

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INDUSTRIAL REVOLUTION, INC.,

Petitioner

v.

HUMANGEAR, INC.,

Patent Owner

U.S. Patent No. 10,555,629

Filing Date: December 7, 2018

Effective Filing Date: March 11, 2014

Issue Date: February 11, 2020

Title: EATING UTENSIL SYSTEM

Attorney Docket No. 480412.80002IPR

IPR Case No. IPR2023-01174

**DECLARATION OF ANDREW W. SMITH, PH.D., P.E.
UNDER 37 C.F.R. § 1.68**

I, Andrew W. Smith, Ph.D., P.E, being over the age of 18 and competent to make the statements herein, hereby declare the following:

1. I am a citizen of the United States and reside in Chicago, Illinois, USA.
2. I have been retained by counsel Seed Intellectual Property Group LLP to provide my opinion on technical matters concerning the validity of U.S. Patent No. 10,555,629 (“the ’629 Patent”). My employer, Exponent, Inc. (“Exponent”), is being compensated for my time at my normal consulting rate in 2023 of \$400 per hour for preparing this declaration. My compensation is not tied to the outcome of this matter.
3. I have no business interest in Industrial Revolution, Inc. (“Industrial Revolution”) whom I understand to be the Petitioner in this case, and I have no business interest in humangear, Inc. (“humangear”), whom I understand to be the owner of the ’629 Patent.

I. BACKGROUND AND QUALIFICATIONS

4. My *curriculum vitae* is attached hereto as Appendix A.

A. Educational Background

5. I hold three academic degrees: a B.A. in Astrophysics (2001) from the University of California at Berkeley, in Berkeley, California, a M.Sc. in Particle Physics (2002) from Durham University, in Durham, United Kingdom, and a Ph.D. in Astrophysics (2008) from Leeds University, in Leeds, United Kingdom.

B. Professional Background

1. Industry Experience

6. I have extensive experience in physics and mechanical engineering, each of these being relevant to the design and performance of both industrial and consumer products (including, but not limited to cutlery) which are subjected to varying loads and motion.

7. I am currently a Managing Engineer in the Chicago, Illinois, office of Exponent. Exponent is the world's largest engineering and scientific consulting firm dedicated to solving technology problems of all kinds. Exponent provides both proactive services aimed at preventing problems, as well as reactive services for investigating and understanding problems that have occurred. I regularly provide consulting services in the areas of mechanical engineering and physics, including (but not limited to) assessing the mechanical design and performance of consumer products such as cooking tools and appliances. I also regularly provide consultation services regarding the mechanical engineering or scientific aspects of intellectual property disputes.

8. I am a Licensed Professional Engineer in California in the field of Mechanical Engineering (License No. 39547).

9. Separate from my experience in physics and mechanical engineering and prior to completion of my academic studies, I accrued approximately seven years of professional experience in food service, including roles as a prep cook, line cook, busboy, waiter, bartender, caterer, and restaurant manager; these roles being in both casual and fine dining environments. Familiarity with a wide variety of designs for tools to both prepare and eat foods was an integral part of these roles. Additionally, I have an avid interest in the design and art of kitchen knives, including collecting Japanese chef knives. I have also completed a course in chef knife forging, including cutting steel blanks and grinding, heat treating, and polishing the blade edge.

10. Additional details about my career history and relevant qualifications are provided in the current version of my *curriculum vitae*, attached as Appendix A.

2. Academic Experience

11. My experience with physics and mechanical engineering, which I currently apply in my professional role at Exponent, dates back well before the priority date of the patent at issue in this matter (see below). During my Ph.D. studies (2005-2008), among other things, I was awarded a predoctoral fellowship from the Harvard-Smithsonian Center for Astrophysics to assist with the deployment and commissioning of an array of specially designed, 12-meter diameter telescopes which were deployed near Mt. Hopkins in southern Arizona. Through my involvement in this project, I gained extensive experience in the mechanical performance of large, rotating telescope structures and methods of

accounting for the deformation of the telescope structure during its motion due to weight shifting and rebalancing.

12. After the completion of my Ph.D., I was employed as a postdoctoral researcher at Argonne National Laboratory (run by the Department of Energy) where I researched the development and design of novel radiation sensors (multi-anode photomultiplier tubes) and the mechanical design of the packages required to deploy them.

13. After my postdoctoral appointment at Argonne, I held a series of appointments at Northwestern University and the University of Utah where (in addition to teaching undergraduate and graduate-level physics courses to engineers and scientists) I continued my research on improving novel sensor technology for ground-based telescopes, including the mechanical design and performance of their associated packages for deployment in the field.

14. Prior to leaving academia, I held a joint faculty appointment between the University of Maryland at College Park and NASA's Goddard Space Flight Center ("GSFC"). At the University of Maryland (in addition to teaching classes in physics for scientists and engineers), I was an active researcher and participant in at least three international scientific collaborations/observatories: the Very Energetic Radiation Imaging Telescope Array System ("VERITAS") observatory in southern Arizona,¹ the High Altitude Water Cherenkov ("HAWC") observatory in Sierra Negra, Mexico,² and NASA's Fermi Gamma-ray Space Telescope³ low-Earth circular orbit. The precise understanding of the mechanical design of the sensors for both science data acquisition and orientation (and their related control systems) was of paramount importance to the reliable scientific operations of these installations. Finally, at NASA GSFC, I was part of a research team designing

¹ <https://veritas.sao.arizona.edu>.

² <https://www.hawc-observatory.org>.

³ <https://fermi.gsfc.nasa.gov>.

sensor elements and associated control systems for integration into future NASA satellite observatories; this research effort involved analysis of the thermal, electrical, and mechanical design of the sensor implementation within the satellite.

15. Additional details about my experience in academia are provided in the attached current version of my *curriculum vitae*. See Appendix A.

3. Publications

16. I have served as primary author or co-author on over 50 peer reviewed articles in the physical sciences. A selected list of these is set forth in the attached current version of my *curriculum vitae*. See Appendix A.

4. Expert Evidence History

17. A listing of cases in which I have testified within the last eight years is found following my *curriculum vitae*. See Appendix B.

C. Scope of Assignment

18. I have been retained to provide my opinion on technical matters concerning the validity of claims 1-23 of the '629 Patent, a copy of which is submitted with the accompanying Petition for Inter Partes Review ("IPR") as Exhibit 1002. I have specifically considered and provided my opinion on whether certain published prior art references, identified and discussed herein, disclose the subject matter recited in the claims of the '629 Patent specified above.

II. INFORMATION CONSIDERED

19. My opinions are based on my six plus years of professional industry experience in mechanical engineering, my 15 years of professional experience in physics, my academic experience in teaching and researching various aspects of mechanical engineering and physics, and my experience with the studies, investigations, and other matters on which I have given expert testimony. In forming my opinions, I have considered the materials referenced below, which are submitted as exhibits accompanying the IPR.

- A. U.S. Patent No. 10,555,629 (“the ’629 patent”) to Miksovsky *et al.*, and its file history (Exs. [1001] and [1003]);
- B. Chinese Utility Model No. CN 2062986U to Feng (Ex. [1004]);
- C. European Design No. 001805383-001 to Kristiansson (Ex. [1005]);
- D. U.S. Patent No. 6,119,351 to Vanderputt (Ex. [1006]);
- E. U.S. Patent Application Pub. No. 2008/0201959 A1 to Kent (Ex. [1007]);
- F. Chinese Patent No. CN 103504965 A to Bo (Ex. [1008]);
- G. U.S. Patent No. 2,318,129 to Torode (Ex. [1009]);
- H. Printed Publication for “The CFL Fork” (Ex. [1010]); and
- I. U.S. Patent No. 4,535,538 to Nelson (Ex. [1011]).

20. Additional information may become available which would further support or modify the conclusions that I have reached to date. Accordingly, I reserve the right to modify or expand this opinion or the bases thereof upon consideration of any further discovery, testimony, or other evidence, including any

issues raised by any expert or witness of the patent owner, or based upon interpretations of any claim term different than those proposed in this declaration.

III. LEGAL PRINCIPLES

21. In expressing my opinions and considering the subject matter of the claims of the '629 Patent, I am relying on certain legal principles that have been explained to me by counsel for Industrial Revolution. Accordingly, I have considered and applied the following standards to evaluate the claims noted above from the '629 Patent.

22. I am instructed by counsel for Industrial Revolution that for an invention claimed in a patent to be patentable, it must be, among other things, new and not obvious in light of what came before it. That which came before is generally referred to as "prior art."

23. I am instructed by counsel for Industrial Revolution that 35 U.S.C. § 102(a) defines the prior art that will preclude the grant of a patent on a claimed invention as follows:

[a] person shall be entitled to a patent unless—

(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or

(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

24. I am further instructed by counsel for Industrial Revolution that 35 U.S.C. § 102(b) sets out exceptions to 35 U.S.C. § 102(a) above, in that prior art that would otherwise be included in 35 U.S.C. § 102(a) shall not be prior art if it falls within an exception under 35 U.S.C. § 102(b). Counsel for Industrial

Revolution instructed me that exceptions to the categories of prior art defined in 35 U.S.C. § 102(a)(1) are provided in 35 U.S.C. § 102(b)(1), which states:

[a] disclosure made 1 year or less before the effective filing date of a claimed invention shall not be prior art to the claimed invention under subsection (a)(1) if—

(A) the disclosure was made by the inventor or a joint inventor or by another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor; or

(B) the subject matter disclosed had, before such disclosure, been publicly disclosed by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor.

25. I am further instructed by counsel for Industrial Revolution that exceptions to the categories of prior art defined in 35 U.S.C. § 102(a)(2) are provided in 35 U.S.C. § 102(b)(2), which states:

[a] disclosure shall not be prior art to a claimed invention under subsection (a)(2) if—

(A) the subject matter disclosed was obtained directly or indirectly from the inventor or a joint inventor;

(B) the subject matter disclosed had, before such subject matter was effectively filed under subsection (a)(2), been publicly disclosed by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor; or

(C) the subject matter disclosed and the claimed invention, not later than the effective filing date of the claimed invention, were owned by the same person or subject to an obligation of assignment to the same person.

26. I am instructed by counsel for Industrial Revolution that the above definitions and exceptions regarding “prior art” were implemented by the America

Invents Act (“AIA”) and became effective March 16, 2013. I am further instructed by counsel for Industrial Revolution that the AIA defines the “effective filing date” for purposes of determining prior art under 35 U.S.C. § 102(a) in 35 U.S.C. § 100(i)(1) as the earliest of: (A) the actual filing date of the patent or the application for the patent containing the claimed invention; or (B) the filing date of the earliest application for which the patent or application is entitled, as to such invention, to a right of priority or the benefit of an earlier filing date under 35 U.S.C. §§ 119, 120, 121, 365, or 386.

27. I am instructed by counsel for Industrial Revolution that the actual filing date of the ’629 Patent is December 7, 2018, and that the ’629 Patent claims priority to U.S. Patent Application No. 15/268,175 filed on September 16, 2016, now abandoned, and U.S. Patent Application No. 14/204,497 filed on March 11, 2014, now U.S. Patent No. 9,468,321 under 35 U.S.C. § 121. I am further instructed by counsel for Industrial Revolution that the effective filing date for purposes of determining patents and printed publications that qualify as prior art to the ’629 Patent under 35 U.S.C. § 102(a), unless an exception applies under 35 U.S.C. § 102(b), is March 11, 2014. I am further instructed by counsel for Industrial Revolution that patents and printed publications with a publication date prior to March 11, 2014, qualify as prior art to the ’629 Patent under 35 U.S.C. § 102(a), unless an exception applies under 35 U.S.C. § 102(b).

28. I am instructed by counsel for Industrial Revolution that, in this context, the burden is on the party asserting unpatentability to prove it by a preponderance of the evidence. I am instructed by counsel for Industrial Revolution that “a preponderance of the evidence” means that a conclusion is proven true to at least the level of more likely than not.

29. I am instructed by counsel for Industrial Revolution that, in this proceeding, the information that may be evaluated is limited to patents and printed

publications. My analysis below compares the claims of the '629 Patent to patents and printed publications that I understand to be prior art to the claims. I am instructed by counsel for Industrial Revolution that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can be shown to “anticipate” the claim. Second, the prior art can be shown to “render obvious” the claim. My understanding of the two legal standards based on the instruction I have been given is set forth below.

A. Anticipation

30. I am instructed by counsel for Industrial Revolution that the following standards govern the determination of whether a claim in the '629 Patent is “anticipated” by the prior art. I have applied these standards in my evaluation of whether the claims identified in Industrial Revolution's petition are anticipated.

31. I am instructed by counsel for Industrial Revolution that, for a patent claim in the '629 Patent to be “anticipated” by the prior art, each and every requirement or claim limitation set forth in a claim must be found, expressly or inherently, in a single prior art reference as recited in the claim. I am instructed by counsel for Industrial Revolution that claim limitations that are not expressly found in a prior art reference are inherent if the prior art necessarily functions in accordance with, or includes, the claim limitations.

B. Obviousness

32. I am instructed by counsel for Industrial Revolution that a claim does not recite patentable subject matter if it would have been obvious to a person of ordinary skill in the field before the effective filing date of the claimed invention. I am further instructed by counsel for Industrial Revolution that obviousness can be

demonstrated by combining teachings from multiple prior art sources. I have also been instructed by counsel for Industrial Revolution that an obviousness determination for a patent claim in the '629 Patent includes consideration of the following factors: (1) the scope and content of the prior art; (2) the differences between the prior art and the claimed subject matter; (3) the level of ordinary skill in the art; and (4) any objective evidence of obviousness or non-obviousness. In addition, the obviousness inquiry should not be performed in hindsight. Instead, the obviousness inquiry should be performed through the eyes of a person of ordinary skill in the art before the effective filing date of the claimed invention.

33. I am also instructed by counsel for Industrial Revolution that secondary considerations may also be considered, such as commercial success, long felt but unsolved needs, and failure of others. Still further, I am instructed by counsel for Industrial Revolution that for a reference to be proper for use in an obviousness inquiry, the reference must be considered analogous art to the claimed invention. An analogous reference to the claimed invention is one which is (1) from the same field of endeavor as the claimed invention; or (2) reasonably pertinent to the problem faced by the inventor. For a reference to be considered reasonably pertinent to the problem, it must have logically commended itself to an inventor's attention in considering his problem. Moreover, for a reference to be reasonably pertinent, one should consider the problem faced by the inventor, as reflected explicitly or implicitly in the specification.

34. In my opinion, all of the references relied upon in this IPR are analogous art and well within the range of references a person of ordinary skill in the art would consult to address the problems described in the '629 Patent, which claims 1-23 are described as addressing.

35. I am instructed by counsel for Industrial Revolution that the obviousness standard for a patent claim in the '629 Patent is defined as follows:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

36. I have been informed and instructed by counsel for Industrial Revolution that claimed subject matter would have been obvious to one of ordinary skill in the art if, for example, it results from (1) the combination of known elements according to known methods to yield predictable results; (2) the simple substitution of one known element for another to obtain predictable results; (3) the use of a known technique to improve similar devices in the same way; (4) applying a known technique to a known device ready for improvement to yield predictable results; (5) trying a finite number of identified, predictable solutions, with a reasonable expectation of success; (6) pursuing known options within one's technical grasp in response to a design need or market pressure to solve a problem; or (7) identifying an express teaching, suggestion or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine the prior art reference teachings to arrive at the claimed invention. I have also been informed that an obviousness analysis incorporates the logic, judgment, and common sense of a person of ordinary skill in the art, which does not necessarily require explication in any particular reference.

37. I have been informed and instructed by counsel for Industrial Revolution that it is improper to combine references where the references teach away from their combination. A reference may be said to teach away when a person of ordinary skill in the art, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a

direction divergent from the path that was taken by the patent applicant. In general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the patentee. I am informed and instructed by counsel for Industrial Revolution that a reference teaches away, for example, if (1) the combination would produce a seemingly inoperative device, or (2) the references leave the impression that the product would not have the property sought by the patentee. I also am informed and instructed by counsel for Industrial Revolution, however, that a reference does not teach away if it merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into the invention claimed.

C. Claim Construction

38. I am instructed by counsel for Industrial Revolution that in an *inter partes* review proceeding, the “broadest reasonable interpretation” standard has been replaced with the federal court claim construction standard that is used to construe a claim in a civil action under 35 U.S.C. § 282(b). This is the same claim construction standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*) and its progeny. Under this claim construction standard, I understand that a claim term should be construed according to the “meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.”⁴

39. I have further been advised by counsel for Industrial Revolution that in construing a claim term, one looks primarily to the “intrinsic” patent evidence, which includes the words of the claims themselves, the remainder of the patent

⁴ *Phillips*, 415 F.3d, 1313, 1315, 1317.

specification, and the prosecution history. I am also instructed by counsel for Industrial Revolution that “extrinsic” or “external” evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims. Extrinsic or external evidence can include dictionaries, technical dictionaries, treatises, textbooks, technical handbooks, industry standards manuals, technical encyclopedias, and the like.

40. I am instructed by counsel for Industrial Revolution that, where a patent applicant provides an explicit definition of a claim term in the specification, that definition may control the interpretation of that term in the claim.

D. Ordinary Skill in the Art

41. I have been informed and instructed by counsel for Industrial Revolution that for the claimed subject matter to be obvious, it must be obvious to a person of ordinary skill in the art before the effective filing date of the claimed invention. The factors that are considered in determining the level of ordinary skill in the art include: (A) type of problems encountered in the art; (B) prior art solutions to those problems; (C) rapidity with which innovations are made; (D) sophistication of the technology in the field; and (E) educational level of active workers in the field. I am further instructed by counsel for Industrial Revolution that in a given case, every factor above may not be present, and one or more factors may predominate.

IV. OPINIONS

A. Level of Skill of a Person of Ordinary Skill in the Art

42. I was asked by counsel for Industrial Revolution to provide my opinion by considering the patent claims through the eyes of a “person of ordinary skill in the art” (“POSITA”) before the effective filing date of the claimed invention, which I have been advised is March 11, 2014 (I will also refer to this date as “the priority date” or “date of priority”).

43. In considering the characteristics of a hypothetical POSITA, I was advised to consider factors, such as the education level and experience of people working in the field at the time of the invention, the types of problems faced in the art and the solutions found to those problems, the pace at which innovations are made in the field, and the sophistication of the technology in the field. With this in mind, I placed myself back in the time frame of the effective filing date of the claimed invention, namely, in the 2012-2014 time frame.

44. In my opinion, a POSITA at the time of the invention would have been a person with a bachelor’s degree in Mechanical Engineering, Physics, or a related field or equivalent experience in designing and manufacturing of consumer products including, but not limited to, camping gear, utensils, cutlery, and related devices.

45. There are a number of reasons why I am able to place myself in the position of a POSITA in the 2012-2014 time frame. First, as of March 11, 2014, I was, at least, a POSITA. As set forth above and in my attached *curriculum vitae*, I held a Ph.D. with a focus on Physics and Astronomy prior to the priority date. Further, I had many co-workers who were POSITAs and, by the date of priority, I had both taught and supervised multiple Ph.D. students in physics who were also POSITAs.

46. By the priority date of the '629 Patent, I also had approximately five years in teaching a wide range of physics courses to scientists and engineers (including statics and mechanics, electromagnetic theory, basic circuit analysis, and basic quantum theory and relativity). By teaching students, I understood what they learned at different stages, how they reviewed documents they had not yet seen, and what conclusions they drew from these various documents. I also understood how students, most of whom were not yet a POSITA, approached a problem and the conclusions they formed concerning what would be obvious to them from review of documents.

47. Furthermore, as described above, as of the priority date of the '629 Patent, I had at least seven years of experience in the food service industry where I gained significant experience interacting with a wide range of tools for both preparing and eating food.

48. In addition to the experience and education which I had as of the priority date of the '629 Patent, I have added to this background an additional (approximately) nine years of experience in researching physical law and investigating the mechanical design and performance of a wide variety of devices; this experience includes at least six years of experience in investigating the mechanical design and performance of consumer products, including kitchen implements.

49. My opinions regarding the state of the art and the understanding of a POSITA provided in this Declaration are made before March 11, 2014, unless expressly stated otherwise. For the ease of reading, I may use a verb in this Declaration or any deposition or testimony in its present tense, e.g., "would reasonably understand," but this should be construed to mean a POSITA before the effective filing date of the claimed invention, i.e., March 11, 2014, unless expressly stated otherwise.

B. Background of the Technology

1. General Overview

50. As will be described below in greater detail, the '629 Patent teaches to the field of “combination eating utensils,”⁵ specifically teaching an alleged invention which combines the most common eating utensils in Western society: the fork, knife, and spoon. As will be shown, this technological field is well understood, exhaustively explored, and is replete with prior art references describing utensils with various features.

51. While a complete telling of the history of the fork, knife, and spoon as each have evolved throughout Western culture is well beyond the scope of this declaration, examples of combining the fork, knife, and spoon (or subsets thereof) into a single device date back to at least the 1800s. For example, U.S. Patent No. 32,916, issued in 1861 to Richards for “Combined Knife, Fork, and Spoon,” (“Richards '916”) discloses a combination of a fork, a knife, and a spoon into a single implement, *see* Figure 1.

⁵ Ex. 1001, 1:17-18.

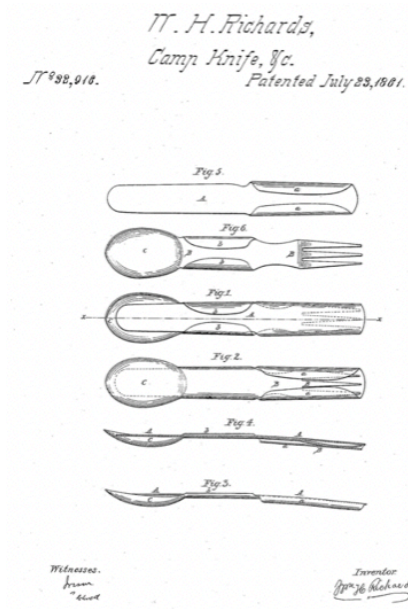


Figure 1. U.S. Patent No. 32,916 to Richards (left) discloses an integrally-formed fork-spoon which interlocks with a separate knife.⁶ The right column shows photographs of examples of the Richards patent purportedly recovered from the effects of a Civil War soldier.⁷

52. The Richards '916 patent teaches a combination utensil suitable for transport and camping: “The object of this invention is to provide a simple and efficient knife fork [*sic*] and spoon for camp purposes at small cost [...]”⁸

53. Contemporary to the Richards '916 patent, examples of “terrapin” forks, which disposed the tines of the fork onto the edge of the bowl of the spoon, were also in production around as early as 1862, *see* Figure 2.

