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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte AARON S. BLUMENTHAL, AARON M. WILLIAMS, and
ANDREW M. TUCHSCHERER

Appeal 2022-003190
Application 16/383,221
Technology Center 3700

Before JENNIFER D. BAHR, PHILLIP J. KAUFFMAN, and
SEAN P. O'HANLON, *Administrative Patent Judges*.

O'HANLON, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1–9 and 21–25. We have jurisdiction over this appeal under 35 U.S.C. § 6(b). We REVERSE.

In explaining our Decision, we refer to the Specification filed April 12, 2019 (“Spec.”), the Final Office Action mailed August 17, 2021 (“Final

¹ We use the term “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Milwaukee Electric Tool Corporation. Appeal Br. 1.

Act.”), the Appeal Brief filed January 6, 2022 (“Appeal Br.”), the Examiner’s Answer mailed March 18, 2022 (“Ans.”), and the Reply Brief filed May 16, 2022 (“Reply Br.”).

SUMMARY OF THE INVENTION

Appellant’s claimed invention relates to bolt cutters. Spec. ¶ 2. Claim 1, the sole independent claim, is reproduced below from page 17 (Claims Appendix) of the Appeal Brief:

1. A bolt cutter comprising:
 - a bolt cutting head, the bolt cutting head comprising:
 - a first bolt cutting blade;
 - a second bolt cutting blade; and
 - a compound hinge coupled to the first and second bolt cutting blades such that the first and second bolt cutting blades are allowed to pivot relative to each other, the compound hinge comprising:
 - a first link defining a first aperture centered around a first axis, the first aperture comprising a first set of recesses; and
 - a second link defining a second aperture centered around a second axis;
 - a first adjustable handle pivotally coupled to the first link, the first adjustable handle defining a third aperture centered around the first axis and comprising a third set of recesses;
 - a locking button that actuates along the first axis and rotates around the first axis, the locking button comprises a set of shoulders that protrude radially away from the first axis, the set of shoulders sized to be received concurrently within both the first set of recesses and the third set of recesses, at least one shoulder of the set of shoulders extends an arcuate distance of at least 20 degrees with respect to the first axis; and
 - a second adjustable handle pivotally coupled to the second link at the second axis.

REFERENCES

The Examiner relies on the following prior art references in rejecting the claims on appeal:

Janson	US 7,346,991 B1	Mar. 25, 2008
Musser	US 8,316,549 B2	Nov. 27, 2012
Carmichael	US 9,089,978 B2	July 28, 2015
Caglar	US 2018/0056409 A1	Mar. 1, 2018
Wang	US 2019/0389037 A1	Dec. 26, 2019

Design of Machine Elements – §2.2 Design of Keys, pages 2.80–2.97 (“Design of Keys”).²

Key/Spline Strength Calculations, roymech.org/Useful_Tables/Keyways/key_strength.html (printed Dec. 3, 2020) (“Roy Mech”).

REJECTIONS

- I. Claims 1–6, 8, and 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Wang, Caglar, Carmichael, Musser, and Janson.
- II. Claims 1–9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Wang, Caglar, Carmichael, Musser, Janson, and Roy Mech.
- III. Claims 1–9 and 21–25 stand rejected under 35 U.S.C. § 103 as being unpatentable over Wang, Caglar, Carmichael, Musser, Janson, Roy Mech, and Design of Keys.

² The Examiner purports the Design of Keys reference to be available at lunyx.files.wordpress.com/2016/01/keys-and-splines.pdf. Final Act. 6.

ANALYSIS

Rejection I – Obviousness Based on Wang, Caglar, Carmichael, Musser, and Janson

The Examiner finds that Wang discloses a bolt cutter substantially as recited in claim 1, including “a first aperture (314) centered around a first axis” and “a locking button (figure 6)” comprising “a set of shoulders (1033).” Final Act. 2–3. The Examiner reasons that at least one of the shoulders extends an arcuate distance of at least 20° with respect to the first axis because “there are 12 teeth, so each tooth pitch covers $360/12=30$ degrees. Examiner notes that there are small gaps between teeth, but the gap is small, so the teeth are at least 20 degrees. Drawings reveal the teeth to cover 25 degrees each.” *Id.* at 3 (emphasis omitted).

Appellant argues that the Examiner errs in finding that Wang’s drawings show “at least one shoulder of the set of shoulders extends an arcuate distance of at least 20 degrees with respect to the first axis,” as recited in claim 1. Appeal Br. 5. In particular, Appellant asserts that “the Examiner merely relies on the proportions of drawings that are not to scale.” *Id.* at 6; *see also id.* at 5 (asserting that “there is nothing in the specification indicating that the drawings are to scale”). For the reasons discussed below, we are persuaded by Appellant’s arguments.

