable means for generating a frictional load on the roller 162 may be used, such as a drum-type brake, a caliper-type brake, or even a set screw which bears down on a turning shaft. The key function, as with any damped feed back controlled system, is to allow the system to respond rapidly without excessive overshooting. In the illustrated arrangement, the braking force will progressively decrease as the diameter of the roll, and thus its inertial mass, decreases.

Wood

Wood's invention relates to a tension roll for webs, and although capable of other uses, is especially adapted for printing presses. The principal objects of Wood's invention are to provide means whereby if the web runs on one end of the spring-pressed roll the roll will be kept in alignment, irrespective of the differences in pressure on the two ends of the roll, this being especially desirable when running a half or quarter width web on the roll; to provide this means in a simple and convenient form adapted to cooperate with the springs which operate on the two ends or bearings of the roll; to provide means whereby, in spite of this construction, the roll can, if desired, be adjusted out of alignment to compensate for unevenness in the web coming from the web roll; and to provide means whereby the two elements above mentioned can cooperate with each other in one mechanism.

Wood teaches that all printing presses are equipped with rolls used for tensioning the web and so are textile finishing and other machines. The tensioning rolls are spring seated and are designed to keep the web, which runs at all times from a more or less uneven paper roll, smooth and taut as it is fed into the press. When it is desired to run only a half or quarter width web, it is usually run on one end of the web roll, and therefore, tends to throw the roll out of alignment. This would be detrimental to good printing and often causes wrinkles in the paper, due to the lack of uniformity of the tension on the two ends of the roll. Wood's invention is designed to eliminate the disalignment of a tension roll, especially when running a half or quarter width paper, and also to provide for adjusting it out of alignment when found necessary due to unevenness of the paper roll.

As shown in Figures 1-3, the web is shown as running from the paper roll 10 over the tension roll 11 to the press. The roll 11 is long enough to accommodate a full width web. The roll 11 is carried by two boxes 12 which are mounted to slide in stationary guides 13, up to a stop screw 14. The web tends to pull these boxes away from this stop screw, and springs 15 are used for resisting the pull of the web and holding the roll under spring tension to properly tension the web. These springs are seated at the opposite end in another pair of boxes 16 which also can slide in the guides. These boxes are held in adjusted position by screws 17.

The springs alone will not hold the tension roll 11 in perfect alignment. To prevent their moving independently of each other, Wood provides each of the roll carrying boxes 12 with a rack 18 permanently and fixedly secured thereto. With each rack a pinion 19 meshes, and each of these pinions is secured on a cross shaft 20 which is free to turn. Therefore, it will be seen that both ends of the roll are obliged to move equal distances, and the roll cannot get out of alignment after it is once properly lined up by the adjustment of the boxes 16.

Wood teaches that due to the unevenness of the paper rolls it has occasionally been found that the tension roll must be deliberately thrown out of alignment. For this purpose the pinions 19 and racks 18 are provided with angular teeth cut of opposite hands. Therefore when the shaft 20 is moved in an axial direction one rack will be advanced and the other drawn back and the roll 11 may be set so that it will be out of alignment and more tension applied to one end than the other. To move the shaft 20 longitudinally it is provided with a grooved collar 21 into which a roll or the end of a lever 22 engages. The other end of this lever is operated by an adjusting screw 23. By means of this screw the uneven adjustment can be provided. The tension of the springs 15 can be increased or decreased to any desired degree by operating the adjusting screw 17 and the tension at both ends can be evened up in that way.

The examiner's position

The examiner concluded (answer, p. 5) that it would have been obvious at the time the invention was made to a person of ordinary skill in the art to substitute Wood's tensioning roll for the spring-biased movable dancer arms of Simmons in Simmons' cushioning conversion machine.

The appellants' position

The appellants argue throughout both briefs that the claimed movable constant-entry device is not suggested by the applied prior art.

Our position

We agree with the appellants that the applied prior art does not suggest the claimed subject matter. In that regard, all the claims under appeal require the cushioning conversion machine to include a constant-entry device which determines an entry point of the stock material upstream of the conversion assembly to be biased to an operating position and movable between the operating position and a tension yielding position. However, these limitations are not suggested by the applied prior art. In that regard, while Simmons does teach a cushioning conversion machine having a constant-entry device (i.e., constant entry roller 128) which determines an entry point of the stock material upstream of the conversion assembly, Simmons' constant-entry device is not biased to an operating position and movable between the operating position and a tension yielding position. Moreover, there is teaching or suggestion in the applied prior art to have made it obvious at the time the invention was made to a person of ordinary skill in the art to have modified Simmons' constant-entry device (i.e., constant entry roller 128) to be biased to an operating position and movable between the operating position and a tension yielding position. In that regard, while Wood does teach the use of a spring-biased tensioning roll, there is no rationale in the teachings of Wood and Simmons to have modified Simmons' constant entry roller 128 to be a tensioning roll.

In addition, it is our opinion that it would not have been obvious at the time the invention was made to a person of ordinary skill in the art to have substituted Wood's tensioning roll for the spring-biased movable dancer arms of Simmons in Simmons' cushioning conversion machine. In that regard, we agree with the appellants (reply brief, pp. 1-3) that the applied prior art does not establish that Wood's tensioning roll and the spring-biased movable dancer arms of Simmons are "art recognized equivalents." Moreover, even if Wood's tensioning roll were substituted for the spring-biased movable dancer arms of Simmons in Simmons' cushioning conversion machine this would not result in the claimed constant-entry device being biased to an operating position and movable between the operating position and a tension yielding position since Simmons' constant entry roller 128 would still be unmovable.

In our view, the only suggestion for modifying Simmons to meet the above-noted limitations stems from hindsight knowledge derived from the appellants' own disclosure. The use of such hindsight knowledge to support an obviousness rejection under 35 U.S.C. § 103 is, of course, impermissible. See, for example, W. L. Gore and Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

For the reasons set forth above, the decision of the examiner to reject claims 34 to 41 and 118 to 125 under 35 U.S.C. § 103 is reversed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 34 to 41 and 118 to 125 under 35 U.S.C. § 103 is reversed.

REVERSED

LAWRENCE J. STAAB Administrative Patent Judge	)
JOHN P. McQUADE Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
JEFFREY V. NASE Administrative Patent Judge	)

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