⁶ Richards '916, Figures 1-6.

⁷ <https://www.yankeerebelantiques.com/very-rare-richards-patent-combination-eating-utensils-dated-1861-sold/>.

⁸ Richards '916, 19-21.



Figure 2. Examples of “terrapiin forks” dating from 1890⁹ (left) and between 1862-1870¹⁰ (right).

54. While the devices shown in Figure 1 and Figure 2 took the approach of combining a fork and spoon into a single unitary structure, there were also devices available in the 1800s which combined a fork and a knife into a unitary structure. For example, a combined knife and fork was used by Vice-admiral Horatio Nelson, a decorated British naval officer of the late 18th century,¹¹ after the loss of his right arm in battle in 1797,¹² *see* Figure 3 (left). This combination of a knife edge on the side of a fork tine can also be seen in, e.g., 19th century “melon forks,” as well as U.S. Design Patent No. D31,575 to Phillips and Stayman in 1899 for a “dessert fork,” *see* Figure 3 (center and right, respectively).

⁹ <https://philamuseum.org/collection/object/305270>.

¹⁰ <https://emuseum.mfah.org/objects/142889/pair-of-terrapiin-forks>.

¹¹ https://en.wikipedia.org/wiki/Horatio_Nelson,_1st_Viscount_Nelson.

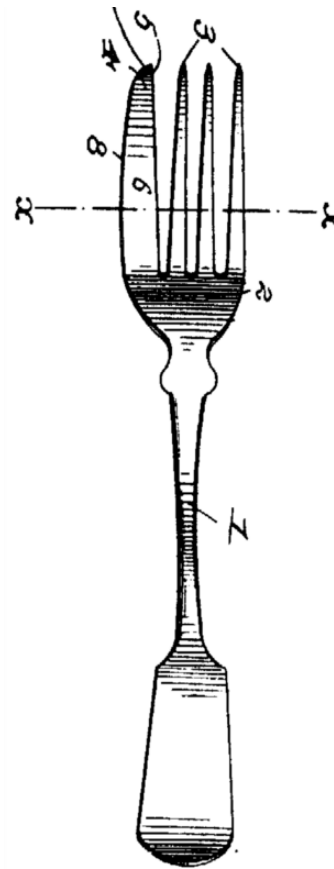
¹² <https://www.rmg.co.uk/collections/objects/rmgc-object-63222>.



**Lord Nelson's Fork
1797-1805**



**Higgins Melon Fork
1886**



**U.S. Des. Patent 31,575
1899**

Figure 3. Examples of combining a knife edge with the side of a fork tine in a single unitary structure. Lord Nelson's fork dated between 1797-1805¹³ (left), a melon fork dated 1886¹⁴ (center), and a design patent from 1899¹⁵ (right) all disclose this feature.

55. Combining all three of the fork, knife, and spoon into a single unitary structure was also known in the art in the late 1800s. U.S. Patent No. 147,119 issued to Francis for an "Improvement in Combined Knives, Forks, and Spoons" in 1874 ("Francis '119") and U.S. Patent No. 843,953 issued to Laramy for "Table Utensil" in 1907 (Laramy '953) both teach a combination utensil wherein the knife

¹³ <https://www.rmg.co.uk/collections/objects/rmgc-object-63222>.

¹⁴ <https://collections.vam.ac.uk/item/O78416/melon-fork-the-CFL-Fork-francis>.

¹⁵ U.S. Design Patent No. 31,575, Figures 1-3.

edge is located on the side of the fork, the fork bowl coinciding with the bowl of the spoon, *see* Figure 4.

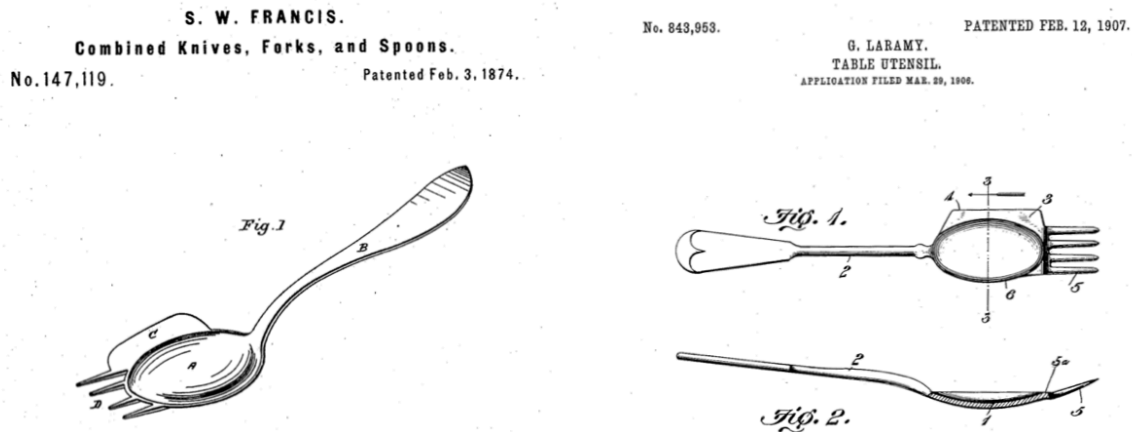


Figure 4. Figures from Francis '119 issued in 1874¹⁶ (left) and Laramy '953 issued in 1907¹⁷ (right) showing a combination of a fork, knife, and spoon integrally formed.

56. While the patents shown in Figure 4 disclose a knife-fork-spoon combination with all three implements located on one end of the implement, there is also early prior art disclosing these elements on separate ends of the handle. For example, U.S. Design Patent 60,369 issued to Quandee and Palmberg in 1922 (“Quandee '369”) discloses a fork with a cutting edge disposed on the side of the fork and the fork coupled with a spoon via a common-use handle, *see* Figure 5.

¹⁶ Francis '119, Figure 1.

¹⁷ Laramy '953, Figures 1-2.

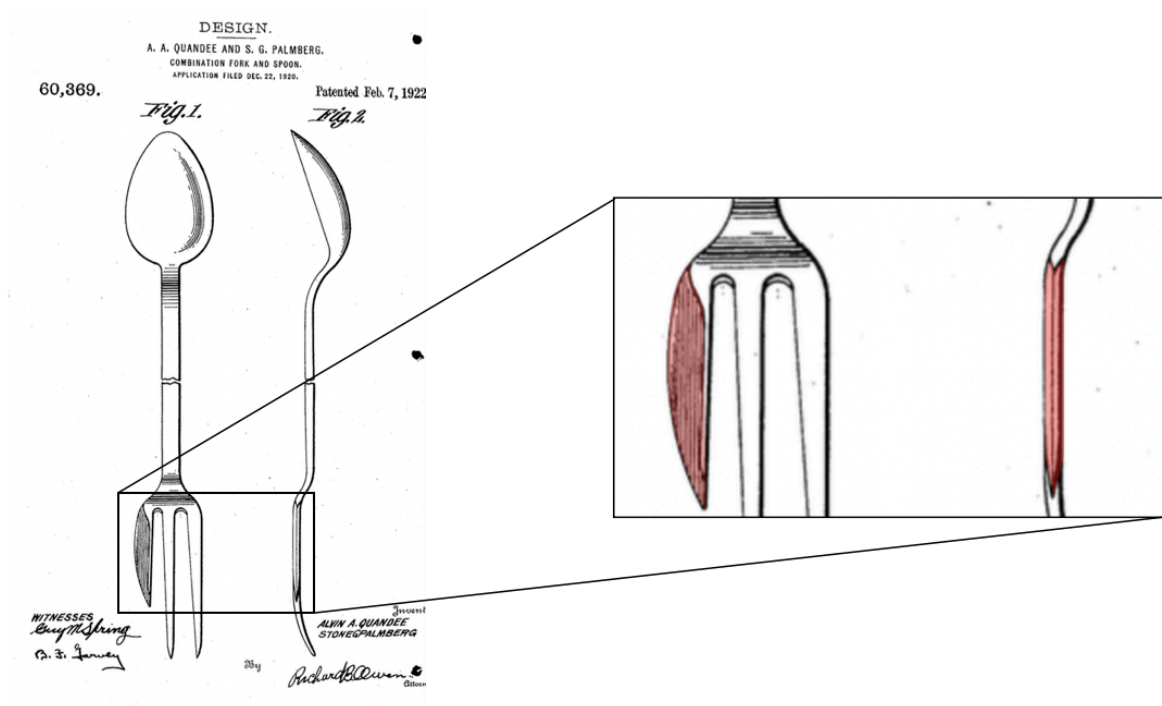


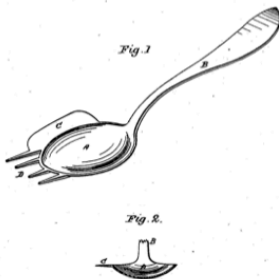
Figure 5. Annotated figures from Quandee '369 issued in 1922¹⁸ disclosing a combination fork-spoon with a cutting edge disposed on the side of the fork tine.

57. The 20th century saw the advent of a number of combination utensils, including (perhaps most notably) the “spork.”¹⁹ The design of the spork resembles earlier designs in that the tines of a fork are disposed on the end of a spoon bowl. Disposable plastic versions of the spork have become a fixture of modern life, *see* Figure 6.

¹⁸ Quandee '369, Figures 1-2.

¹⁹ The modern term “spork” (or a spoon-fork) first appeared in a trademark application by Hyde W. Ballard in 1951 for a stainless steel eating utensil, U.S. Trademark Application, No. 609,277, filed January 26, 1951.

S. W. FRANCIS.
Combined Knives, Forks, and Spoons.
No. 147,119.
Patented Feb. 3, 1874.



Nov. 27, 1934. G. S. WILSON
TABLE FORK OR SIMILAR ARTICLE
Filed May 3, 1934
Des. 93,956

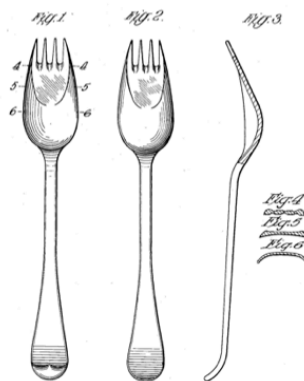


Figure 6. Some early progenitors of the modern-day spork disclosed by Francis '119 issued in 1874²⁰ (left) and in U.S. Design Patent No. 93,956 issued to Wilson (Wilson '956) in 1934.²¹ The modern-day spork (right).²²

58. Similarly, more modern versions of the “3-in-1”-type utensils (knife, fork, spoon) have also appeared. For example, the “splayd” (a combination fork, knife, and spoon) was purportedly invented by William McArthur in the 1940s;²³ the splayd incorporate the tines of a fork on the bowl of a spoon and disposes a curved knife edge on each side of the fork tines, *see* Figure 7.

²⁰ Francis '119, Figures 1-2.

²¹ Wilson '956, Figures 1-3.

²² <https://www.webrestaurantstore.com/choice-individually-wrapped-medium-weight-white-plastic-spork-pack/999WSPORKWP.html>, last accessed June 19, 2023.

²³ <https://australianfoodtimeline.com.au/splayds-invented/>.



Figure 7. The “splayd” eating utensil incorporates curved knife edges on both sides of a fork-spoon combination. Examples from both 1978 (left)²⁴ and the late 1950s (right)²⁵ are shown.

59. More recent combination utensils such as the Light My Fire spork²⁶ and the spork disclosed in the European Union Intellectual Property Office (EUIPO) Design No. 001805383-001 to Kristiansson²⁷ have appeared in the 2000s-2010s.^{28,29} These utensils combine a serrated knife onto the edge of fork tines and also incorporate a spoon as a unitary structure, *see* Figure 8.

²⁴ <https://collections.vam.ac.uk/item/O271314/splayd-splayd-combination-knife-mrs-mcarthur/?carousel-image=2017KL7976>.

²⁵ <https://www.310bis.com/product/xz-sold-original-vintage-splayds-australia-set-of-6/37>.

²⁶ <https://lightmyfire.com/en/spork-original-bio>.

²⁷ Ex. 1005.

²⁸ https://www.youtube.com/watch?v=r_WL8Xr1fxk.

²⁹ <https://www.nytimes.com/2006/09/17/business/yourmoney/17goods.html>.



Figure 8. Two examples of more recent fork, knife, and spoon combination utensils (“sporks”). The Light My Fire spork is shown on the left,³⁰ and the spork disclosed by Kristiansson is shown on the right.³¹

60. As shown above, the art of combination utensils that disclose various combinations of forks, knives, and spoons is well explored. As further evidence of this, below I present a summary of 13 prior art references which disclose various combinations of forks, knives, and spoons into a single device. While I do not use the following references as primary or secondary references in the grounds discussed herein, I will rely on them to demonstrate what was commonly known in the art at the time of the ’629 Patent filing (i.e., to demonstrate the knowledge of a POSITA). Exemplary figures from these references are shown in Figure 9. The abbreviations I use for these references are shown in Table 1.

61. U.S. Patent No. 4,984,367 issued January 15, 1991, to Albanese for a “Combination Utensil”; I will refer to this prior art reference as “A367.” A367 discloses a spoon with fork tines disposed at the top of the spoon and a chamfered cutting edge on the side of the spoon head.

³⁰ <https://lightmyfire.com/en/spork-original-bio>.

³¹ Ex. 1005, Representation.

62. U.S. Patent No. 88,370 issued March 30, 1869, to Cox for a “Combined Knife and Fork”; I will refer to this prior art reference as “C370.” C370 discloses a fork with substantially straight inner tines and a chamfered knife edge disposed on each side of the fork head.

63. U.S. Patent No. 2,473,288 issued June 14, 1949, to McNeill for a “Combination Table Utensil”; I will refer to this prior art reference as “M288.” M288 discloses a fork with a concave fork bowl portion and a serrated cutting edge disposed on the side of the fork head.

64. U.S. Patent Application Publication No. 2003/0110644 published June 19, 2003, to Miller for a “Universal Fork”; I will refer to this prior art reference as “M644.” M644 discloses a fork with a concave fork head portion, substantially straight inner tines and a chamfered knife edge disposed on each side of the fork head.

65. U.S. Patent No. 1,699,248 issued January 15, 1929, to Pasal for a “Table Utensil”; I will refer to this prior art reference as “P248.” P248 discloses a fork with a concave fork head portion, substantially straight inner tines and a chamfered knife edge disposed on each side of the fork head.

66. U.S. Design Patent No. D31,575 issued October 3, 1899, to Phillips and Stayman for a “Dessert Fork”; I will refer to this prior art reference as “P575.” P575 discloses a fork with a concave fork head portion, substantially straight inner tines and a chamfered knife edge disposed on one side of the fork head.

67. U.S. Design Patent No. D60,369 issued February 7, 1922, to Quandee and Palmberg for a “Combination Fork and Spoon”; I will refer to this prior art reference as “Q369.” Q369 discloses an integrally-formed spoon and fork combination utensil with a fork head on end of a handle and a spoon head on the other. The fork head of Q369 includes straight inner tines and a chamfered knife edge disposed on one side of the fork head.

68. U.S. Design Patent No. D93,956 issued November 27, 1934 to Wilson for a “Table Fork or Similar Article;” I will refer to this prior art reference as “W956.” W956 discloses a fork with a concave fork bowl portion, and substantially straight inner fork tines.

69. U.S. Patent No. 32,916 issued July 23, 1861 to Richards for a “Combined Knife, Fork, and Spoon;” I will refer to this prior art reference as “R916.” R916 discloses an integrally-formed spoon and fork combination utensil with a fork head on end of a handle and a spoon head on the other. The fork head of R916 includes substantially straight inner fork tines.

70. U.S. Patent No. 147,119 issued February 3, 1874, to Francis for “Combined Knives, Forks, and Spoons”; I will refer to this prior art reference as “F119.” F119 discloses a combination fork/spoon utensil with the inner fork tines being substantially straight and a cutting edge disposed on the side of the fork/spoon head.

71. U.S. Patent No. 843,953 issued February 12, 1907, to Laramy for “Table Utensil”; I will refer to this prior art patent as “L953.” L953 discloses a combination fork/spoon utensil with the inner fork tines being substantially straight and a cutting edge disposed on the side of the fork/spoon head.

72. U.S. Patent No. 4,771,541 issued September 20, 1988, to Bouchakian for a “Combination Fork and Knife”; I will refer to this prior art patent as “B541.” B541 discloses a fork with a concave fork head portion, substantially straight inner tines and a serrated knife edge disposed on one side of the fork head.

73. U.S. Design Patent No. D192,970 issued June 5, 1962, to Loertz for a “Combined Knife, Fork, and Spoon”; I will refer to this prior art reference as “L970.” L970 discloses a fork/spoon combination with a serrated cutting edge disposed on the side of the fork/spoon head.

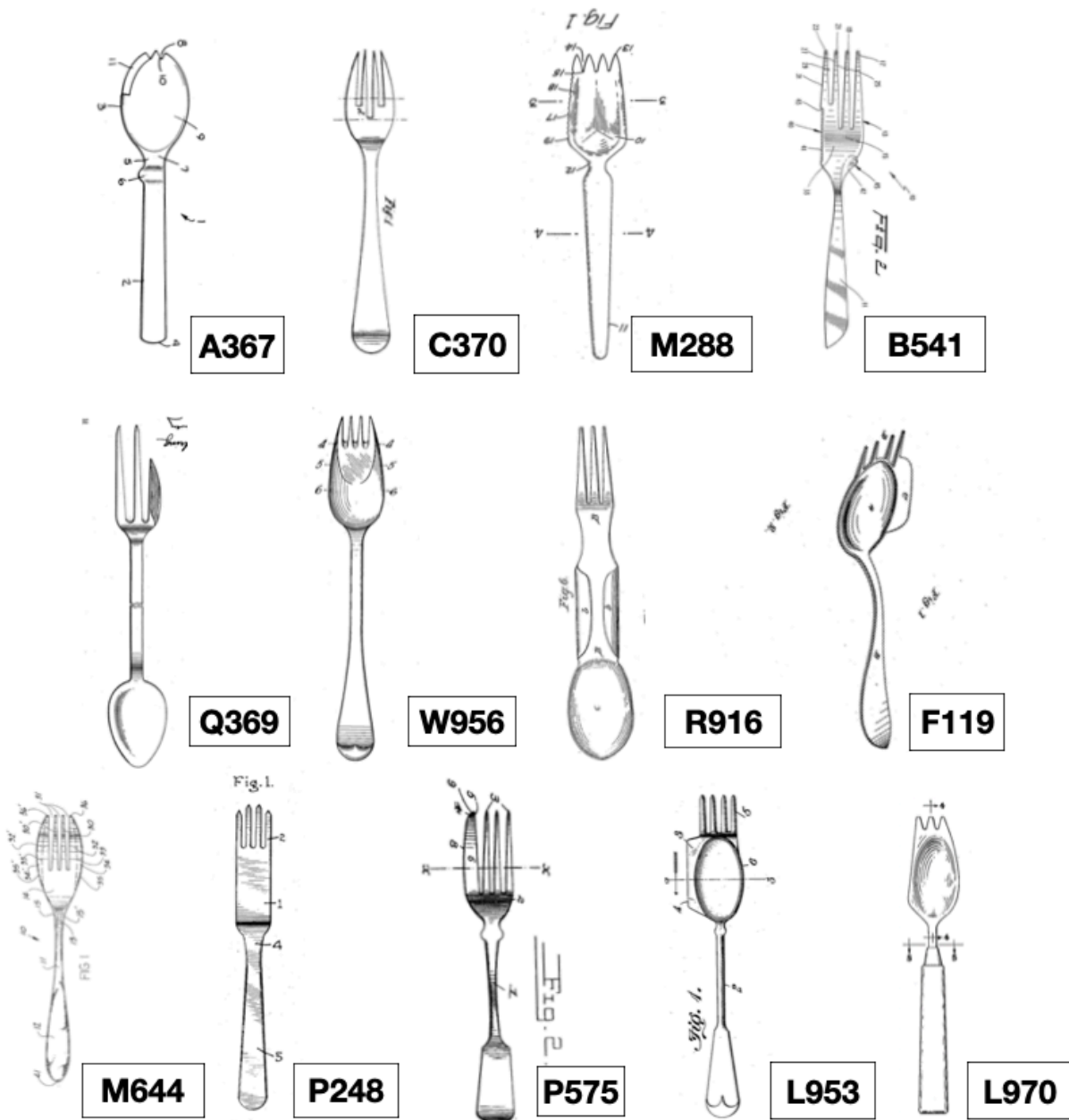


Figure 9. Additional references relied upon to demonstrate the knowledge of a POSITA, see Table 1 for corresponding abbreviation definitions.

Table 1. Table listing relevant prior art references and corresponding abbreviations.

Prior Art	Abbreviation
U.S. Patent No. 4,984,367	A367
U.S. Patent No. 88,370	C370
U.S. Patent No. 2,473,288	M288
U.S. Patent App. Pub. No. 2003/0110644	M644
U.S. Patent No. 1,699,248	P248
U.S. Design Patent No. D31,575	P575
U.S. Design Patent No. D60,369	Q369
U.S. Design Patent No. D93,956	W956
U.S. Patent No. 32,916	R916
U.S. Patent No. 147,119	F119
U.S. Patent No. 843,953	L953
U.S. Patent No. 4,771,541	B541
U.S. Design Patent No. D192,970	L970

C. United States Patent No. 10,555,629

74. United States Patent No. 10,555,629 was filed on December 7, 2018, and issued on February 11, 2020, to Christopher A. Miksovsky, Clint N. Slone, Evelyne Chaubert, Charlie Nghiem, Robert C. Lane, and Jonathan P. Downing. United States Patent No. 10,555,629 claims priority to U.S. Patent Application No. 15/268,175 filed on September 16, 2016, now abandoned, and U.S. Patent Application No. 14/204,497 filed on March 11, 2014, now U.S. Patent No. 9,468,321.

75. The '629 Patent is titled "Eating Utensil System."

76. I have reviewed the '629 Patent. I have also reviewed the file history for the '629 Patent.³² I have provided descriptions of the '629 Patent that may be pertinent to my analysis below. My descriptions and opinions herein are not intended to be a comprehensive discussion of an entire understanding of the '629 Patent.