Figure 6 of Wang is reproduced below.

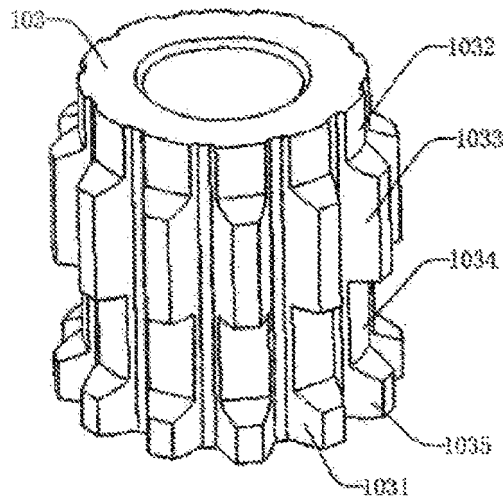


Fig. 6

Figure 6 of Wang shows spline block 103 having a cylindrical body and a plurality of first racks 1031 evenly distributed around the outside wall to form a gear arrangement. Wang ¶ 88. Each of first racks 1031 includes first widened tooth 1033. *Id.*

As discussed above, the Examiner maps Wang's first widened tooth 1033 to the "shoulder" recited in claim 1. Final Act. 3. The Examiner states, "there are 12 shoulders, and . . . 360 degrees divided by 12 is 30 degrees, which is considerably more than the claimed 20 degrees or more." Ans. 8. The Examiner's calculation for the arcuate distance of each widened tooth 1033 appears to provide the *maximum* arcuate distance for each of twelve teeth spaced evenly around the circumference of spline block 103. As Appellant observes, however, Figure 6 shows that there are gaps between adjacent teeth. Reply Br. 2. The Examiner's rejection acknowledges the gaps, and finds that each "gap is small, so the teeth are at least 20 degrees." Final Act. 3 (italics omitted). The Examiner's finding appears to be based entirely on speculative assumptions regarding the relative proportions of each widened tooth 1033 and the gap between adjacent teeth, as depicted in

Figure 6. Such speculation is insufficient to support an obviousness conclusion. *See In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967) (holding that rejections based on obviousness “must rest on a factual basis” and may not “resort to speculation, unfounded assumptions, or hindsight reconstruction to supply deficiencies in [the] factual basis”). Moreover, “it is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.” *Hockerson-Halbertstadt, Inc. v. Avia Group Int’l*, 222 F.3d 951, 956 (Fed. Cir. 2000). Here, Wang is silent as to the particular sizes of widened tooth 1033 and the gaps between adjacent teeth. Thus, the Examiner errs in relying on Figure 6 of Wang to disclose “at least one shoulder . . . extends an arcuate distance of at least 20 degrees,” as recited in claim 1.

Accordingly, for the foregoing reasons, we do not sustain the rejection of independent claim 1, or its dependent claims 2–6, 8, and 9, as being unpatentable over Wang, Caglar, Carmichael, Musser, Janson, and Roy Mech.

*Rejection II – Obviousness Based on Wang, Caglar,
Carmichael, Musser, Janson, and Roy Mech*

Claims 1–6, 8, and 9

The Examiner does not provide any additional findings or reasoning regarding claims 1–6, 8, and 9 based on the teachings of Roy Mech. Final Act. 5–6. Thus, the Examiner’s rejection of these claims is insufficient for the reasons stated above regarding Rejection I, and we do not sustain the rejection of these claims.

Claim 7

Claim 7 depends from claim 1 and further recites “wherein the at least one shoulder extends an arcuate distance between 29 degrees and 33 degrees with respect to the first axis.” Appeal Br. 18 (Claims Appendix). The Examiner relies on Roy Mech to support his taking of “Official Notice that the art of spline tooth design is a well developed field.” Final Act. 5. The Examiner finds that Roy Mech teaches “the relationship between spline key width (b) and the expected torque (T).” *Id.* The Examiner states that, “[i]f there is a shearing problem caused by too much torque, one of ordinary skill in the art can easily see that increasing key width (b) can solve this problem.” *Id.* at 5–6. The Examiner determines that it would have been obvious “to have made Wang’s teeth circumferentially larger, or smaller, depending on the shear strength needed, which in turn depends on the material being cut,” and, “[a]ccordingly, a tooth having a circumferential width of between 29 and 33 degrees is considered to be obvious.” *Id.* at 6.

