The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte TROY J. BUNCH, JR.

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Appeal No. 2007-0023
Application No. 10/410,854

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HEARD: January 11, 2007

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Before OWENS, CRAWFORD and GROSS, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

The appellant appeals from a rejection of claims 24-36, 38, 40-42, 44 and 47-54, which are all of the pending claims.

THE INVENTION

The appellant claims a threaded fastener. Claims 24 and 44 are illustrative:

24. A fastener comprising:

a head portion having a first opening;

a coupling portion having a second opening; and

a shank portion positioned between said head portion and said coupling portion;

said fastener being axially hollow such that a longitudinally extending hole extends completely through said fastener between said first and second openings with said hole having a reduced diameter portion within said shank portion.

44. A fastener comprising:

a head portion;

a threaded portion having threads on an outer surface to form a male connector, said threads including a first thread closest to said head portion; and

a shank portion positioned between said head portion and said threaded portion,

said fastener being axially hollow such that a longitudinally extending hole extends completely through said shank portion with said hole having a reduced diameter portion within said shank portion,

said shank portion being defined by a tubular structure having an outer wall and an inner wall, with said inner wall having said reduced diameter portion and with said inner and outer walls being curved,

said outer wall of said shank portion forming an arc extending along the entire distance between said first thread of said threaded portion and a bottom surface of said head portion and said arc extending continuously between the uppermost section of said coupling portion and the bottommost section of said head portion.

THE REFERENCES

Taylor	1,172,406	Feb. 22, 1916
Wescott	1,926,925	Sep. 12, 1933
Nodière	2,006,276	Jun. 25, 1935
Costello	2,546,332	Mar. 27, 1951

THE REJECTIONS

The claims stand rejected under 35 U.S.C. § 103 as follows: claims 24, 27, 30, 31, 33-35 and 50 over Nodière in view of Taylor; claims 25, 26, 28, 29, 38, 40, 41, 44, 47, 48, 50, 53 and 54 over Nodière in view of Taylor and Wescott; and claims 32, 36, 42, 49, 51 and 52 over Nodière in view of Taylor, Wescott and Costello.

OPINION

We reverse the aforementioned rejections. We need to address only the independent claims, i.e., claims 24, 38, 44 and 50.

Claim 24

Claim 24 requires a fastener that is axially hollow completely through the fastener.

Nodière discloses a safety bolt having

> [a] hollow unthreaded shank provided with circumferential depressed ring portions of varying wall thickness spaced by intermediate portions whose surface is parallel to the bolt axis. The central bore of the parallel intermediate portions, and the cross section of the ring portions, are both so designed that for all axial points of the bolt the cross-sectional area of the unthreaded portion equals the cross-sectional area carried by the core of the threaded portion measured between the deepest points of the threads. [page 1, left column, lines 16-26]

* * *

> Along the axis of the bolt *b* and throughout the length of its body or shank, a bore *a* is provided which in itself in the parallel portions of the shank reduces the cross-sectional area of the unthreaded body or shank to a value equal to that of the core of the threaded portion, measured between the deepest points of the threads, the outer diameter of the shank remaining the same as the outer diameter of this threaded portion. This unthreaded shank of the bolt is provided with annular grooves or depressions *c* which form ring portions *c'* and modify the linearity of the mid-fibre along the length of the bolt and give it a wavy shape such that this mid-fibre stretches yieldingly to a greater extent than if it were linear. [page 2, left column, lines 27-42]

As shown in Nodière's figure 1, the hollow portion of the shank does not extend all the way through the bolt but, rather, extends only from the inner end of the head to the inner end of the threaded portion. Nodière does not indicate how a bolt having that hollow portion is made.

Taylor discloses a hollow bolt that is formed from a piece of tubing, has an opening all the way through it, and has a shouldered or square head having an enlarged recess or opening (page 1, lines 20-27; figure 1).

The examiner argues that "it would have been obvious to one of ordinary skill in the art to form the fastener of Nodiere to be hollow the entire length thereof as discloses [sic] in Taylor because such would greatly simplify the manufacture of the fastener" (answer, page 4). Nodière's bolt, the examiner argues, likely is made by a complicated process such as forming the

hollow core as a separate tube and then attaching it to head and threaded portions (answer, page 6). The examiner argues that even if Taylor's process were modified to form a shank having Nodière's wavy hollow portion, such as by using hot or cold forming and/or cutting, Taylor's process still would be simpler than forming Nodière's shank and then attaching head and threaded portions to it (answer, page 8).

Even if Taylor's process could be modified to form Nodière's wavy hollow shank portion, the examiner's argument is not persuasive for the following reasons.

First, the examiner has not established that the bolt performance desired by Nodière, i.e., elastic and resilient yield under vibration without exceeding the elastic limit of the material of the bolt and without permanent deformation of the bolt (page 1, left column, lines 10-13), could be obtained if the bolt were hollow throughout its entire length.

Second, extending Nodière's hollow portion through the threaded portion would prevent the cross-sectional area at the core of the threaded portion measured between the deepest points of the threads from equaling the cross-sectional area of the unthreaded portion at all of its axial points (first page, left column, lines 22-26). The examiner argues that the hollow portion's wall could be thinned to maintain the desired cross-

sectional area ratio (answer, page 7). The examiner, however, has not established that one of ordinary skill in the art would have expected that if the hollow portion wall were thinned, Nodière's desired elastic and resilient yield under vibration without exceeding the elastic limit of the material of the bolt and without permanent deformation of the bolt would be obtained (page 1, left column, lines 10-13).