1. Overview

77. The '629 Patent teaches to the field of “combination eating utensils that may be suitable for transport.”³³ Specifically, the '629 Patent teaches various embodiments which comprise either a fork or a fork-spoon combination, both of the fork and spoon comprising a bowl portion (i.e., having a concave-shaped aspect) and overall being formed of a glass reinforced thermoplastic suitable for food contact.³⁴

78. In a preferred embodiment, an “integral combination fork and spoon utensil” is disclosed.³⁵ The fork 240 has a head portion 241 which is connected to handle 210 and includes four tines 242, 244.³⁶ The tines 242, 244 each have a “pointed tip”;³⁷ the inner tines 242 are taught to be straight in extent while the two outer tines 244 are taught to have a “substantially straight inner edge and a curved outer edge 245.”³⁸ The outer edges 245 of the outer tines 244 are also “tapered or chamfered such that the fork 240 can be used to cut through or separate foods that do not require a knife,”³⁹ *see* Figure 10. The disclosed “tapered or chamfered”

³² Ex. 1003.

³³ Ex. 1001, 1:17-18.

³⁴ Ex. 1001, 6:21-23.

³⁵ Ex. 1001, 9:34-35.

³⁶ Ex. 1001, 9:43-56.

³⁷ Ex. 1001, 9:55.

³⁸ Ex. 1001, 9:45-48.

³⁹ Ex. 1001, 9:57-60.

edges of the fork are taught to have a preferred angle of “about 20-25 degrees, and preferably about 23 degrees.”⁴⁰

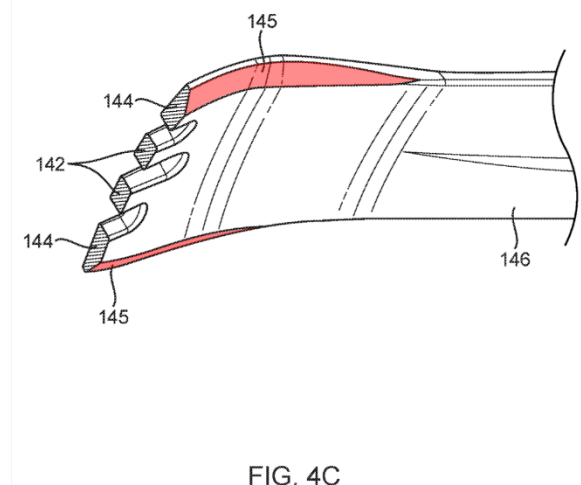
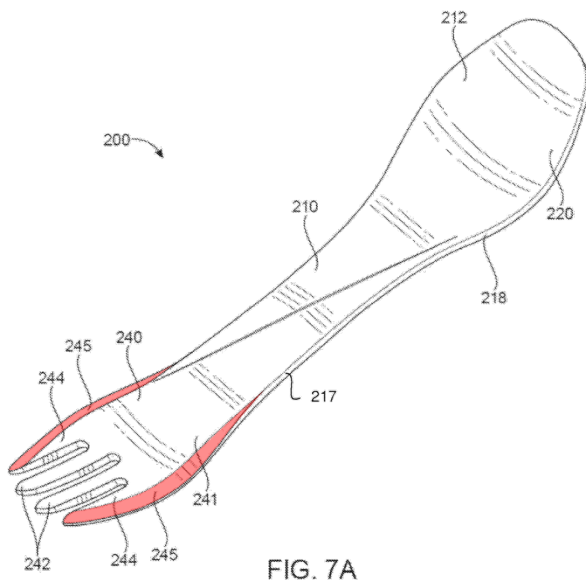


Figure 10. Annotated figures from the '629 Patent showing the fork of the claimed invention.⁴¹ The “tapered or chamfered” edges 245/145 are indicated in red highlights and are taught to be disposed on each side of the fork tines so as to accommodate both left- and right-handed users.⁴²

79. The spoon 220 of the '629 Patent is taught to comprise a “head portion or bowl 212 on its distal end”;⁴³ the bowl portion having a “substantially elongated pentagonal⁴⁴ shape with rounded corners”⁴⁵ and “a substantially flat side edge 218 and end edge 218b, which allows for ‘scraping’ food from a container [...],”⁴⁶ see Figure 11.

⁴⁰ Ex. 1001, 10:8-11.

⁴¹ Ex. 1001, Figures 7A and 4C.

⁴² Ex. 1001, 4:10-11.

⁴³ Ex. 1001, 10:20-21.

⁴⁴ As will be discussed, the use of the term “pentagonal” in the specification is confusing as the disclosed embodiments represented in the drawings of the patent (and referred to as pentagonal), would be recognized as “hexagonal” as opposed to pentagonal.

⁴⁵ Ex. 1001, 10:29-30.

⁴⁶ Ex. 1001, 10:21-24.

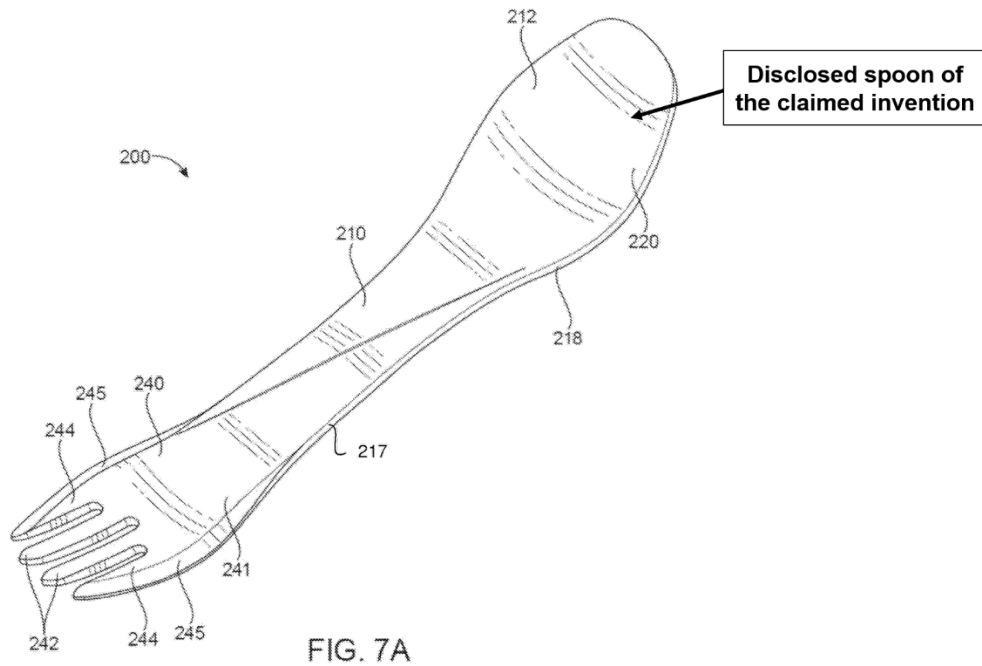


Figure 11. Figure 7A from the '629 Patent showing the disclosed spoon of the claimed invention.⁴⁷

80. In another preferred embodiment, the spoon 110 and fork 140 are formed separately and each include a “low profile interlocking mechanism” (e.g., rails on the undersides of each of the fork and spoon) which allow the fork and spoon to be slid into engagement in either a nested or “end to end” configuration.⁴⁸ In the nested configuration, the fork and spoon are interlocked such that the bottom of the fork bowl rests on top of the front of the spoon bowl; in the end-to-end configuration, the fork and spoon are interlocked such that each is at an opposite end of the structure, *see* Figure 12.

81. It should be noted that while the specification of the '629 Patent provides considerable disclosure regarding the interlocking means (e.g., recesses 150 and detents 152) which allow the fork and spoon to engage in the

⁴⁷ Ex. 1001, Figure 5A.

⁴⁸ *See* Ex. 1001, 3:1-12.

configurations shown in Figure 12, such details are not claimed in claims 1-23 of the '629 Patent, and therefore, they are not relevant to this declaration.

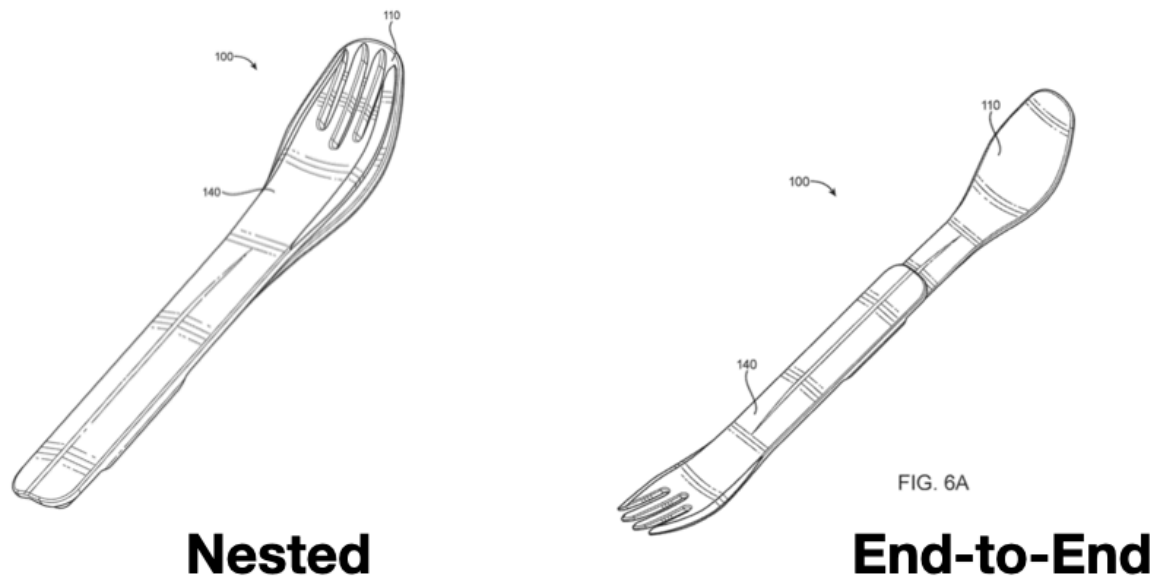


Figure 12. Figures from the '629 Patent showing the disclosed fork and spoon being interlocked in the nested (left)⁴⁹ and end-to-end (right)⁵⁰ configurations.

2. Prosecution History

82. U.S. Patent Application No. 16/213,466, which would eventually become the '629 Patent, was filed on December 7, 2018, with 20 claims recited. In subsequent filings in 2019, the patentee proceeded to file claim amendments as well as adding additional claims 21-35.

83. The Examiner, in a non-final rejection dated April 19, 2019, found that Claims 1-10 and 19-35 were unpatentable as they were (among other reasons) obvious over combinations of prior art. Among other things, the Examiner found that the prior art teaches that:

⁴⁹ Ex. 1001, Figure 1A.

⁵⁰ Ex. 1001, Figure 6A.

- “it is old and well known in the art of fork tines with a cutting feature to incorporate a chamfered outer edge.”⁵¹
- “it is old and well known in the art of eating utensils to incorporate a spoon head (Fig.1), the handle connects the fork head to the spoon head (Fig. 1), the spoon head has a concave spoon bowl portion (Fig. 1), the spoon and fork bowl portions being formed on a front surface of the utensil.”⁵²
- It would have been obvious to add a prior art spoon head to a prior art fork “because all claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective function and the combination would have yielded predictable results.”⁵³
- “it is old and well known in the art of fork tines to incorporate pointed tips.”⁵⁴
- “it is old and well known in the art of spoon bowls to incorporate a spoon bowl portion with a substantially flat side edge.”⁵⁵
- “It is old and well known in the art of eating utensils with a spoon head to incorporate the spoon head tilted at a first angle relative to the handle such that a distal end of the spoon head extends above the handle on a front side.”⁵⁶
- “it is old and well known in the art of hand tools to incorporate glass reinforced thermoplastic material.”⁵⁷

⁵¹ Ex. 1003, p. 165.

⁵² *Id.*, p. 164.

⁵³ *Id.*, p. 164.

⁵⁴ *Id.*, p. 165.

⁵⁵ *Id.*, p. 176.

⁵⁶ *Id.*, p. 167.

⁵⁷ *Id.*, p. 168.

84. A response was filed on July 18, 2019, which amended the independent claims (1, 20, 21, and 26) to recite “a side surface of the eating utensil extends continuously along an entire length of the eating utensil from the distal tip of an outer tine to a distal tip of the spoon bowl, wherein the chamfer is chamfered at an angle from the side surface” or a similar limitation.⁵⁸ and Claim 20 was amended to recite a chamfer which forms a “curved splitting feature.”⁵⁹

85. In a further response, the Examiner issued a final action on October 9, 2019, rejecting claims 1, 2, 4-10, and 20-35 under U.S.C. § 112(b) and suggesting a modified independent claim that they “considered to distinguish patentably over the art of record.”⁶⁰ The proposed allowable claim provided by the Examiner included, among others: “a fork head with front and back surfaces defining the tines and bowl portion and an outer one of the tines and the bowl portions being further defined by a chamfer and a curved side surface which together define a splitting feature [...]”⁶¹

86. On November 11, 2019, the Applicant filed a response traversing the objections under U.S.C. § 112(b), cancelling independent claims 20, 21, and 26, and adding/amending independent claims 1, and 36-38 to incorporate the language suggested by the Examiner.

87. The '629 Patent was subsequently allowed on December 16, 2019.

3. Claims of the '629 Patent

88. I understand that Industrial Revolution is challenging claims 1-23 of the '629 Patent. These claims recite:

89. Claim 1:

⁵⁸ *Id.*, p. 150.

⁵⁹ *Id.*, p. 142.

⁶⁰ *Id.*, p. 74.

⁶¹ *Id.*, p. 74.

1[preamble] An eating utensil comprising:

1[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines; and

1[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer, the chamfer coupling the fork front surface with the curved side surface;

1[c] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the chamfer and the curved side surface defines a curved splitting feature;

1[d] a spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface;

1[e] the spoon front surface, the spoon back surface, and the spoon side surface partially defining a concave spoon bowl portion, the spoon bowl portion facing a same way as the concave fork bowl portion;

1[f] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

1[g] the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil;

1[h] the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil; and

1[i] the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.

90. **Claim 2:**

An eating utensil as recited in claim 1, wherein inner ones of the plurality of tines each has a pair of substantially straight side edges and a pointed distal tip.

91. **Claim 3:**

An eating utensil as recited in claim 2, wherein the outer one of the tines has a wider base end than the inner ones of the tines.

92. **Claim 4:**

4[preamble] An eating utensil as recited in claim 1,

4[a] wherein the concave spoon bowl portion is further defined by at least three substantially flat side edges with rounded corners connecting the flat side edges,

4[b] wherein one of the flat side edges further defines the single side surface of the utensil.

93. **Claim 5:**

5[preamble] An eating utensil as recited in claim 1,

5[a] wherein the concave spoon bowl portion is tilted at a first angle relative to the handle front surface, and

5[b] the concave fork bowl portion is tilted at a second angle relative to the handle front surface,

5[c] such that at least a portion of each of the bowl portions extend forward from the handle front surface.

94. **Claim 6:**

6[preamble] An eating utensil as recited in claim 1,

6[a] wherein the concave spoon bowl portion is further defined by a plurality of substantially flat side edges,

6[b] wherein one of the substantially flat side edges further defines the single side surface of the utensil.

95. **Claim 7:**

An eating utensil as recited in claim 1, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

96. **Claim 8:**

8[preamble] An eating utensil formed from a glass filled nylon thermoplastic material, the eating utensil comprising:

8[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines, and

8[b] a concave fork bowl portion, a first outer one of the tines and the concave fork bowl portion being further defined by a first chamfer and a first curved side surface coupled to the first chamfer;

8[c] the first chamfer coupling the fork front surface with the first curved side surface;

8[d] the first curved side surface coupling the first chamfer with the fork back surface;

8[e] the first chamfer is oblique in relation to the first curved side surface and the coupling between the first chamfer and the first curved side surface defines a first curved splitting feature;

8[f] a second outer one of the tines and the concave fork bowl portion being further defined by a second chamfer and a second curved side surface coupled to the second chamfer;

8[g] the second chamfer coupling the fork front surface with the second curved side surface;

8[h] the second curved side surface coupling the second chamfer with the fork back surface, the second chamfer is

oblique in relation to the second curved side surface and the coupling between the second chamfer and the second curved side surface defines a second curved splitting feature;

8[i] a spoon head having a spoon front surface, a spoon back surface, and first and second spoon side surfaces coupling the spoon front surface with the spoon back surface;

8[j] wherein the spoon front surface, the spoon back surface, and the first and second spoon side surfaces defining a concave spoon bowl portion, the spoon bowl portion faces the same way as the concave fork bowl portion;

8[k] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a first and second handle side surface coupling the handle front surface to the handle back surface;

8[l] the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil;

8[m] the fork back surface, the spoon back surface, and the handle back surface collectively defining a single back surface of the utensil;

8[n] the first fork side surface, the first spoon side surface, and the first handle side surface collectively defining a single first side surface of the utensil; and

8[o] the second fork side surface, the second spoon side surface, and the second handle side surface collectively defining a single second side surface of the utensil.

97. Claim 9:

9[preamble] An eating utensil comprising:

9[a] a first head having a first front surface and a first back surface both partially defining a plurality of tines, and

9[b] a first concave bowl portion, an outer one of the tines and the first concave bowl portion being further defined by a chamfer and a first curved side surface coupled to the chamfer;

9[c] the chamfer coupling the first front surface with the first curved side surface;

9[d] the first curved side surface coupling the chamfer with the first back surface, and the chamfer is oblique in relation to the first curved side surface;

9[e] a second head having a second front surface, a second back surface, and a second side surface coupling the second front surface with the second back surface;

9[f] the second front surface, the second back surface, the second side surface partially defining a second concave bowl portion, the second concave bowl portion faces the same way as the first concave bowl portion;

9[g] a handle that couples the second head to the first head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

9[h] the first front surface, the second front surface, and the handle front surface collectively defining a single front surface of the utensil;

9[i] the first back surface, the second back surface, and the handle back surface collectively defining a single back surface of the utensil; and

9[j] the first side surface, the second side surface, and the handle side surface collectively defining a single side surface of the utensil.

98. Claim 10:

The eating utensil as recited in claim 9, wherein the handle, the first head, and the second head are integrally formed.

99. **Claim 11:**

The eating utensil as recited in claim 9, wherein an inner one of the tines is substantially straight.

100. **Claim 12:**

The eating utensil as recited in claim 9, wherein the outer one of the tines is further defined by a substantially straight inner edge.

101. **Claim 13:**

The eating utensil as recited in claim 9, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

102. **Claim 14:**

14[preamble] The eating utensil as recited in claim 9,

14[a] wherein the second concave bowl portion is further defined by a plurality of substantially flat side edges,

14[b] wherein one of the substantially flat side edges further defines the single side surface of the utensil.

103. **Claim 15:**

15[preamble] An eating utensil comprising:

15[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

15[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer,

15[c] the chamfer coupling the fork front surface with the curved side surface,

15[d] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the chamfer and the curved side surface defines a curved splitting feature;

15[e] a handle coupled to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

15[f] the fork front surface and the handle front surface defining a single front surface of the utensil;

15[g] the fork back surface and the handle back surface defining a single back surface of the utensil; and

15[h] the fork side surface and the handle side surface defining a single side surface of the utensil.

104. Claim 16:

16[preamble] The eating utensil as recited in claim 15,

16[a] further comprising a spoon head coupled to the handle on an opposite side from where the fork head is coupled to the handle,

16[b] the spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface,

16[c] wherein the spoon front surface, the spoon back surface, and the spoon side surface defining a concave spoon bowl portion;

16[d] the spoon front surface further defining the single front surface of the utensil;

16[e] the spoon back surface further defining the single back surface of the utensil; and

16[f] the spoon side surface further defining the single side surface of the utensil.

105. Claim 17:

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is tilted in relation to the handle front surface at an angle of about 20-25 degrees.

106. Claim 18:

18[preamble] The eating utensil as recited in claim 16,

18[a] wherein the concave spoon bowl portion is further defined by a substantially flat side edge,

18[b] wherein the substantially flat side edge further defines the single side surface of the utensil.

107. Claim 19:

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is further defined by a substantially flat end edge.

108. Claim 20:

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion has a substantially pentagonal shape.

109. Claim 21:

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is further defined by at least three substantially flat side edges with rounded corners connecting the flat side edges, wherein one of the flat side edges further defines the single side surface of the utensil.

110. Claim 22:

The eating utensil as recited in claim 15, wherein the handle front surface has a diagonal ridge.

111. Claim 23:

The eating utensil as recited in claim 15, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

D. Overview of the Prior Art

1. Chinese Utility Model No. CN 2062986U to Feng

112. I have reviewed Chinese Utility Model No. CN 2062986U issued to Feng (“Feng”), which was filed on April 4, 1990, and published on October 3, 1990.⁶² Feng was published more than one year prior to the effective filing date of the ’629 Patent, March 11, 2014. I understand that Feng qualifies as prior art at least under 35 U.S.C. § 102(a)(1) and that none of the exceptions under 35 U.S.C. § 102(b)(1) would apply.

113. Feng teaches to the field of “silverware that combines a knife, a fork, and a spoon.”⁶³ Feng states that the claimed invention is “suitable for use in situations such as traveling, picnics, and the like, and can also be used for group

⁶² See Ex. 1004, cover page.

⁶³ Ex. 1004, Abstract.

dining of children in kindergartens.”⁶⁴ Feng further states that the claimed invention achieves “multi-purposes, convenient carrying and use, small volume, low manufacturing cost, and saving raw materials, and is suitable for use at home and in travel.”⁶⁵

114. The claimed invention corresponds to “[a] three-purpose silverware, characterized in that one end of a handle 1 is installed with a spoon head 2, the other end thereof is installed with a fork head 3, and one or two sides of the fork head are formed with a blade 4, thereby forming the silverware,” *see* Figure 13 below.⁶⁶

115. In the preferred embodiment, “the handle 1, the spoon head 2, and the fork head 3 are made of stainless steel integrally through stamping, and the blade 4 is formed by sharpening one side of the fork head.”⁶⁷ *See* Figure 13. Feng teaches that the preferred embodiment can also be made of “regular carbon steel” or “plastic material.”⁶⁸

⁶⁴ Ex. 1004, Abstract.

⁶⁵ Ex. 1004, Description.

⁶⁶ Ex. 1004, Claim 1.

⁶⁷ Ex. 1004, Description.

⁶⁸ Ex. 1004, Description.

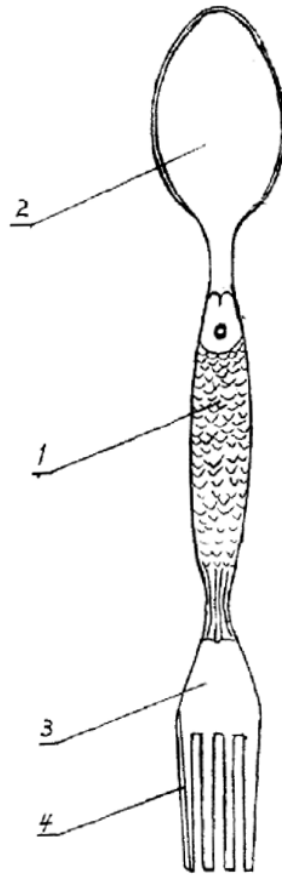


Figure 13. Sole figure from Feng showing the preferred embodiment of the claimed invention.⁶⁹ Reference numbers 1, 2, 3, and 4 correspond to the handle, spoon head, fork head, and blade, respectively.