Appellant argues that one of ordinary skill in the art would not have been motivated to modify Wang’s widened tooth 1033 to have an arcuate distance between 29 and 33 degrees, as claimed. Appeal Br. 12. Appellant asserts that the Examiner has not identified any evidence to support a conclusion that teeth shearing is a problem in Wang’s design. *Id.* According to Appellant, the Examiner’s rejection is based upon impermissible hindsight. *Id.*

In the Answer, the Examiner states that “the width of the shoulder (tooth/key/spline) is a known results effective variable.” Ans. 10 (emphasis omitted). The Examiner also states that Roy Mech teaches “the association between tooth width and torsional strength” and provides “[t]he formulae

needed to design proper shoulder widths.” *Id.* According to the Examiner, a “person of ordinary skill designing a tool such as Wang would have a choice to make on shoulder width, based on how much torque was needed to cut what they want to cut.” *Id.*

In this case, the design need and market pressure are the need to cut larger/harder wires or bolts (larger shoulder width), and on the other hand, the need to reduce material usage and tool weight (smaller shoulders). A person of ordinary skill must balance these needs, to arrive at the proper shoulder width for the tool, be it large width, small width, or anything in between.

Id. at 11.

The Examiner’s stated position appears to be that the shoulder arcuate distance values recited in claim 7 would have been obvious as a matter of routine optimization of a result-effective variable. In such a case, it is incumbent upon the Examiner to explain, or provide evidence to demonstrate, that the parameter to be optimized was recognized as a result-effective variable. A particular parameter must first be recognized as a result-effective variable, that is, a variable that achieves a recognized result, before the determination of the optimum or workable ranges of the variable may be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 620 (CCPA 1977); *see also In re Applied Materials, Inc.*, 692 F.3d 1289, 1295 (Fed. Cir. 2012) (explaining that it is not inventive to discover the optimum or workable ranges by routine experimentation if the optimized variable is a result-effective variable). Roy Mech discloses that the torque capacity of a key can be determined by equation based on a number of variables including key breadth (b). Roy Mech 3–4. However, the Examiner does not identify any teaching in Roy Mech suggesting that modifying the key breadth achieves a recognized result in the amount of

material used to make a tool or a tool's weight. The prior art demonstrates a relationship between the breadth of a key and its torque capacity, but the Examiner has not explained adequately why one of ordinary skill in the art would select the specific arcuate distance values recited in the claim. Thus, the Examiner has not established the requisite factual basis to support the determination that the at least one shoulder extending an arcuate distance between 29 and 33 degrees with respect to the first axis would have been obvious as a matter of routine optimization of a result-effective variable.

Additionally, to the extent that the Examiner's stated reasoning suggests that the claimed arcuate distance values would have been obvious as a matter of design choice (*see* Ans. 10–11 (reasoning that one of ordinary skill would make a "choice" to balance shoulder width with material usage, tool weight, and size of bolts to be cut), such a position lacks evidentiary support. The Examiner does not point to, nor do we discern, any evidence that designing a shoulder to have a narrower width would necessarily result in lower tool material usage or lower tool weight. Even assuming, *arguendo*, that a narrower shoulder width would reduce the amount of material used to make each shoulder, it appears that any such reduction in would be made up for in designing the corresponding recesses to be smaller to maintain proper engagement with the shoulder. In short, the Examiner's reasoning for obviousness lacks rational underpinnings. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness") (cited with approval in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007)).

Accordingly, for the foregoing reasons, we do not sustain the rejection of claim 7 as being unpatentable over Wang, Caglar, Carmichael, Musser, Janson, and Roy Mech.

*Rejection III – Obviousness Based on Wang, Caglar,
Carmichael, Musser, Janson, Roy Mech, and Design of Keys*

Claims 1–9

The Examiner does not provide any additional findings or reasoning regarding claims 1–9 based on the teachings of Design of Keys. Final Act. 6–7. Thus, the Examiner’s rejection of these claims is insufficient for the reasons stated above regarding Rejections I and II, and we do not sustain the rejection of these claims.

Claims 21–25

The rejection of claims 21–25, which depend from claim 1, relies on the same proposed combination of Wang, Caglar, Carmichael, Musser, and Janson that we find deficient for the reasons discussed above in connection with Rejection I. *See* Final Act. 6. The Examiner relies on Roy Mech and Design of Keys to teach additional features, but does not articulate any findings or reasoning that would remedy the aforementioned deficiency in the combination of Wang, Caglar, Carmichael, Musser, and Janson. *See id.* at 6–7. Accordingly, we do not sustain the rejection of claims 21–25 as being unpatentable over Wang, Caglar, Carmichael, Musser, Janson, Roy Mech, and Design of Keys.

CONCLUSION

In summary,

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-6, 8, 9	103	Wang, Caglar, Carmichael, Musser, Janson		1-6, 8, 9
1-9	103	Wang, Caglar, Carmichael, Musser, Janson, Roy Mech		1-9
1-9, 21-25	103	Wang, Caglar, Carmichael, Musser, Janson, Roy Mech, Design of Keys		1-9, 21-25
Overall Outcome				1-9, 21-25

REVERSED