Third, the examiner has not established that if Nodière's hollow portion were extended such that the bolt appears hollow at each end, the bolt would look like an ordinary bolt regularly used in practice as desired by Nodière (page 1, right column, line 55 – page 2, left column, line 2). The examiner argues that Nodière does not state that the ordinary look is critical or preclude the bolt from having open ends (answer, page 8). The examiner argues that the presence of Nodière's depressions *c* and *c'* along the hollow portion indicates that Nodière gives "ordinary" a meaning broad enough to encompass a bolt having an opening at each end (answer, pages 8-9). Nodière's goal is to make a bolt that looks like an ordinary bolt yet has increased elastic deformation (page 1, second column, line 51 – page 2, left column, line 2). Nodière achieves that goal by using a shank that is hollow and has annular grooves (page 2, left column, lines 3-17). The bolt having that shank is the bolt

Nodière considers to have an ordinary look. Nodière does not indicate that if the bolt had open ends it would have the ordinary look.

For the above reasons we conclude that the examiner has not established a prima facie case of obviousness of the inventions claimed in the appellant's claims 24, 27, 30, 31, 33-35 and 50.

Claims 38, 44 and 50

Claims 38 and 50 require a fastener that is axially hollow completely through the fastener. Claim 44 requires (and claim 38 also requires) a threaded fastener having a hollow shank portion between a head portion and a threaded portion, and an outer wall forming an arc extending the entire distance between a bottom surface of the head portion and the first thread closest to the head portion. Claim 50 also requires a "shank portion having means extending continuously along the entire extent of said shank portion for elastically deforming to axially preload said fastener."

Wescott discloses a metal sucker rod that is used in pumping wells (page 1, lines 15-19). The sucker rod can be a box and pin type rod having at one end an externally threaded pin and at the other end an internally threaded socket or box, or can be a double pin rod having, at each of its ends, a threaded pin that screws into a separate female coupling (page 1, lines 25-34). To

prevent severe concentration of vibratory stresses at any point and distribute them over such a large area that the fatigue or endurance limit of the metal is not exceeded, the pin is undercut between the last full thread and the body of the rod to a diameter less than the minor diameter of the threaded section (page 1, lines 69-72). The surface formed by the undercutting has smooth transitory curves joining the threaded section and the body (page 1, lines 73-76).

The examiner argues that "it would have been obvious for one of ordinary skill in the art to form the device of modified Nodiere with only a single continuous curve between the head and thread in view of the teachings of Wescott. A continuous curve would be advantageous depending upon the particular application" (answer, page 4). The examiner acknowledges (answer, page 10) that the examiner's proposed modification of Nodière is contrary to Nodière's requirement that the cross-sectional area at the deepest point of the thread is equal to the cross-sectional area of the unthreaded shank at all of its axial points (page 1, left column, lines 19-26). The examiner argues that "the skilled artisan would modify Nodiere, admittedly not maintaining the constant cross-sectional area, to reduce the cross-sectional area of the shank portion as disclose [sic] in Wescott in order to further improve the characteristics of the bolt in resisting

loosening due to vibration as discussed in Wescott" (answer, page 10). The benefit disclosed by Wescott, however, pertains to a solid shank. The examiner has not established that one of ordinary skill in the art would have expected the benefit to apply to Nodière's bolt having a hollow shank. Furthermore, Nodière's bolt also resists loosening due to vibration, but does so by having a wavy hollow shank with a cross-sectional area that, at all axial points, equals the cross-sectional area between the deepest points of the threads (page 1, left column, lines 1-33). The examiner has not established that in view of the applied references, one of ordinary skill in the art would have expected Wescott's arced outer wall to provide better resistance to vibration than Nodière's wavy hollow shank having the same cross-sectional area as the core between the deepest points of the threads, or would have had some other motivation to depart from Nodière's required 1:1 cross-sectional area ratio and instead use Wescott's arced outer wall.

We therefore conclude that the examiner has not established a prima facie case of obviousness of the invention claimed in the appellant's claims 38, 44 and 50. A further reason why the examiner has not established a prima facie case of obviousness of the inventions claimed in the appellant's claims 38 and 50 is that, like claim 24 discussed above, they require a fastener that

is axially hollow completely through the fastener. The examiner does not rely upon Wescott for any disclosure that remedies the above-discussed deficiency in Nodière and Taylor as to that claim requirement. Accordingly, we reverse the rejections of claims 25, 26, 28, 29, 38, 40, 41, 44, 47, 48, 50, 53 and 54. Because the examiner does not rely upon Costello for any disclosure that remedies the deficiency in Nodière, Taylor and Wescott as to the claims from which claims 32, 36, 42, 49, 51 and 52 depend, we also reverse the rejection of those claims.

DECISION

The rejections under 35 U.S.C. § 103 of claims 24, 27, 30, 31, 33-35 and 50 over Nodière in view of Taylor, claims 25, 26, 28, 29, 38, 40, 41, 44, 47, 48, 50, 53 and 54 over Nodière in view of Taylor and Wescott, and claims 32, 36, 42, 49, 51 and 52 over Nodière in view of Taylor, Wescott and Costello, are reversed.

REVERSED

TERRY J. OWENS Administrative Patent Judge	)
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	) BOARD OF PATENT
	) APPEALS
	) AND
MURRIEL E. CRAWFORD	) INTERFERENCES
Administrative Patent Judge	)
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ANITA PELLMAN GROSS	)
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