2. European Design No. 001805383-001 to Kristiansson

116. I have reviewed the EUIPO Design No. 001805383-001 to Kristiansson (“Kristiansson”), published on January 18, 2011.⁷⁰ Kristiansson was published more than one year prior to the effective filing date of the ’629 Patent, March 11, 2014. I understand that Kristiansson qualifies as prior art at least under 35 U.S.C. § 102(a)(1) and that none of the exceptions under 35 U.S.C. § 102(b)(1) would apply.

⁶⁹ Ex. 1004, Drawing.

⁷⁰ Ex. 1005, p. 1.



Figure 14. The combination utensil of Kristiansson which comprises a curved outer fork tine including a beveled edge.⁷¹

117. As can be seen in Figure 14, Kristiansson discloses a combination fork-spoon-knife utensil. The fork/spoon head comprises a curved outer tine with a beveled or chamfered and serrated knife edge.⁷²

3. U.S. Patent Application Pub. No. 2008/0201959 A1 to Kent

118. I have reviewed U.S. Patent Application Publication No. 2008/0201959 A1 to Kent (“Kent”), which was filed on February 28, 2007, and published on August 28, 2008.⁷³ Kent was published more than one year prior to the effective filing date of the ’629 Patent, March 11, 2014. I understand that Kent qualifies as prior art at least under 35 U.S.C. § 102(a)(1) and that none of the exceptions under 35 U.S.C. § 102(b)(1) would apply.

⁷¹ Ex. 1005, pp. 1, 5.

⁷² Ex. 1005, pp. 1, 5.

⁷³ Ex. 1007, Cover.

119. Kent teaches to the field of “eating utensils,” particularly to an “eating utensil that functions as a one-piece knife, fork and spoon.”⁷⁴ Kent states that the “objective of the invention is to enable varied people groups to eat a meal of various consistencies with only one eating utensil,”⁷⁵ including “people who are handicapped, suffering from diseases such as Parkinson’s, the elderly, and those in the hospital”⁷⁶ as well as those that need to travel “as light as possible.”⁷⁷

120. The claimed invention corresponds to an eating utensil that has a “wide upper section that consists of two blunted knife edges that end at the top of the utensil in a three pronged fork. The center of the upper portion has a hollowed out center section that is the spoon area,”⁷⁸ *see* Figure 15. The fork tines, two blunted knife edges, and spoon area are annotated in Figure 15 as elements 1, 2, 3, and 4, respectively. Kent further states that the utensil can be made from a variety of materials, including “precious metal, metal, wood, compressed wood, plastic, polypropylene, [and] poly vinyl acrylic.”⁷⁹

121. The preferred embodiment is shown in Figure 15. Kent states that “other modifications and changes varied to fit particular operating requirements and environments will be apparent to those skilled in the art [...]”⁸⁰

⁷⁴ Ex. 1007, [0002].

⁷⁵ Ex. 1007, [0006].

⁷⁶ Ex. 1007, [0004].

⁷⁷ Ex. 1007, [0005].

⁷⁸ Ex. 1007, [0010].

⁷⁹ Ex. 1007, [0011].

⁸⁰ Ex. 1007, [0019].

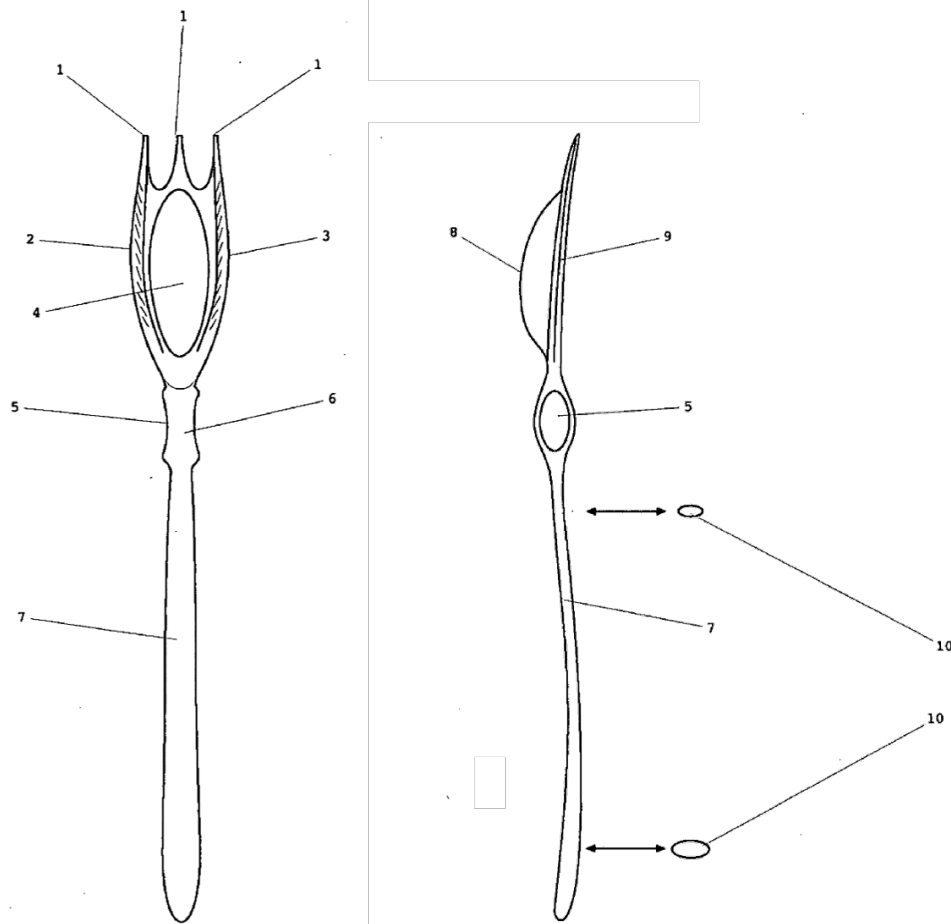


Figure 15. Figure 1 and Figure 2 from Kent showing the front view (left)⁸¹ and side view (right)⁸² of the claimed invention. The fork tines, two blunted knife edges, and spoon area are reference numbers 1, 2, 3, and 4, respectively.

4. U.S. Patent No. 6,119,351 to Vanderputt

122. I have reviewed U.S. Patent No. 6,119,351 issued to Vanderputt (“Vanderputt”), which was filed on August 6, 1998, and issued on September 19, 2000.⁸³ Vanderputt was published more than one year prior to the effective filing date of the ’629 Patent, March 11, 2014. I understand that Vanderputt qualifies as

⁸¹ Ex. 1007, Figure 1.

⁸² Ex. 1007, Figure 2.

⁸³ Ex. 1006, Cover.

prior art at least under 35 U.S.C. § 102(a)(1) and that none of the exceptions under 35 U.S.C. § 102(b)(1) would apply.

123. Vanderputt teaches to the field of combination eating utensils, specifically teaching a claimed invention that functions as a fork and allows a “user to cut food with the side of the fork.”⁸⁴ Vanderputt states that the claimed invention addresses a “need for an improved combined knife and fork having a more rigid cutting edge, reinforced tines and superior food handling abilities resulting from a fork head having an upper concave surface which also tends to result in a convenient cutting edge.”⁸⁵

124. The claimed invention corresponds to a “beveled edge fork” with “a concave upper surface 54, enclosed by a U-shaped upper convex perimeter surface 55.”⁸⁶ The upper convex perimeter surface “mates with a lower beveled edge on a lower convex surface, forming left and right cutting edges, allowing a user to cut food with the side of the fork.”⁸⁷ Further, “the curved cutting edge 57 allows the user to easily cut through many softer foods.”⁸⁸ Vanderputt also teaches that “the upper concave surface 54 defines a somewhat spoon-like region within a middle portion of the head 40 of the fork.”⁸⁹ The preceding numbered elements are annotated in Figure 16.

125. The preferred embodiment is shown in Figure 16, below, but Vanderputt states that “other versions are possible,”⁹⁰ including an alternative version with “three tines, made more rigid by left and right reinforcements.”⁹¹

⁸⁴ Ex. 1006, Abstract.

⁸⁵ Ex. 1006, 1:29-34.

⁸⁶ Ex. 1006, 2:43-51.

⁸⁷ Ex. 1006, 2:43-51.

⁸⁸ Ex. 1006, 3:5-6.

⁸⁹ Ex. 1006, 2:63-65.

⁹⁰ Ex. 1006, 3:43.

⁹¹ Ex. 1006, 3:45-46.

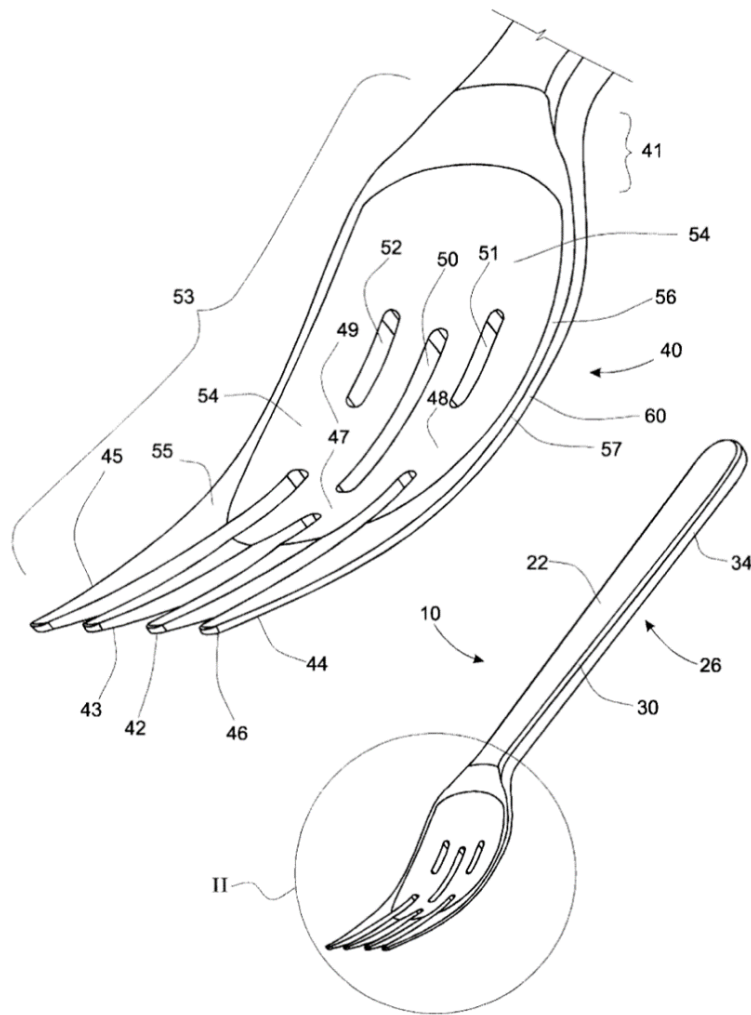


Figure 16. Figure 1 and Figure 2 from Vanderputt showing a close-up view of the fork head (top)⁹² and an overall view of the claimed combined eating utensil invention (bottom).⁹³ The meaning of relevant annotated elements is discussed in the text.

5. Chinese Patent No. CN 103504965A to Bo

126. I have reviewed Chinese Patent CN 103504965A issued to Bo (“Bo”), which was filed on June 26, 2012, and issued on January 15, 2014.⁹⁴ Bo was

⁹² Ex. 1006, Figure 2.

⁹³ Ex. 1006, Figure 1.

⁹⁴ Ex. 1008, Cover.

published more than one year prior to the effective filing date of the '629 Patent, March 11, 2014. I understand that Bo qualifies as prior art at least under 35 U.S.C. § 102(a)(1) and that none of the exceptions under 35 U.S.C. § 102(b)(1) would apply.

127. The invention claimed by Bo relates to a “multifunctional spoon” with a spoon, fork, and knife integrated in a unitary structure.⁹⁵ Bo states that the purpose of the claimed invention is to “provide a multifunctional spoon that is convenient to use and does not take up space.”⁹⁶

128. The claimed invention corresponds to an eating utensil that “includes a handle 1 [and] a spoon head 2 [that] is arranged at one end of the spoon handle 1 [...] a fork 3 is arranged at the other end of the spoon handle 1, and the spoon head 2 and the fork 3 are both integrally formed with the spoon handle 1.”⁹⁷ The claimed invention also includes “a toothed knife 4 [...] on one side of the fork 3...”⁹⁸ The preceding reference numbers are shown in Figure 17, below.

129. The preferred embodiment of the claimed invention is shown in Figure 17 below, but Bo states that those skilled in the art could generate modified embodiments that remain within the scope of the claims.

⁹⁵ Ex. 1008, Claim 1.

⁹⁶ Ex. 1008, [0008].

⁹⁷ Ex. 1008, [0022].

⁹⁸ Ex. 1008, [0023].

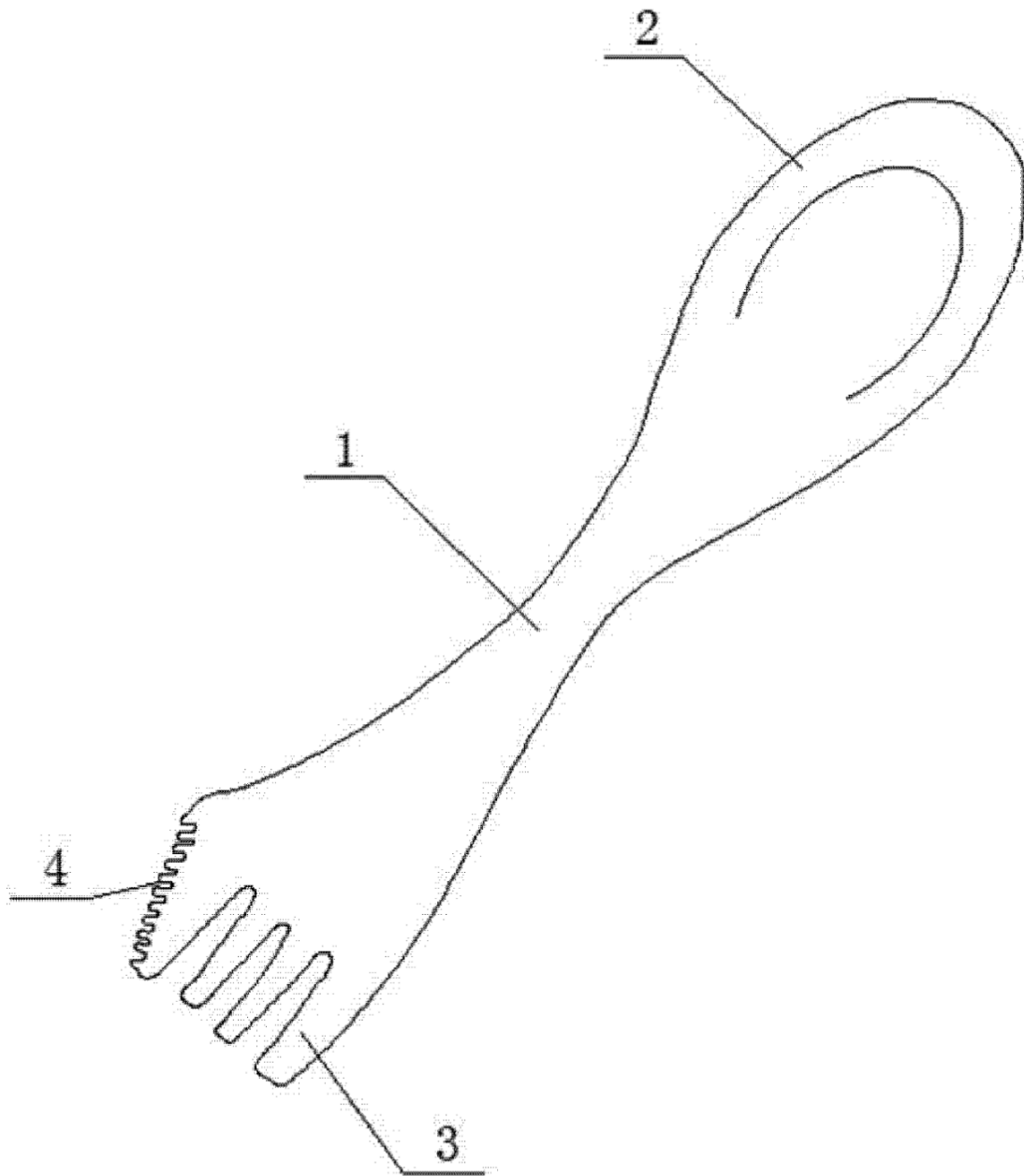


Figure 17. Sole figure from Bo showing the claimed invention.⁹⁹ The meaning of relevant reference numbers is discussed in the text above.

⁹⁹ Ex. 1008, Figure 1.

6. U.S. Patent No. 2,318,129 to Torode

130. I have reviewed U.S. Patent No. 2,318,129 issued to Torode (“Torode”), which was filed on June 2, 1941, and issued on May 4, 1943.¹⁰⁰ Torode was published more than one year prior to the effective filing date of the ’629 Patent, March 11, 2014. I understand that Torode qualifies as prior art at least under 35 U.S.C. § 102(a)(1) and that none of the exceptions under 35 U.S.C. § 102(b)(1) would apply.

131. Torode teaches to the field of combination eating utensils, particularly to a “combination knife, fork, and spoon.”¹⁰¹ Torode states that the “purpose of this invention is to provide a utensil whereby these three important elements [knife, fork, and spoon] are combined in a single structure, thus eliminating the necessity of the presence of three different utensils for this purpose.”¹⁰² Torode further discusses advantageous uses of the claimed invention, including use by individuals with “one hand or arm,”¹⁰³ use by institutions that must clean a large number of eating utensils,¹⁰⁴ and use by individuals that must transport their eating utensils frequently (e.g., campers or those in the Army or Navy).¹⁰⁵

132. The claimed invention corresponds to an eating utensil with a “fork body 3” that terminates to “a series of spaced apart tines 4” on one end of “handle portion 1.”¹⁰⁶ The “knife blade portion 7”¹⁰⁷ is also a part of fork body 3. The opposite end of handle portion 1 “terminates to [a] spoon bowl 5.”¹⁰⁸ The preceding numbered elements are annotated in Figure 18, below.

¹⁰⁰ Ex. 1009, Cover.

¹⁰¹ Ex. 1009, Cover.

¹⁰² Ex. 1009, 1:3-8.

¹⁰³ Ex. 1009, 1:13.

¹⁰⁴ Ex. 1009, 1:17-24.

¹⁰⁵ Ex. 1009, 1:25-28.

¹⁰⁶ Ex. 1009, 2:5-8.

¹⁰⁷ Ex. 1009, 2:14-15.

¹⁰⁸ Ex. 1009, 2:8-10.

133. The preferred embodiment is shown in Figure 18 (top), but Torode notes that modified embodiments are possible, e.g., the embodiment shown in Figure 18 (bottom) where spoon bowl 5 has been omitted.

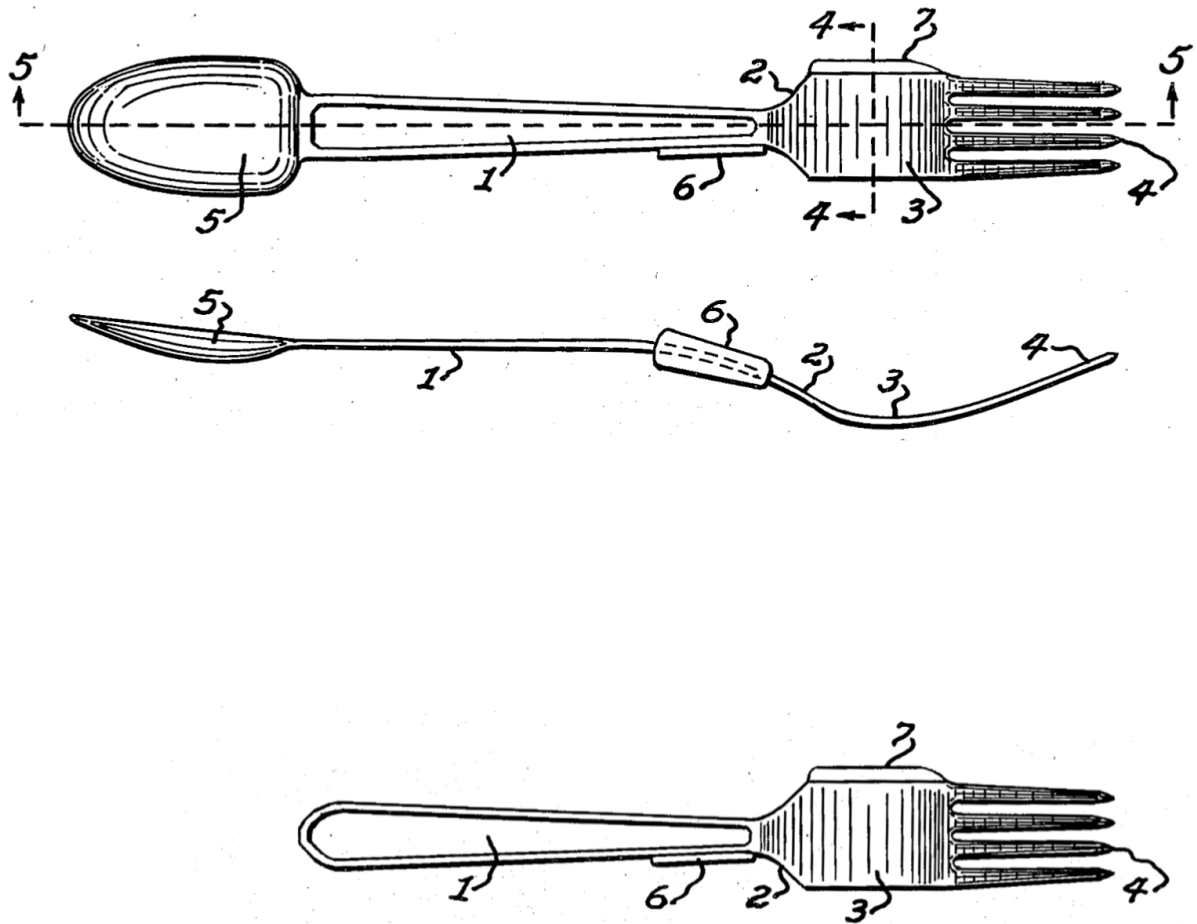


Figure 18. Figures 1-3 from Torode showing one embodiment of the claimed invention (top and middle),¹⁰⁹ and a modified embodiment of the claimed invention (bottom).¹¹⁰ The meaning of relevant reference numbers are discussed in the above text.

¹⁰⁹ Ex. 1009, Figures 1-2.

¹¹⁰ Ex. 1009, Figure 3.

7. Printed Publication for the Charles-François Languedocq Fork ("the CFL Fork")

134. I have reviewed excerpts of a book titled “French Silver Cutlery of the XIXth Century” by David Allan, published December 13, 2007.¹¹¹ This book describes and shows an “oyster fork” represented to be from the period of 1845-1854.¹¹² I will refer to this publication herein as “the CFL Fork.” I understand that the CFL Fork qualifies as prior art under 35 U.S.C. § 102(a)(1) because it was published and generally available for purchase (i.e., in 2007)¹¹³ before the effective filing date of the claimed invention, March 11, 2014. I understand that none of the exceptions under 35 U.S.C. § 102(b)(1) apply.

135. The CFL Fork is a combination eating utensil that combines the functionality of a fork and knife. The CFL Fork has a knife edge along a wider outer fork tine, being described: “the left tine is slightly wider and sharpened.”¹¹⁴ Relevant features of the CFL Fork are shown in annotated Figure 19, below.

¹¹¹ Ex. 1010, pp. 2, 6. Ex. 1010 also includes on pp. 6-8 screenshots of the Amazon.com page where the referenced book is available for purchase as well as the URL and date of access.

¹¹² Ex. 1010, p. 3.

¹¹³ *Id.*, p. 2.

¹¹⁴ *Id.*, p. 3.

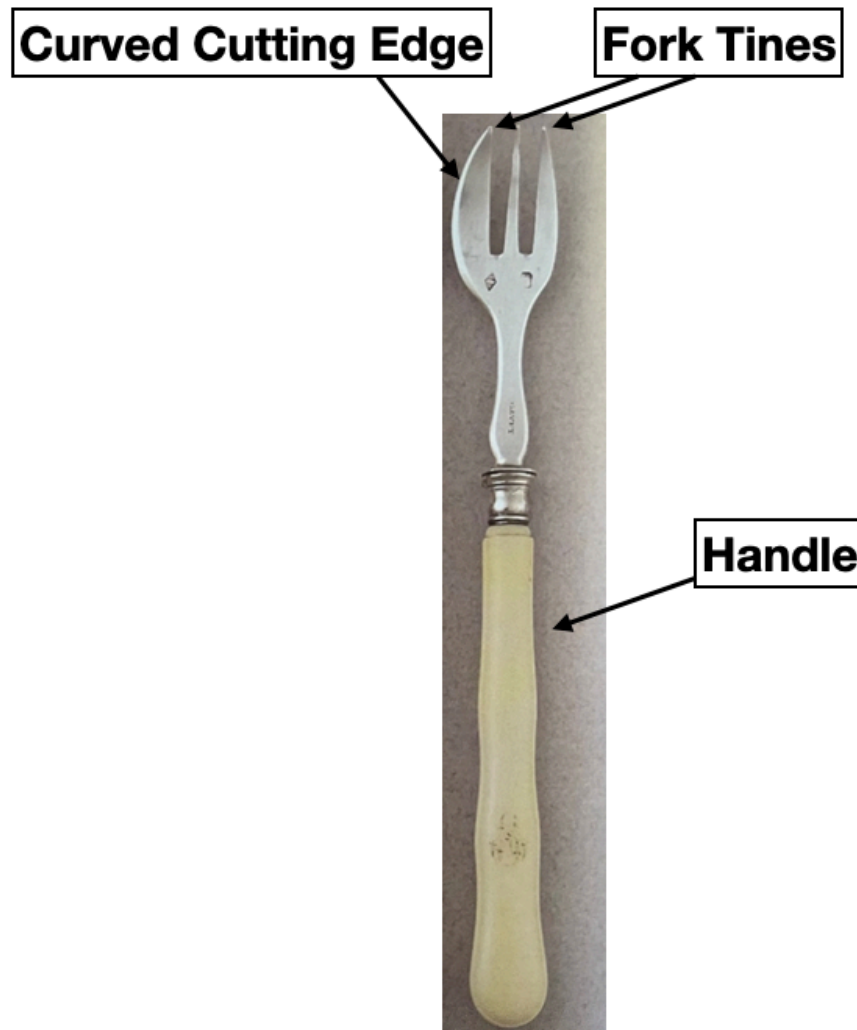


Figure 19. Annotated image of the CFL Fork.¹¹⁵

8. U.S. Patent No. 4,535,538 to Nelson

136. I have reviewed U.S. Patent No. 4,535,538 issued to Nelson (“Nelson”), which was filed on April 10, 1984, and issued on August 20, 1985.¹¹⁶ Nelson was published more than one year prior to the effective filing date of the ’629 Patent, March 11, 2014. I understand that Nelson qualifies as prior art at least under 35 U.S.C. § 102(a)(1) and that none of the exceptions under 35 U.S.C. § 102(b)(1) would apply.

¹¹⁵ Ex. 1010, p. 3.

¹¹⁶ Ex. 1011, Cover.

137. Nelson teaches to the field of combination eating utensils, specifically teaching a claimed invention that functions as a fork, knife, or spoon.¹¹⁷ Nelson states that the claimed invention solves problems present in prior combination eating utensils, e.g., cutting edges “which can cause injury to the mouth when the utensil is used as a fork or spoon.”¹¹⁸

138. The preferred embodiment corresponds to a combination eating utensil with “an elongated handle 12 having a concavo-convex scoop 13 at one end. The scoop 13 has a curved surface forming a basin bowl 14 for retention of food materials. The scoop 13 functions as a spoon. At one end of the scoop 13 are a plurality of tines 16 extending outwardly therefrom. The tines 16 function generally in the manner of a fork.”¹¹⁹ The preferred embodiment also includes a “bevel edge 23” that “can sever food materials upon rocking pressure on the handle 12 [...] but is nonserrated to prevent injury to the mouth of a user.”¹²⁰ The preceding numbered elements are annotated in Figure 20.

139. The preferred embodiment is shown in Figure 20, below, but Nelson states that “various changes, adaptations and modifications may be made therein without departing from the spirit of the invention and the scope of the appended claims.”¹²¹

¹¹⁷ Ex. 1011, 1:6-9.

¹¹⁸ Ex. 1011, 1:19-20.

¹¹⁹ Ex. 1011, 2:22-31.

¹²⁰ Ex. 1011, 2:32-40.

¹²¹ Ex. 1011, 2:63-67.

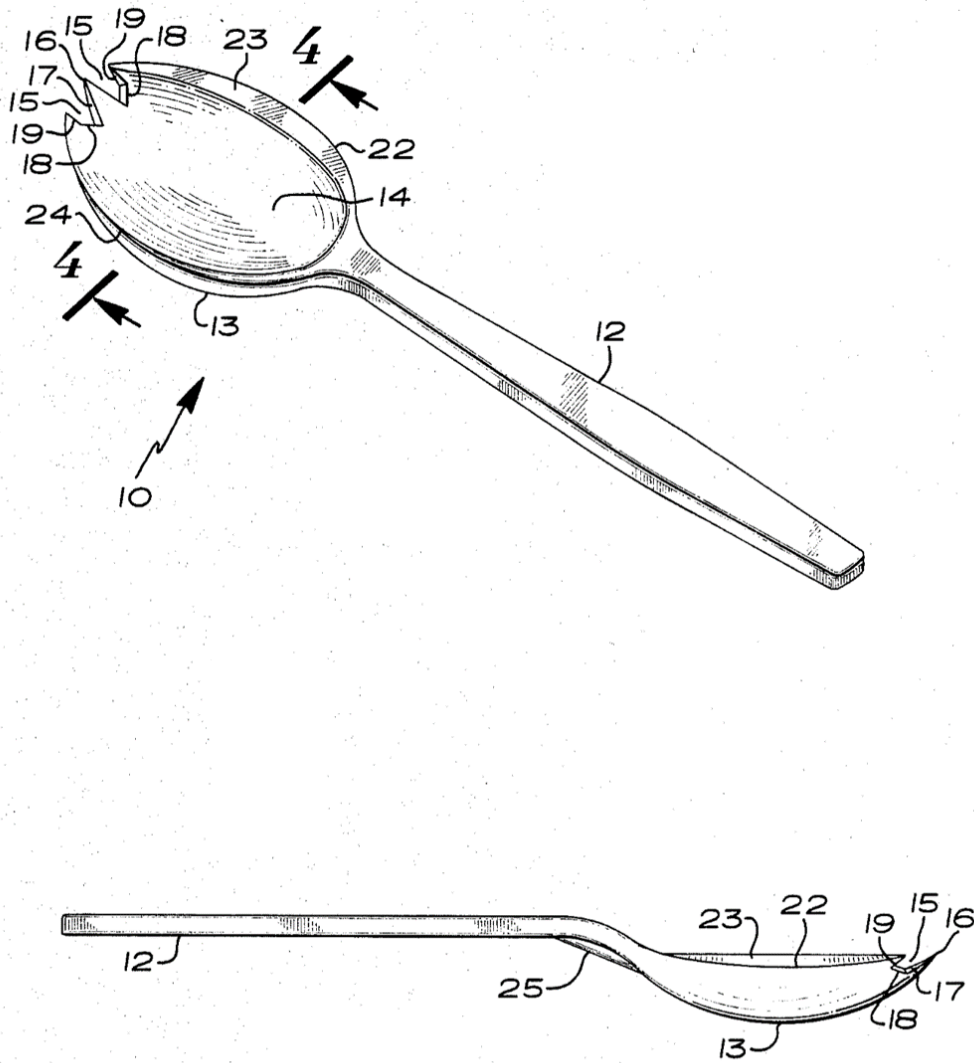


Figure 20. Figure 1 and Figure 2 from Nelson showing a particular view of the preferred embodiment of the claimed invention (top),¹²² and a side view of the preferred embodiment of the claimed invention (bottom).¹²³ The meaning of relevant reference numbers is discussed in the above text.

¹²² Ex. 1011, Figure 1.

¹²³ Ex. 1011, Figure 2.

E. Motivations to Combine

1. Motivation to Combine Feng and Kristiansson

140. In my opinion, as of March 11, 2014, a POSITA would have found it obvious to combine the teachings of Feng and Kristiansson. Both Feng and Kristiansson teach to the fields of combination cutlery (fork, knife, and spoon combined into a single device), specifically with a chamfered knife edge disposed on an outer tine of the fork, *see* Figure 21. In looking to improve Feng, a POSITA would have readily understood that the devices of Kristiansson and Feng are analogous to each other and disclose similar design elements for the same purpose.

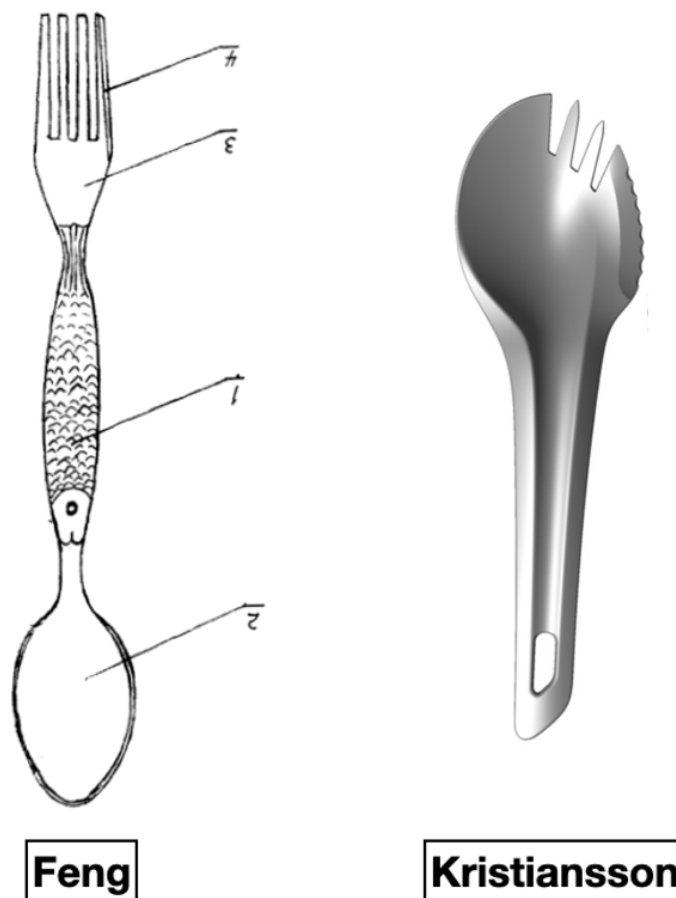


Figure 21. Figures showing the prior art utensils of Feng¹²⁴ as compared to Kristiansson.¹²⁵

141. Kristiansson teaches a more pronounced curved outer edge (and an associated wider outer tine carrying said edge). A POSITA would understand that the design of Kristiansson could be readily incorporated into other multi-use utensils which comprise a chamfered outer fork tine. In view of Feng (which is directed towards a wide audience including, but not limited to, children), a POSITA would understand that the more pronounced curve of Kristiansson (extending to the edge of the tine) would allow for greater rocking motion of the

¹²⁴ Ex. 1004, Drawings.

¹²⁵ Ex. 1005, p. 5.

chamfered edge by a user; thus, improving the splitting and or cutting ability of the utensil while retaining a relatively blunted chamfer edge (so as to avoid injury to the mouths of children). Concomitantly, a POSITA would understand that the wider and more pronounced curved tine of Kristiansson would provide greater load-bearing capability and rigidity compared to the outer tine of Feng during cutting or splitting operations.

142. Both Feng and Kristiansson are relatively simple arrangements of elements with known functions (spoon, fork, and knife), and a POSITA would not encounter any difficulty in incorporating the teachings of Kristiansson into Feng.

2. Motivation to Combine Kent, Vanderputt, and Bo

143. In my opinion, as of March 11, 2014, a POSITA would have found it obvious to combine the teachings of Kent with any one or more of Vanderputt and Bo. Each of Kent, Vanderputt, and Bo teach to the field of combination cutlery (fork, knife, and spoon combined into a single device), specifically with a chamfered knife edge disposed on an outer tine of the fork, *see* Figure 22. In looking to improve Kent, a POSITA would readily understand that the devices of Kent, Vanderputt, and Bo are analogous to each other and disclose similar design elements for the same purpose.

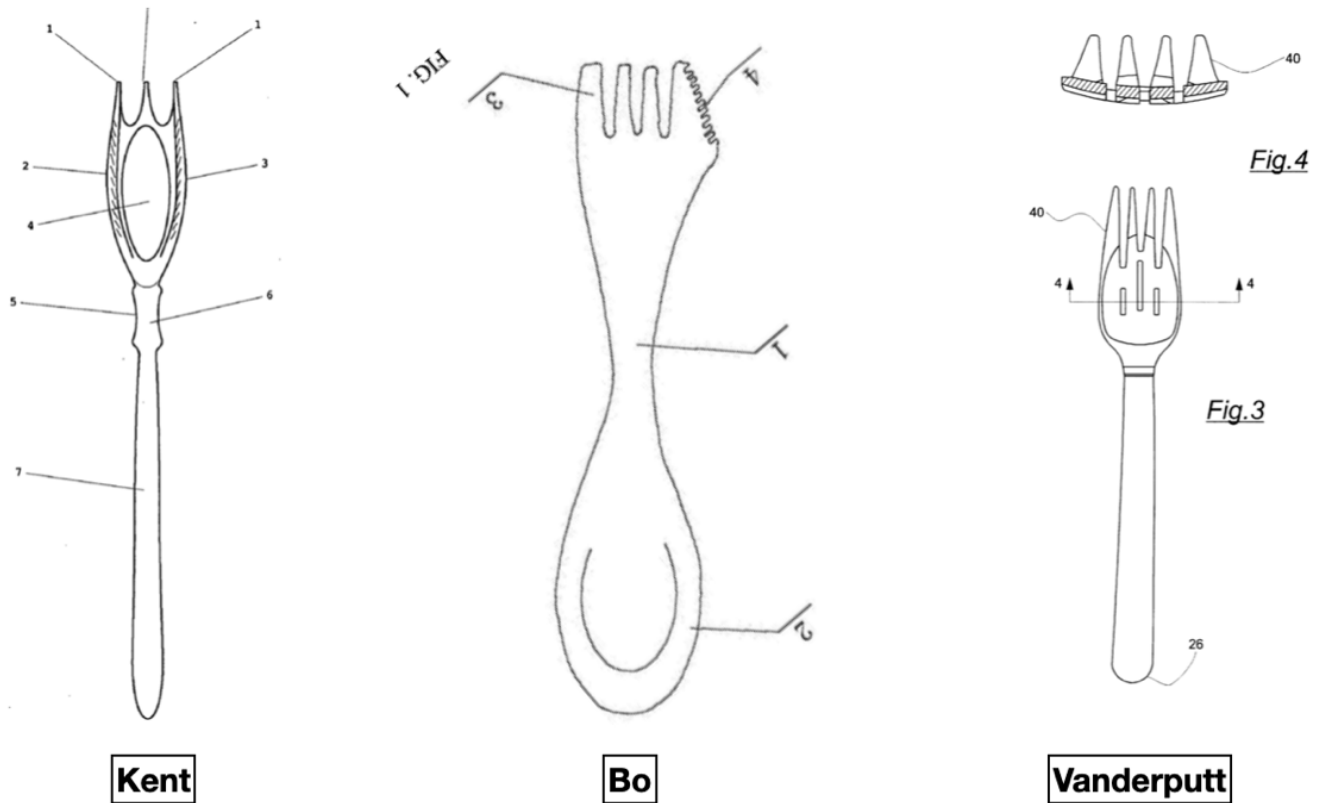


Figure 22. Figures showing the prior art utensils of Kent (left)¹²⁶ as compared to Bo (center)¹²⁷ and Vanderputt (right).¹²⁸

144. Both Kent and Bo disclose combination fork-knife-spoon utensils. In looking to improve Kent, a POSITA would understand that prior art such as Bo discloses alternate means for accomplishing the same overall function (i.e., providing a multi-function single utensil). A POSITA would recognize that the disclosure of Bo wherein a spoon bowl is located at the opposite end of a handle from the fork-knife combination (as opposed to the three utensils being co-located as in Kent) would provide an improved design as it would reduce the risk of a user cutting their mouth while closing their mouth over the spoon surface. A POSITA would also recognize that incorporating a spoon at the opposite end of the handle

¹²⁶ Ex. 1007, Figure 1.

¹²⁷ Ex. 1008, Figure 1.

¹²⁸ Ex. 1006, Figures 3-4.

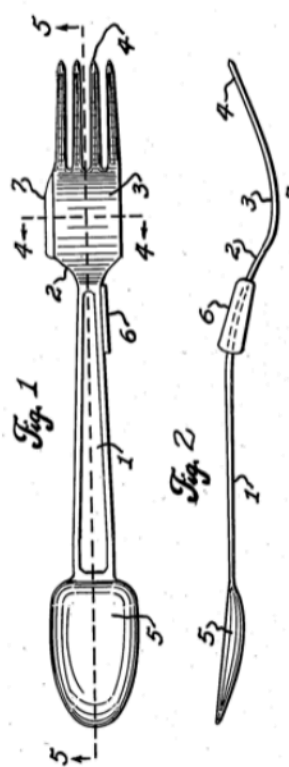
from the fork of Kent, such as taught by Bo, would provide a beneficial single-piece utensil for eating a variety of foods, i.e., the single piece utensil would include dedicated spoon, fork, and knife functionality in a single utensil.

145. Furthermore, a POSITA would also have prior art such as Vanderputt in front of them while seeking to further improve Kent. Vanderputt, as in Kent, discloses a fork head with both outer tines comprising a chamfered knife edge. A POSITA would understand that the design features of Vanderputt (e.g., a plurality of straight-sided inner tines, among others) could be readily incorporated into Kent as a matter of design choice and with a reasonable expectation of success.

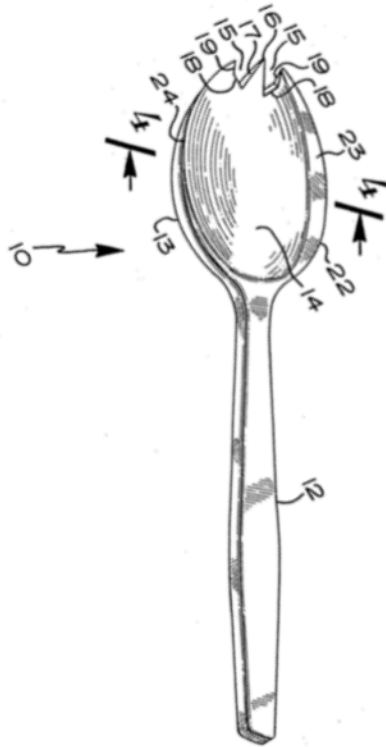
146. Each of Kent, Vanderputt, and Bo are relatively simple arrangements of elements with known functions (spoon, fork, and knife) and a POSITA would not encounter any difficulty in incorporating the teachings of either Bo or Vanderputt into Kent.

3. Motivation to Combine Torode, Nelson, and the CFL Fork

147. In my opinion, as of March 11, 2014, a POSITA would have found it obvious to combine the teachings of Torode with any one or more of Nelson or the CFL Fork. Each of Torode, Nelson, and the CFL Fork teach to the field of combination cutlery (a fork and/or a knife and/or a spoon combined into a single device), specifically with a chamfered knife edge disposed on an outer tine of the fork.



Torode



Nelson



The CFL Fork

Figure 23. Figures showing the prior art utensils of Torode¹²⁹ as compared to Nelson¹³⁰ and the CFL Fork.¹³¹

148. In view of Torode (which is directed towards a wide audience including, but not limited to, children and the handicapped), a POSITA would understand that the more pronounced curved side surface of the CFL Fork (that extends along an entire outer edge of the fork from the fork body to the end of the outer tine) would allow for greater rocking motion of the chamfered edge by a user; thus, improving the splitting and or cutting ability of the utensil while retaining a relatively blunted chamfer edge (so as to avoid injury to the mouth of the user). Further, a POSITA would also recognize that the more concave fork

¹²⁹ Ex. 1009, Figures 1-2.

¹³⁰ Ex. 1011, Figure 1.

¹³¹ Ex. 1010, p. 3.

bowl portion of Nelson incorporated into Torode would aid a user during eating smaller food which could be either scooped or forked.

149. Each of Torode, Nelson, and the CFL Fork are relatively simple arrangements of elements with known functions (spoon, fork, and knife), and a POSITA would not encounter any difficulty in incorporating the teachings of either the CFL Fork or Nelson into Torode.

F. Opinions Regarding Claim Construction

150. I am instructed by counsel for Industrial Revolution that independent claims 1, 8, 9, and 15 of the '629 Patent, in addition to dependent claims 2-7, 10-14, and 16-23 are being challenged by Industrial Revolution in its petition.

151. I am instructed by counsel for Industrial Revolution that claim terms are to be construed according to their ordinary and customary meaning to one of ordinary skill in the art before the effective filing date of the claimed invention in light of the disclosures in the patent and the prosecution history.

152. I have applied the meaning of the claim terms of the '629 Patent that is generally consistent with the plain and ordinary meaning of these terms as would be understood by a POSITA before the effective filing date of the claimed invention in light of the disclosures in the patent and the prosecution history.

G. Claims 1- 23 of the '629 Patent are Obvious over Feng

1. Claim 1

1[preamble] An eating utensil comprising

153. Feng discloses an eating utensil: “[t]he present utility model discloses a silverware that combines a knife, a fork, and a spoon [...]”¹³² Thus, Feng discloses this element.

1[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

154. Feng discloses a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines, *see*, e.g., Figure 25, below.

1[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer, the chamfer coupling the fork front surface with the curved side surface,

155. The figure of Feng is not drawn in such a way to allow for a POSITA to determine whether Feng discloses a concave fork bowl portion or not; however, Feng illustrates curvature at the connection between the fork and the handle that is consistent with a concave fork bowl portion. It was also known in the art as of the effective date of the ’629 Patent to make eating forks with curved fork bowls so as to allow for scooping material, as well as securing it with the tines of a fork.

156. For example, in recounting the history of the fork, the California Academy of Sciences states:

“In late 17th Century France, larger forks with four curved tines were developed. The additional tines made diners less likely to drop food, and the curved tines served as a scoop so people did not have to constantly switch to a spoon while eating.”¹³³

157. Accordingly, it was well known in the art to have a curved fork bowl in a fork. Figure 24 provides further examples from the prior art that include

¹³² Ex. 1004, Abstract.

¹³³ <https://research.calacademy.org/research/anthropology/utensil/forks.htm>.

utensils with concave fork bowl portions, thereby demonstrating that a concave fork bowl portion was well within the knowledge of a POSITA.

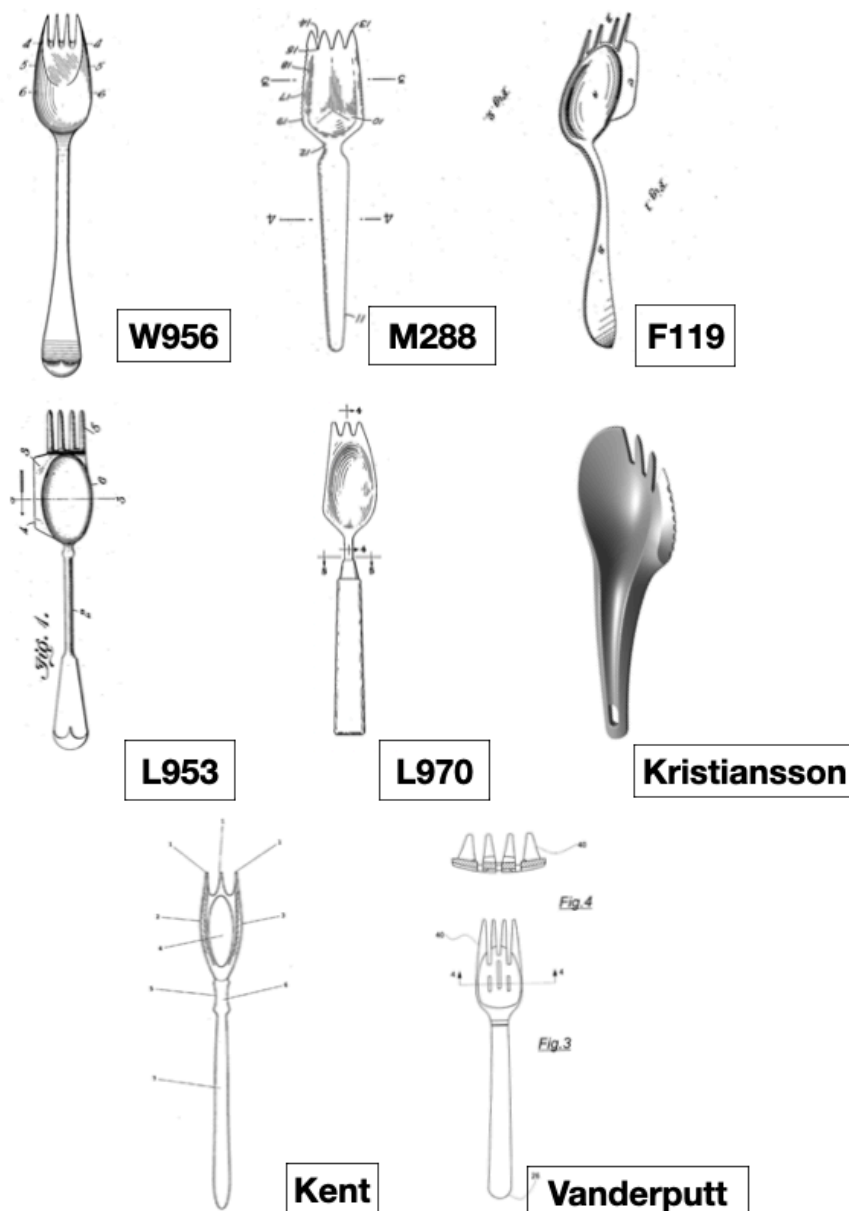


Figure 24. Figures showing prior art utensils with concave fork bowl portions. Patent numbers corresponding to these abbreviations can be found in Table 1.

158. Therefore, to the extent that Feng does not disclose a concave fork bowl portion, a POSITA would have found it obvious to add concavity to the fork

portion to increase the ability of the fork portion to retain food. Thus, in the alternative, it would be obvious to a POSITA to modify Feng to include a concave fork bowl based on concave fork bowls generally being known and the associated advantages provided thereby.

159. Feng discloses an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer; the chamfer further coupling the fork front surface with the curved side surface. As can be seen in Figure 25, the figure of Feng shows an outer tine and a fork bowl portion comprising a chamfered edge surface; Feng refers to this surface as a blade and discloses: “one or two sides of the fork head are formed with a blade 4, thereby forming the silverware.”¹³⁴ A POSITA would understand that a non-zero width surface must extend from the side of the fork; thus, a POSITA would understand Feng to have a side surface. Additionally, as can also be seen in Figure 25, the side surface of Feng is curved with the curved side coupled to the chamfered edge and, therefore, coupling the fork front surface to the curved side surface.

¹³⁴ Ex. 1004, Claim 1.

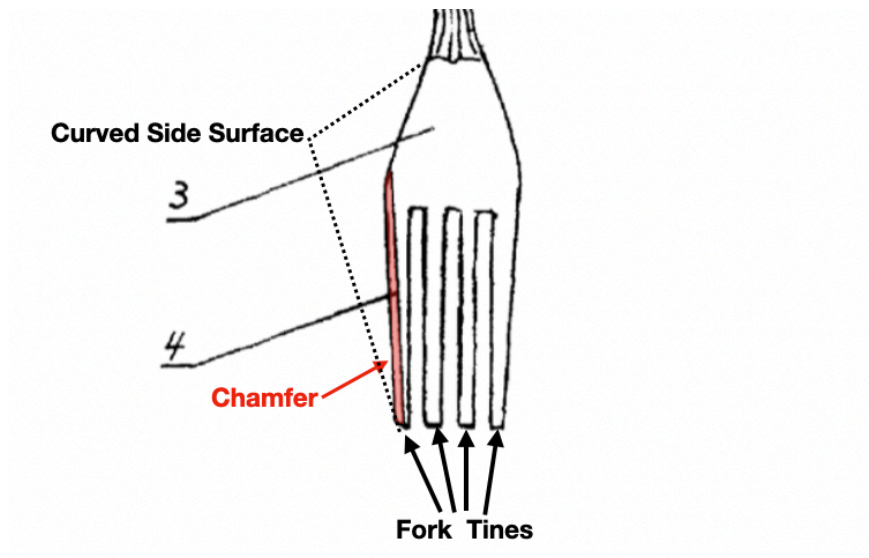


Figure 25. The figure of Feng annotated to show the chamfer and curved side surface of Feng.

160. Common dictionary definitions of “chamfer” include:

“a cut on the edge or corner of something that makes it slope slightly rather than being perfectly square.”¹³⁵

and

“An edge machined at an angle, typically 45°. See also BEVEL.”¹³⁶

161. While the ’629 Patent specification refers to “tapered or chamfered outer edges,”¹³⁷ the specification does not disclose that the angle of the chamfer is limited to 45°, specifically teaching: “[i]n a particular embodiment, the outer edges 145 are chamfered at an angle of about 20-25 degrees, and preferably at an angle of about 23 degrees.”¹³⁸ The ’629 Patent further teaches that: “[i]n addition to

¹³⁵ <https://dictionary.cambridge.org/us/dictionary/english/chamfer>, last accessed 06/23/23.

¹³⁶ Dictionary of Mechanical Engineering, Oxford University Press, 2nd Edition, 2019 : Chamfer.

¹³⁷ See, e.g., Ex. 1001, 3:52.

¹³⁸ Ex. 1001,4:4-6.

being curved, the outer edges 145 of the outer tines 144 are also tapered or chamfered such that the fork 140 can be used to cut through or separate foods that do not require a knife.”¹³⁹

162. Accordingly, a POSITA would understand that the chamfer disclosed by the '629 Patent encompasses a range of bevel angles so long as the chamfered edge results in a surface able to provide cutting or separating of foods. Therefore, a POSITA would recognize the knife edge 4 of Feng as a chamfer as disclosed in the '629 Patent.

163. Furthermore, it was well known in the art as of the effective filing date of the '629 Patent to provide a beveled cutting or splitting feature to the curved side of a fork tine, *see* Figure 26, below. A POSITA would have realized the utility of adding a cutting edge to the side of a fork to provide for the ability to both cut and secure/spear food using only a single hand or instrument. Further, a POSITA would have known that making the cutting side of a fork tine curved would allow a user to rock back and forth on the edge to promote cutting.^{140,141}

164. To the extent that it is determined that a chamfer as disclosed in the '629 Patent requires a blunted cutting edge, a POSITA would have recognized that Feng teaches towards the use of a blunted edge as Feng discloses that its invention is directed towards “children in kindergartens.”¹⁴² Accordingly, in view of this teaching of Feng, a POSITA would know to use a blunted edge for the disclosed knife edge 4 of Feng so that the resulting utensil is safe for use with children in kindergartens.

¹³⁹ Ex. 1001, 3:49-52.

¹⁴⁰ *See, e.g.*, Ex. 1011, 1:58-61.

¹⁴¹ *See, e.g.*, Ex. 1011, 2:35-42.

¹⁴² Ex. 1004, Abstract.

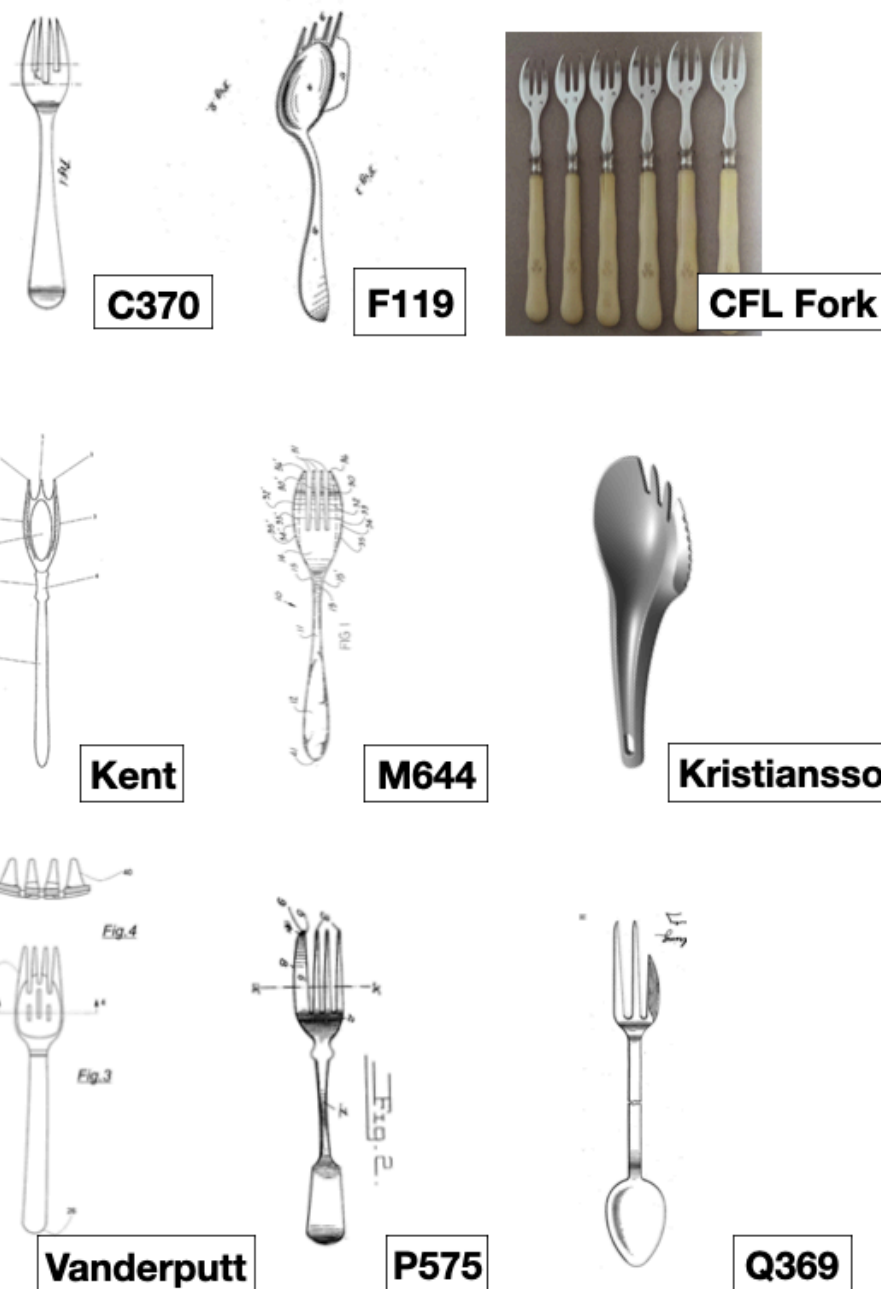


Figure 26. Figures showing prior art utensils with cutting surfaces coupled to curved side surfaces on the fork tines. Patent numbers corresponding to these abbreviations can be found in Table 1.

1[c] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the chamfer and the curved side surface defines a curved splitting feature;

165. As can be seen in Figure 25, Feng discloses a knife edge (chamfer) formed on the side of one of the tines, coupled to what a POSITA would understand to be a side surface of the fork, the side surface being coupled to the back surface. A POSITA would understand that the coupling between a knife surface and a side surface would represent a splitting or cutting feature in the sense that the resulting combination is able to cut foods.

166. Feng also teaches a device that is directed towards children: “The present utility model is suitable for use in situations such as traveling, picnics, and the like, and can also be used for group dining of children in kindergartens.”¹⁴³ Accordingly, a POSITA would realize that the disclosed knife edge of Feng would not be particularly sharp and is therefore oblique. If the angle between the knife edge and the side surface was 90° (i.e., not oblique), as in Figure 27, below, the resulting knife edge would be sharp and not suitable for use with children, in direct contrast to the teachings of Feng. In view of the above, I conclude that Feng discloses or suggests a chamfer that is oblique to a curved side surface of a fork.

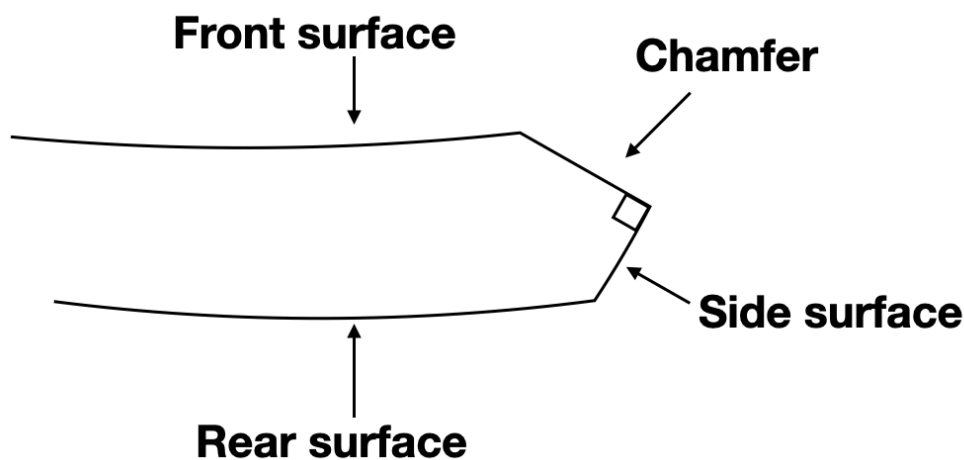


Figure 27. A cross-sectional view of a fork front surface with a chamfer coupling the front surface to a side surface, the side surface further coupling the chamfer to the rear surface. A non-oblique angle (90°) would result in a relatively sharp knife edge not suitable for child products as Feng is directed towards.

¹⁴³ Ex. 1004, Abstract.

1[d] a spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface,

167. As shown in Figure 28, Feng discloses a spoon head coupled to the handle: “two ends of a handle are respectively provided with a fork head and a spoon head [...]”¹⁴⁴ A POSITA would understand that a spoon has a front and back surface as well as an intervening side surface between front and back surfaces. A POSITA would recognize the raised portion of the drawing of the spoon in Feng as the spoon lip which delimits the side surface, highlighted in red in Figure 28.

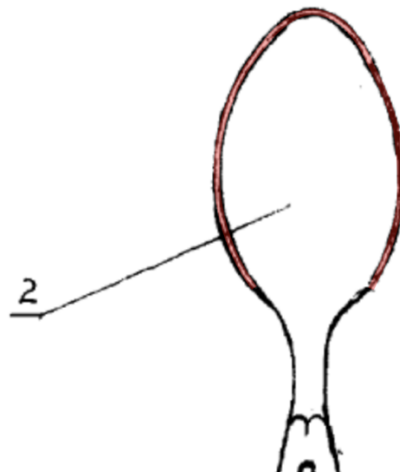


Figure 28. An annotated figure from Feng showing spoon head (2) coupled to the handle of Feng. The lip bordering the side surface of Feng is highlighted in red.

1[e] the spoon front surface, the spoon back surface, and the spoon side surface partially defining a concave spoon bowl portion, the spoon bowl portion facing a same way as the concave fork bowl portion;

168. A POSITA would understand that spoons include concave bowl portions defined by the front, side, and back surfaces and would recognize that, by

¹⁴⁴ Ex. 1004, Description.

simply disclosing a spoon, Feng discloses a concave bowl portion, *see* Figure 29, below.

169. A POSITA would also recognize from the drawing of Feng that Feng teaches a spoon bowl portion facing the same direction as the fork bowl portion of Feng (both bowl portions are facing the viewer in the figure of Feng).

170. That the lip of the spoon bowl of Feng is clearly visible (e.g., *see* Figure 28) indicates that the spoon bowl is facing upward. This can be seen by comparing what similar, typical spoon heads look like from the front and from the back. Shown in Figure 29, below, are photographs taken of a normal kitchen spoon from both facing the bowl portion (left in Figure 29) and facing the back of the spoon (right in Figure 29). The similarities between the drawing of Feng and the photograph taken from the front of the spoon are obvious and include that the lip is clearly visible in both Feng and the left photograph; additionally, in the left photograph, the lip of the spoon runs underneath the spoon handle at the neck of the spoon, which is also seen in the drawing of Feng. Neither of these features are seen in the photograph taken of the rear face of the spoon (right in Figure 29). Accordingly, based on their common knowledge of how the front surfaces of spoons appear, a POSITA would recognize the figure of Feng as disclosing a spoon bowl portion facing towards the viewer. This is the same direction as a POSITA would assume that the fork bowl portion is facing given the disclosure about the knife edge 4 visible in the figure of Feng.

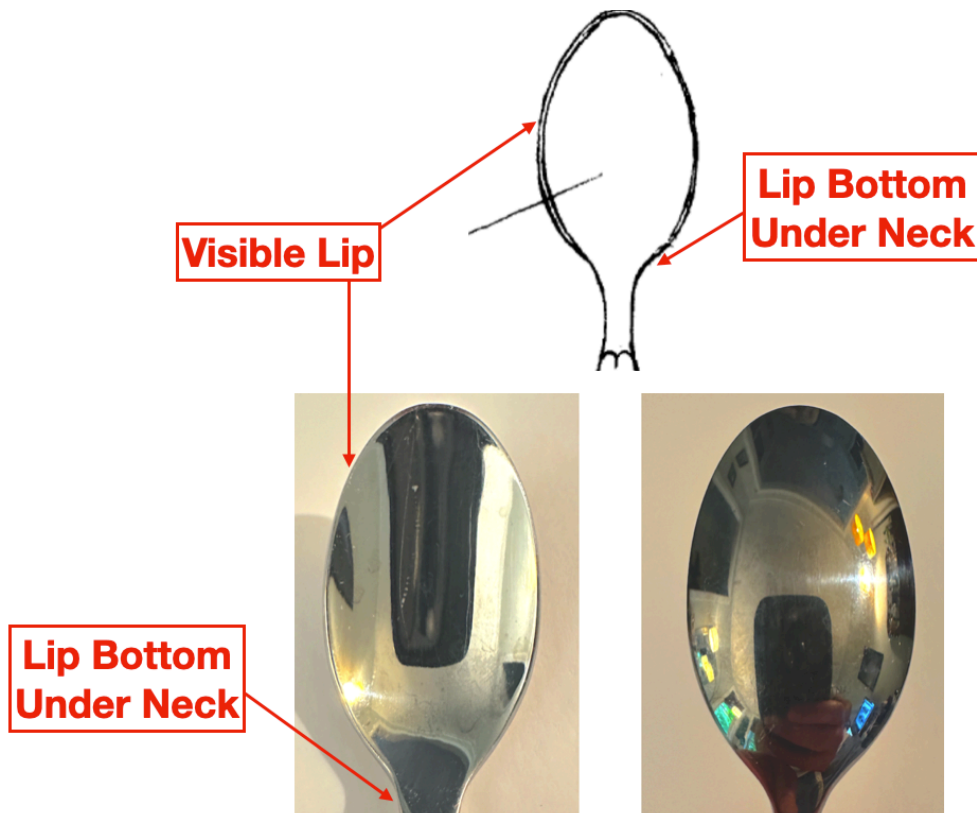


Figure 29. The figure of Feng as compared to photographs taken of a common kitchen spoon from the front side (left) and rear side (right) of the spoon bowl portion. As discussed in the text, this comparison would lead a POSITA to understand that the figure of Feng discloses a spoon bowl portion facing upwards, the same direction as the fork bowl portion.

171. The '629 Patent teaches an alleged benefit to having the fork and spoon bowl face the same direction: “With the spoon head 112 and the fork head 141 oriented the same way, the fork head 141 does not get in the way of the user’s hand when the combination utensil is being used as a spoon and when the combination utensil is being used as a fork, the spoon head 112 does not get in the way of the user’s hand.”¹⁴⁵ However, the '629 Patent provides no further detail on why this would be the case. In my opinion, the justification provided by the '629 Patent for a specific benefit to having the spoon and fork heads face the same direction is lacking; for example, in my experience, there is no benefit to a user in

¹⁴⁵ Ex. 1001, 9:27-32.

terms of the implement elements “getting in the way” of a user’s hand which would not exist with, e.g., the fork and spoon bowls facing opposite directions.

172. Accordingly, to the extent that Feng does not show the fork and spoon bowl portions facing the same direction, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success.

173. Configuring a combination utensil with fork and spoon bowl portions disposed on opposite ends of a handle was well-known and said portions facing the same direction was also known within the art, as shown, e.g., in Figure 30, below.

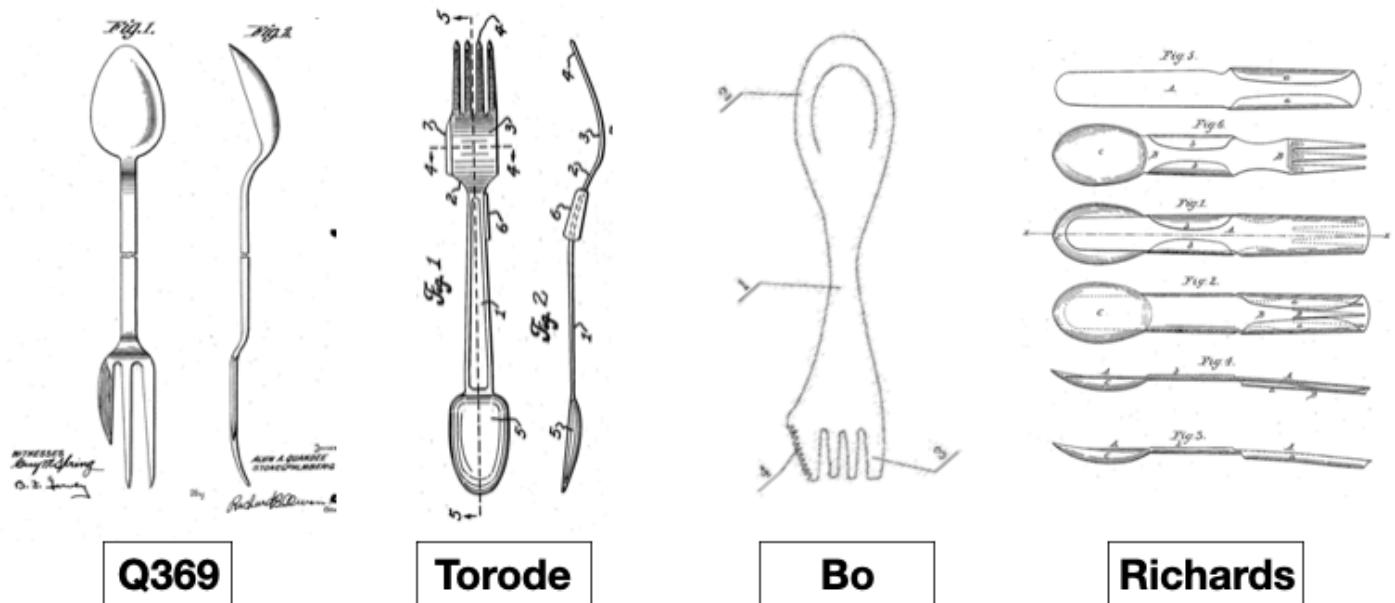


Figure 30. Various combination prior art utensils which have fork and spoon heads disposed on opposite ends of a handle, several of which (i.e., at least Torode and Richards) are configured with the fork and spoon bowl portions facing the same direction.

1[f] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

174. Feng discloses the handle coupling the spoon head to the fork head of Claim 1[f]: “The specific construction of the present utility model is as follows: a three-purpose silverware, characterized in that one end of a handle 1 is installed with a spoon head 2, the other end thereof is installed with a fork head 3, and one or two sides of the fork head 3 are formed with a blade 4.”¹⁴⁶

175. A POSITA would understand that the handle of Feng would necessarily require a front and back surface with a side surface providing coupling between these two.

1[g] the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil;

1[h] the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil; and

1[i] the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.

176. Claim elements 1[g]-1[i] can be analyzed simultaneously.

177. As described above, Feng discloses a combination utensil (*see* ¶153) that is a single piece and a POSITA would understand that such a construction necessarily includes respective front, back, and side surfaces of a fork, handle, and spoon that collectively define single front, back, and side surfaces of the combination utensil. Thus, Feng discloses this element. To the extent that Feng does not disclose fork and spoon bowl portions facing the same direction, a POSITA would view modifying Feng to be so configured as one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success.

¹⁴⁶ Ex. 1004, Description.

178. To the extent a modification of Feng is needed for the fork and spoon bowl portions facing the same way, a POSITA would recognize that the resulting fork front surface, the spoon front surface, and the handle front surface would collectively define a single front surface of the utensil and that the fork back surface, the spoon surface, and the handle back surface would collectively define a single back surface of the utensil. Furthermore, a POSITA would recognize that, Feng alone (even without the potential modification of changing the directions of the fork or spoon bowl portions) would have a single side surface defined by the side surface of each of the fork, spoon, and handle collectively.

179. Accordingly, for at least the above reasons, the elements of Claim 1 of the '629 Patent are disclosed by or would have been obvious over Feng.

2. Claim 2

An eating utensil as recited in claim 1, wherein inner ones of the plurality of tines each has a pair of substantially straight side edges and a pointed distal tip.

180. As can be seen in, e.g., Figure 25, at least one of the inner tines of Feng has substantially straight side edges and the ends of the tines in Feng are pointed, at least at the corners of the ends of the tines. Thus, Feng discloses the limitations of this claim. To the extent that the tines of Feng do not have pointed distal tips, modifying Feng so as to include pointed fork tines would have been an obvious modification (*see* ¶83: “it is old and well known in the art of fork tines to incorporate pointed tips”). The tine ends of Feng could be molded into rounded tips so as to both improve the ability of Feng to spear and secure food, as well as keeping with the taught application of Feng to provide utensils for young children.

181. Such a modification of Feng would have been an obvious improvement achieved by applying a known technique; for example, it was widely

known at the time of the '629 Patent filing to use pointed tips on the ends of forks, *see* Figure 31. Thus, this claim would be obvious over Feng.

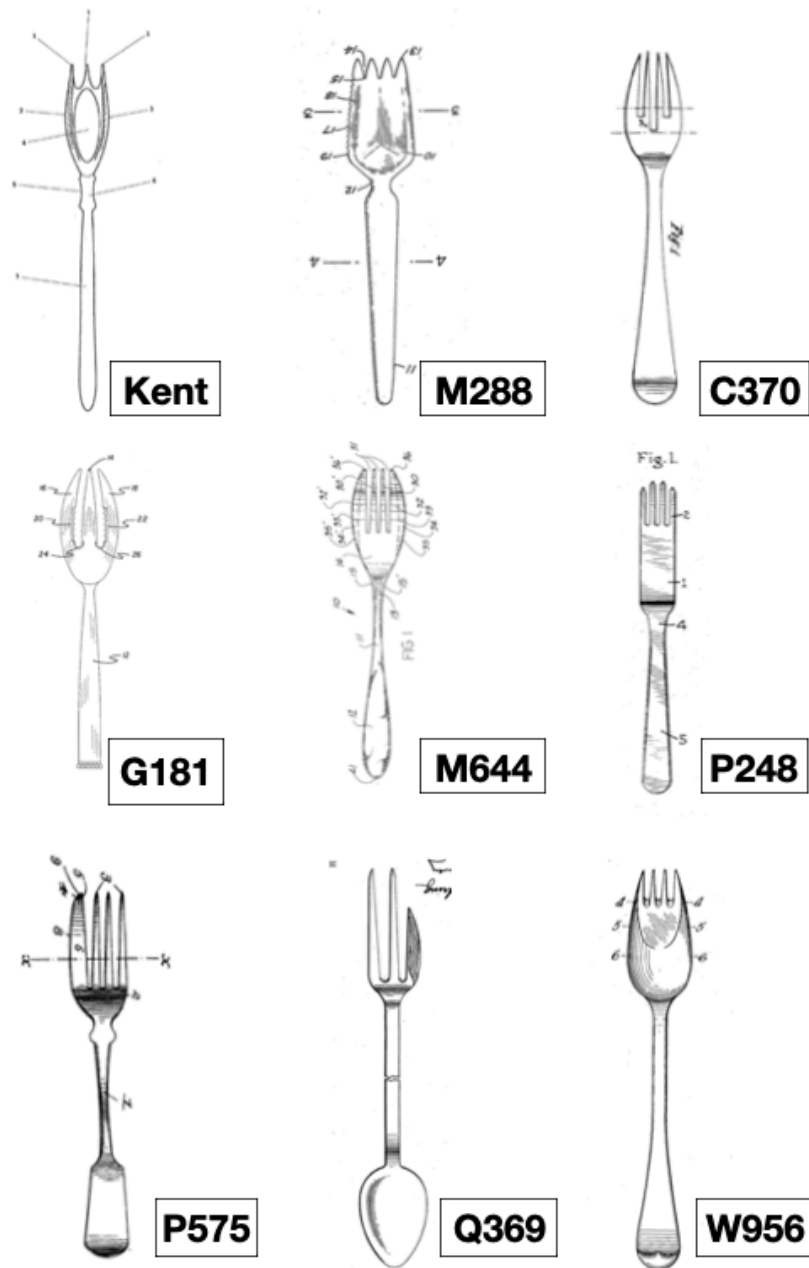


Figure 31. Figures showing prior art fork tines with pointed distal ends. Patent numbers corresponding to these abbreviations can be found in Table 1.

3. Claim 3

An eating utensil as recited in claim 2, wherein the outer one of the tines has a wider base end than the inner ones of the tines.

182. The specification of the '629 Patent does not teach any benefit (either functional or aesthetic) to having at least one of the outer tines having a wider base end than the “inner ones” of the tines. However, as can be seen in Figure 32, both of the outer tines of Feng have a wider base than at least one of the inner tines. To the extent that Claim 3 requires the outer one of the tines to have a wider base than *each* of the inner ones of the tines, it would have been obvious to a POSITA to make the outer tine containing the knife edge (“the knife tine”) of Feng to have a relatively wider base than the rest of the tines so as to allow for enough structural support of the knife tine during cutting or splitting operations.

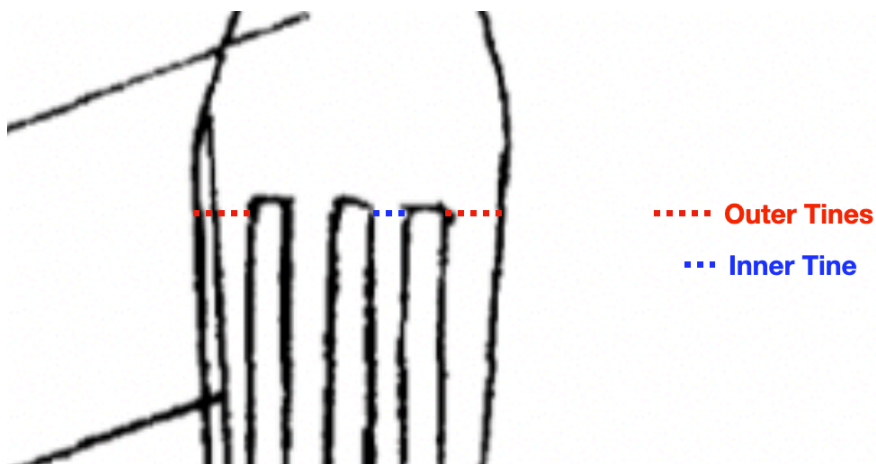


Figure 32. An annotated and zoomed in version of the figure from Feng showing the inner tine width (blue) as smaller than each of the outer tine widths.

183. Such a modification of Feng would have been an obvious improvement resulting in a stronger knife tine less likely to bend or break during

cutting operations and would have been achieved by applying a known technique; for example, it was widely known at the time of the '629 Patent filing to incorporate a wider base on the tine with the knife edge, *see* Figure 33. Thus, this claim is disclosed by, or rendered obvious over Feng.

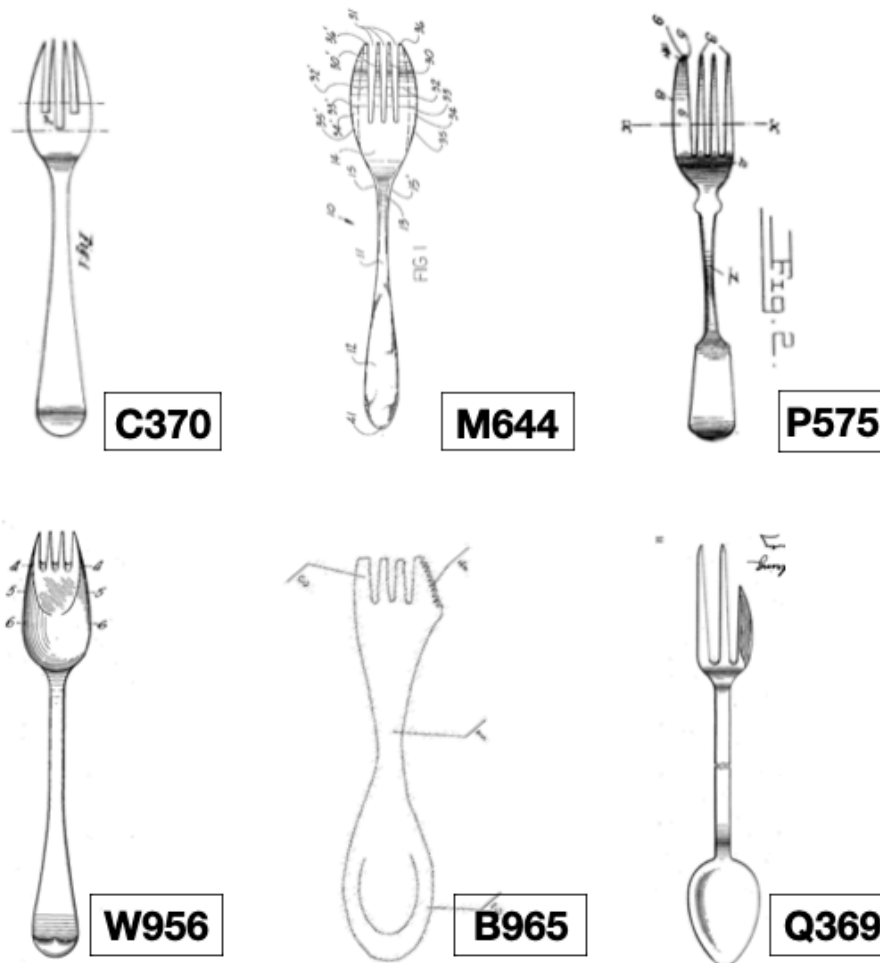


Figure 33. Figures showing prior art fork-knife combination utensils with the knife tine having a wider base than the inner tines as would have been obvious to provide structural support during cutting. Patent numbers corresponding to these abbreviations can be found in Table 1.

4. Claim 4

4[preamble] An eating utensil as recited in claim 1,

184. As shown above, each and every limitation of Claim 1 of the '629 Patent is disclosed by or would have been obvious over Feng.

4[a] wherein the concave spoon bowl portion is further defined by at least three substantially flat side edges with rounded corners connecting the flat side edges,

185. The specification of the '629 Patent provides very little guidance as to what is meant by “a plurality of substantially flat side edges,” only teaching: “the bowl 212 of the spoon 220 has a substantially flat side edge 218 and end edge 218b, which allows for ‘scraping’ food from a container (e.g., a yogurt container) or a bowl.”¹⁴⁷

186. However, based on the drawings and the specification text of the '629 Patent, it is unclear which side edges of the '629 Patent are taught to be “substantially flat” nor which direction in which the edges are meant to be flat. In other words, the side edge of the disclosed spoon could be flat along either 1) the side edge from the top surface to the bottom surface of the spoon, or 2) the side edge from the handle to the tip of the spoon, *see* Figure 34; it is not entirely clear from the figures of the '629 Patent which one is being taught.

¹⁴⁷ Ex. 1001, 10:21-24.

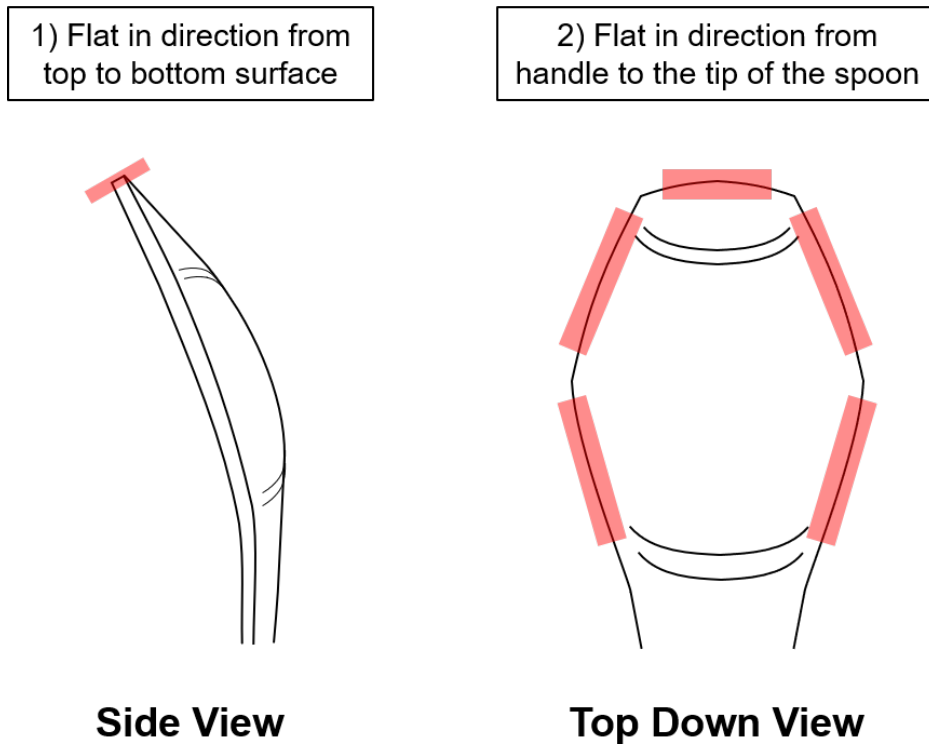


Figure 34. Illustrative schematic showing the two ways to interpret “substantially flat” in the context of Claim 4 of the ’629 Patent. Note that this figure is intended as an illustrative schematic only and is not necessarily representative of the claimed invention of the ’629 patent or any prior art references.

187. For example, the ’629 Patent teaches: “As illustrated, the side edge 118 and front edge 118b of the bowl 112 of the spoon 110 is substantially flat [...]”.¹⁴⁸ Several views of the claimed edges are shown in Figure 35, below.

188. With regard to the options for which direction the edges 118 and 118b are taught to be substantially flat in, Figure 35 shows the side edges 118b to be generally curved from the top surface of the spoon surface direction. Accordingly, the patent specification appears to infer that the edges 118 are substantially flat in a direction from the handle to the tip of the spoon, and end edges 118b are

¹⁴⁸ Ex. 1001, 5:35-38.

substantially flat from one side of the spoon to the other, as in the right image of Figure 34, above.

189. However, as can be seen in the drawings presented in Figure 35, below, a POSITA would understand “substantially flat” to be interpreted rather liberally. For example, while the side edges 118 have some lengths from the handle to the tip of the spoon which could be considered flat, the front or end edge side 118b has nearly no aspects of it which would be considered flat except for a very small part in the middle of the front or end edge (i.e., the front or end edge may arguably contain a very small locally flat section).

190. Accordingly, to the extent that edge 118b is taught to be substantially flat, the side edges of Feng would also be considered to be substantially flat as they each contain locally flat sections, as shown in Figure 36, below.

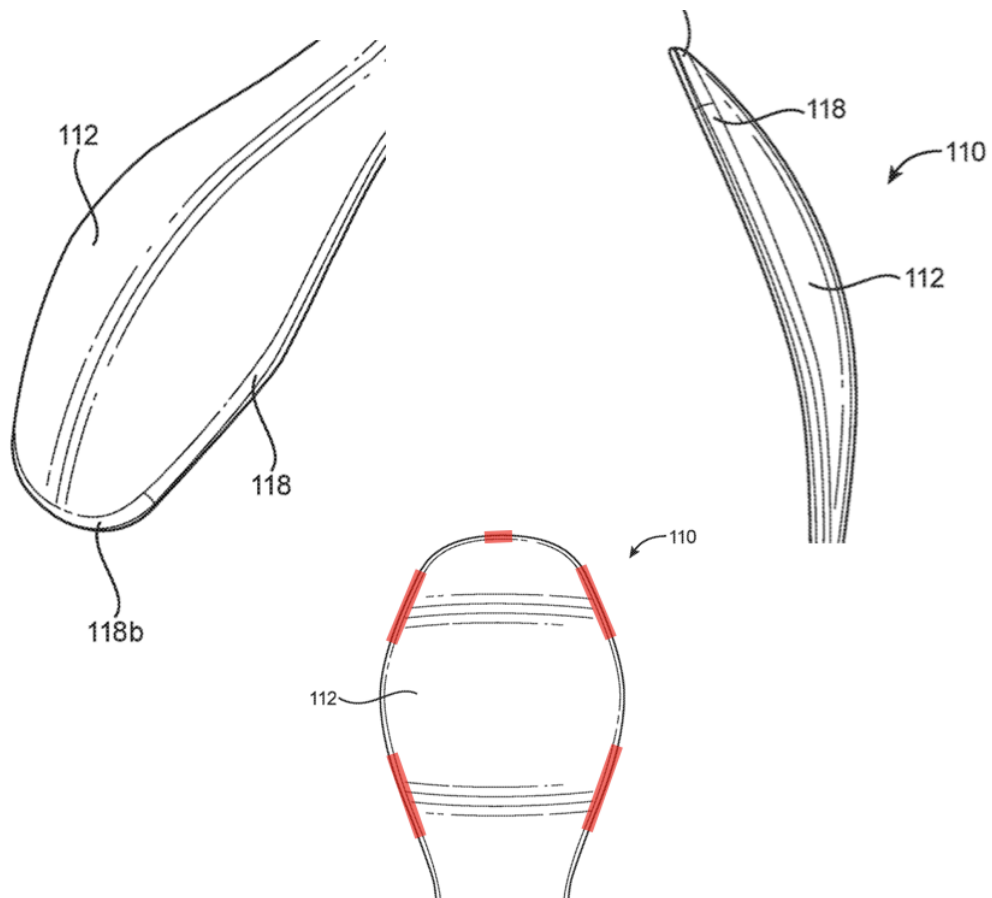


Figure 35. Figures from the '629 Patent showing the edges 118 and 118b as they are taught to be "substantially flat." The sections of said edges which are locally flat are highlighted in red.

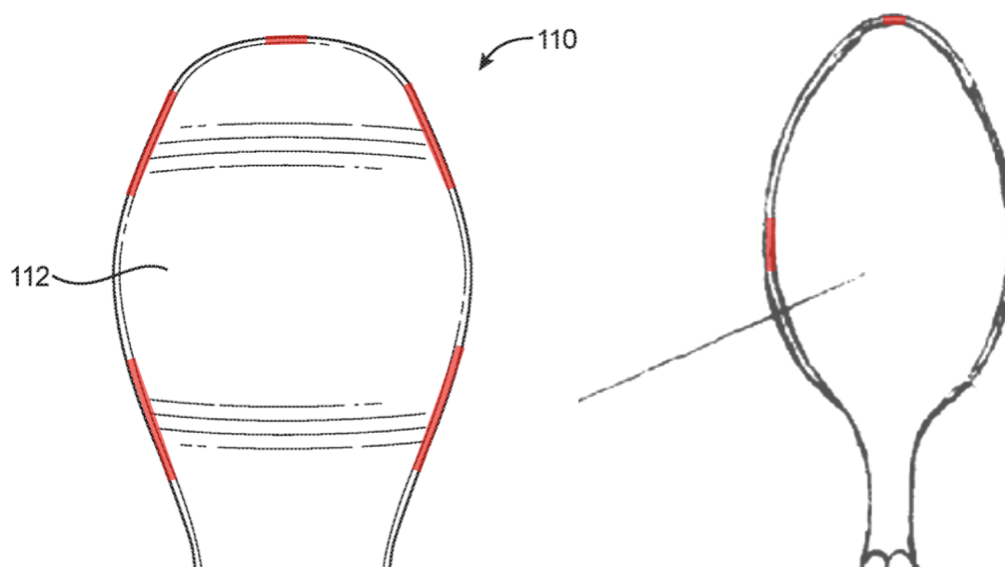


Figure 36. The locally flat side and front edges of the '629 Patent and Feng (red highlights, left and right respectively). To the extent that “substantially flat” is interpreted as containing locally flat sections, Feng would also disclose substantially flat side and front edges.

191. Alternatively, to the extent that the “substantially flat” limitation is determined to represent a characteristic of the side and front edges which Feng does not read on, the '629 Patent specification provides no justification for this alleged benefit, i.e., the patent does not explain why, exactly, a “substantially straight side edge” would “allow” scraping food from the side of a container; nor why three edges specifically would provide a benefit not accomplished by some other number.

192. Based on my experience with the use of utensils to eat from a variety of containers, I am not aware of any reason that the “substantially flat side edges” of the claimed invention would “allow” scraping as opposed to, e.g., the side edges of the concave spoon bowl being curved and not flat. Furthermore, to the extent that the '629 Patent specification is meant to suggest that flat side edges would provide a more complete mating with the interior of a container for “scraping,” this would only be the case when the overall curvature of the flat side edge is

substantially matched to the interior surface of the container. This matching is certainly not claimed nor discussed within the '629 Patent nor would such a teaching be feasible to accomplish for every conceivable eating container given the variance in eating container shapes generally.

193. Accordingly, a POSITA would understand that having a plurality of (specifically at least three) substantially flat side edges would be one of a number of possible configurations from which they could choose based purely on design considerations. Thus, to the extent that Feng does not show a concave spoon bowl portion defined by three substantially flat side edges, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success.

4[b] wherein one of the flat side edges further defines the single side surface of the utensil.

194. As discussed previously, Feng discloses an intervening side surface between front and back surfaces of the concave spoon bowl portion, *see* Figure 28. This side surface similarly intervenes between front and back surfaces of the concave fork bowl portion and handle coupling the spoon and concave fork bowl portions, and accordingly, defines the single side surface of the utensil.

195. To the extent that Feng does not disclose “substantially flat side edges,” modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success as discussed in relation to limitation 4[a]. By incorporating the design choice in Claim 4[a], the modified version of Feng would also necessarily then practice the limitations of Claim 4[b] because the connection between the handle and spoon side surface is a continuous surface that assists in defining the single side surface of the combination utensil of Feng.

196. Accordingly, for at least the reasons above, each and every limitation of Claim 4 of the '629 Patent is disclosed by or would have been obvious over Feng.

5. Claim 5

5[preamble] An eating utensil as recited in claim 1,

197. As shown above, each and every limitation of Claim 1 of the '629 Patent is disclosed by or would have been obvious over Feng.

5[a] wherein the concave spoon bowl portion is tilted at a first angle relative to the handle front surface and

5[b] the concave fork bowl portion is tilted at a second angle relative to the handle front surface

198. The limitations of Claims 5[a] and 5[b] (i.e., the fork and spoon bowls being tilted with respect to the handle front surface) are not described in the specification of the '629 Patent. Accordingly, a POSITA would be left to assume that the “tilting” is the result of both the fork and spoons having concave bowls.

199. In addition, every fork with a concave head and every spoon includes at least a portion of the concave head and spoon at a non-zero angle relative to the handle. To the extent that the figure of Feng does not expressly inform a POSITA as to whether Feng teaches concave fork and spoon bowl portions and the angle of said portions relative to the handle, a POSITA would have assumed that they were concave as making the fork and spoon bowl portions concave was the most common design at the time of the '629 Patent filing and was widely known in the art. The angle of the respective bowl portions of the modified utensil of Feng relative to the handle would be well within the knowledge of a POSITA (*see* examples in section IV.B.1) and could be selected according to design

considerations. To the extent that these concave fork and bowl portions are required to be tilted at two different angles with respect to the handle, such a feature would be purely aesthetic and not offer any specific functional value whatsoever.

5[c] such that at least a portion of each of the bowl portions extend forward from the handle front surface.

200. Similar to the tilting limitations above, the '629 Patent discloses little guidance regarding limitation 5[c] which requires at least a portion of each of the fork and spoon bowl portions extend forward from the handle front surface.

201. That notwithstanding, the '629 Patent discloses that the recited utensil of the claimed invention has a “substantially wide U-shaped configuration” and teaches: “the combination spoon and fork system 100 has a substantially wide U-shaped configuration, as shown in FIG. 6D. It will be appreciated that the U-shaped configuration is comfortable for a user to hold and manipulate.”¹⁴⁹ However, the '629 Patent specification provides no justification for this statement, i.e., the patent does not explain why, exactly, a wide U-shaped configuration would be more comfortable for a user to manipulate relative to other configurations. Based on my experience with eating utensils in a variety of contexts, I am not aware of any reason that the overall U-shaped configuration of the claimed invention would be considered easier to use than if, e.g., the bowl portions of the fork and spoon did not extend forward at all from the front surface of the handle.

202. Accordingly, a POSITA would not recognize any utility to the limitations of Claim 5[c] and accordingly view the limitation as purely aesthetic and a matter of simple design choice. A POSITA would understand that having a portion of the bowl portions of each of the fork and spoon extend forward from the

¹⁴⁹ Ex. 1001, 9:21-27.

handle would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Feng does not show a portion of each of the bowl portions of the fork and spoon extending forward from the handle front surface, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success.

203. Therefore, for at least the reasons above, each and every limitation of Claim 5 of the '629 Patent is disclosed by or would have been obvious over Feng.

6. Claim 6

6[preamble] An eating utensil as recited in claim 1,

204. As shown above, each and every limitation of Claim 1 of the '629 Patent is disclosed by or would have been obvious over Feng.

6[a] wherein the concave spoon bowl portion is further defined by a plurality of substantially flat side edges,

205. As discussed above in reference to Claim 4, to the extent that edges 118 and 118b are taught to be substantially flat (from left to right sides of the spoon in Figure 36 (right)), the side edges of Feng would also be considered to be substantially flat as they each contain locally flat sections. Additionally or alternatively, it would be obvious to modify Feng to include such flat edges as a matter of design choice.

206. To the extent that the “substantially flat” limitation is determined to represent a characteristic of the side and front edges which Feng does not read on, the '629 Patent specification provides no justification for this alleged benefit, i.e., the patent does not explain why, exactly, a “substantially straight side edge” would “allow” scraping food from the side of a container.

207. Accordingly, a POSITA would understand that including a plurality of substantially flat side edges would be one of a number of possible configurations from which they could choose based purely on design considerations. To the extent that Feng does not show a concave spoon bowl portion defined by a plurality of substantially flat side edges, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success.

6[b] wherein one of the substantially flat side edges further defines the single side surface of the utensil.

208. As discussed previously, Feng discloses an intervening side surface between front and back surfaces of the concave spoon bowl portion, *see* Figure 28. This side surface similarly intervenes between front and back surfaces of the concave fork bowl portion and handle coupling the spoon and concave fork bowl portions, and accordingly, defines the single side surface of the utensil.¹⁵⁰

209. To the extent that Feng does not disclose “substantially flat side edges,” modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success as discussed in relation to limitation 6[a]. By incorporating the design choice in Claim 6[a], the modified version of Feng would also necessarily then practice the limitations of Claim 6[b] because the connection between the handle and spoon side surface is a continuous surface.

210. Accordingly, for at least the reasons above, each and every limitation of Claim 6 of the '629 Patent is disclosed by or would have been obvious over Feng.

¹⁵⁰ Ex. 1004, Description.

7. Claim 7

7[preamble] An eating utensil as recited in claim 1,

211. As shown above, each and every limitation of Claim 1 of the '629 Patent is disclosed by or would have been obvious over Feng.

7[a] wherein the eating utensil is formed of a glass reinforced thermoplastic material.

212. Feng discloses that its utensil can be integrally formed using “plastic material,”¹⁵¹ and to the extent that Feng does not explicitly teach glass filled plastic materials, it would have been obvious to a POSITA to practice Feng using a glass filled plastic material. As Feng additionally contemplates the use of steel to fabricate Feng’s utensil, it would be obvious for a POSITA to try glass reinforced plastic as an alternative, known material to improve the properties of the utensil.¹⁵² The addition of glass to thermoplastic materials was known at the time of the '629 Patent to improve various physical and mechanical properties of plastics, such as chemical resistance, heat resistance, tensile strength, dimensional stability, and moisture resistance.¹⁵³ These improved properties would be beneficial to the utensil of Feng that is designed to be used for “traveling, picnics, dining of children in kindergartens, and regular family uses.”¹⁵⁴ Thus, this claim is obvious over Feng.

8. Claim 8

8[preamble] An eating utensil formed from a glass filled nylon thermoplastic material, the eating utensil comprising:

¹⁵¹ Ex. 1004, Description.

¹⁵² Rosato, Donald. Designing with plastics and composites: a handbook. Springer Science & Business Media, 2013, pp. 77-78.

¹⁵³ *Id.*, pp. 79-80, 82.

¹⁵⁴ Ex. 1004, Description.

213. As described in my analysis of Claim 1, Feng discloses an eating utensil: “The present utility model discloses a silverware that combines a knife, a fork, and a spoon.”¹⁵⁵

214. As shown in the analysis of Claim 7, Feng a POSITA would have been motivated to practice Feng using a glass-filled thermoplastic material, as the addition of glass to thermoplastics is known to improve various physical and mechanical properties of thermoplastics. More specifically, a POSITA would be motivated to use nylon as the base thermoplastic material, as it is commonly used as a metal replacement,¹⁵⁶ and Feng additionally contemplates the use of metal to fabricate its utensil.¹⁵⁷ As similarly discussed above with respect to Claim 7, glass-filled nylon thermoplastic materials were known at the time of the ’629 Patent to provide heat resistance, odor resistance, structural stability, and overall good durability.^{158,159}

215. Accordingly, Feng discloses this element or a POSITA would have found it obvious to practice Feng using a glass-reinforced nylon thermoplastic material.

8[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

216. This element is identical to claim element 1[a] and is accordingly disclosed by Feng for the same reasons that claim element 1[a] was.

8[b] a concave fork bowl portion, a first outer one of the tines and the concave fork bowl portion being further

¹⁵⁵ Ex. 1004, Abstract.

¹⁵⁶ Mark, Herman. Encyclopedia of Polymer Science and Technology, 3rd Edition. Volume 3: Polyamides, Plastics. John Wiley & Sons, Inc. 2004, p. 618.

¹⁵⁷ Ex. 1004, Description.

¹⁵⁸ Rosato, Donald. Designing with plastics and composites: a handbook. Springer Science & Business Media, 2013, pp. 424-425.

¹⁵⁹ Mark, Herman. Encyclopedia of Polymer Science and Technology, 3rd Edition. Volume 3: Polyamides, Plastics, pp. 630-631.

defined by a first chamfer and a first curved side surface coupled to the first chamfer,

217. This element is identical to claim element 1[b] except for referring to a “first” chamfer and “first” curve side surface. As the analysis of claim element 1[b] demonstrated that at least one chamfer and curved side surface is included in Feng and/or would have been obvious over Feng, the limitations of claim element 8[b] are also included in Feng and/or would have been obvious over Feng.

8[c] the first chamfer coupling the fork front surface with the first curved side surface,

218. As demonstrated in my analysis of Claim 1, Feng includes a first chamfer (knife edge 4) disposed on the outside edge of one of the fork tines. Also, as was shown, this first chamfer is coupled directly to the first curved side surface. As the fork front surface comprises the outer fork tine surface which transitions into the first chamfer and the first chamfer is directly coupled to the first curved side surface, a POSITA would recognize that the first chamfer couples the fork front surface to the first curved side surface. Thus, Feng discloses this element.

8[d] the first curved side surface coupling the first chamfer with the fork back surface,

219. The limitations of claim element 8[d] are contained within the limitations of claim element 1[c], with the difference being the references to the “first curved side surface” and “first chamfer.” As the analysis of element 1[c] demonstrated that Feng discloses and/or renders obvious at least one curved side surface coupling at least one chamfer with the fork back surface, Feng also discloses and/or renders obvious “the first curved side surface coupling the first chamfer with the fork back surface” of element 8[d].

8[e] the first chamfer is oblique in relation to the first curved side surface and the coupling between the first chamfer and the first curved side surface defines a first curved splitting feature,

220. The limitations of claim element 8[e] are contained within the limitations of claim element 1[c], with the difference being the references to the “first curved side surface,” “first chamfer,” and “first curved splitting feature.” As the analysis of element 1[c] demonstrated that Feng discloses and/or renders obvious at least one chamfer being disposed obliquely in relation to a curved side surface and the coupling between at least one chamfer and the said side surface defines a curved splitting feature, Feng also discloses and/or renders obvious “the first chamfer is oblique in relation to the first curved side surface and the coupling between the first chamfer and the first curved side surface defines first curved splitting feature” as recited in element 8[e].

8[f] a second outer one of the tines and the concave fork bowl portion being further defined by a second chamfer and a second curved side surface coupled to the second chamfer,

8[g] the second chamfer coupling the fork front surface with the second curved side surface,

8[h] the second curved side surface coupling the second chamfer with the fork back surface, the second chamfer is oblique in relation to the second curved side surface and the coupling between the second chamfer and the second curved side surface defines a second curved splitting feature;

221. Claim elements 8[f]-8[h] can be analyzed simultaneously and disclose a second chamfer, second curved side surface, and a second curve splitting feature

that respectively disclose the same limitations as disclosed by the first chamfer, first curved side surface, and first curved splitting feature.

222. Feng teaches that its combination fork, spoon, and knife can be configured with either one or two knife edges on either one or two sides of the fork (emphasis added): “The technical key point of the present utility model is as follows: two ends of a handle are respectively provided with a fork head and a spoon head, **and one or two sides of the fork head are made into a blade** [...]”¹⁶⁰

223. A POSITA would recognize this as teaching to dispose an equal and opposite configuration of a knife edge, curved side surface, and curved splitting feature on the opposite side of the fork of Feng, *see* Figure 37.

224. As the configuration of Feng with a single chamfer on the fork disclosed or rendered obvious all of the limitations regarding a first chamfer, first curved side surface, and first curved splitting feature, and these are the same respective limitations recited for the second chamfer, second curved side surface, and second curved splitting feature, a POSITA would recognize that the teaching of Feng to provide a second knife edge on the other side of the fork discloses and/or renders obvious the limitations of claim elements 8[f]-8[h].

¹⁶⁰ Ex. 1004, Description.

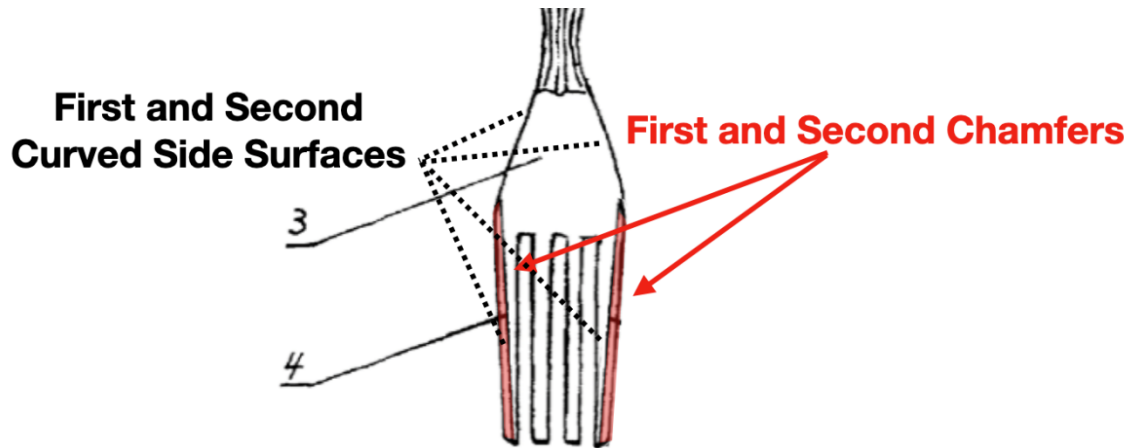


Figure 37. A modified and annotated version of the figure of Feng showing the configuration of Feng with two blades (one on each side of the exterior of the fork) as taught by Feng.

8[i] a spoon head having a spoon front surface, a spoon back surface, and first and second spoon side surfaces coupling the spoon front surface with the spoon back surface,

225. As discussed above with respect to claim element 1[d], a POSITA would understand that a spoon has a front and back surface as well as an intervening side surface (highlighted in red in Figure 28) between front and back surfaces. This intervening side surface can be further distinguished as first and second side surfaces, as shown in Figure 38, below. Thus, Feng discloses this element.

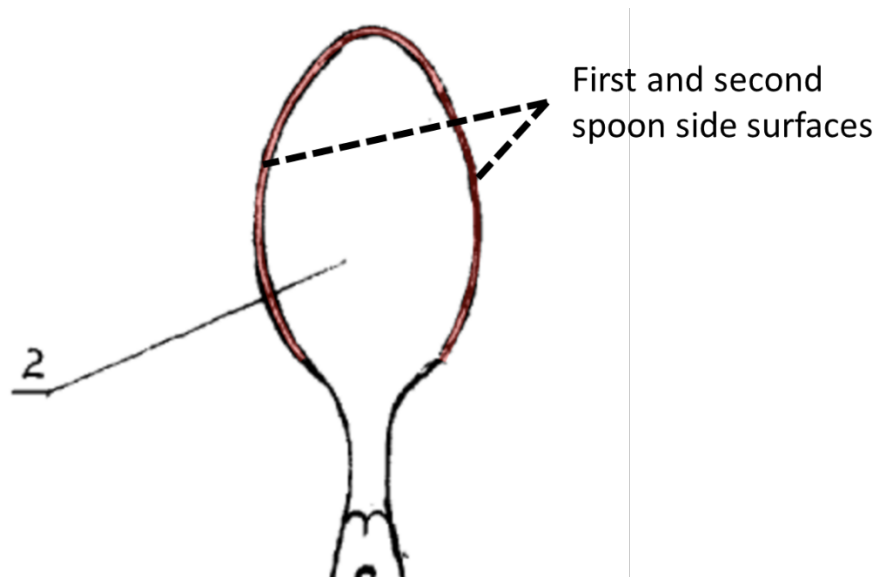


Figure 38. An annotated figure from Feng showing the spoon head portion coupled to the handle of Feng. The first and second spoon side surfaces are annotated in red.

8[j] wherein the spoon front surface, the spoon back surface, and the first and second spoon side surfaces defining a concave spoon bowl portion, the spoon bowl portion faces the same way as the concave fork bowl portion;

226. This element is similar to claim element 1[e], except it further identifies two side surfaces of the spoon, i.e., the first and second spoon side surfaces. The side surface identified with respect to Claim 1[e] comprises the first and second spoon side surfaces, as shown above with respect to claim element 8[i]. Therefore, claim element 8[j] is accordingly disclosed and/or rendered obvious by Feng for the same reasons that claim element 1[e] was.

8[k] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a first and second handle side surface coupling the handle front surface to the handle back surface;

227. This element is identical to claim element 1[f] with the exception of reciting “first and second” side surface of the handle, as opposed to “a” side surface of the handle. As was shown in the analysis of claim element 1[f], Feng discloses a handle with front and back surfaces. A POSITA would recognize that at least two side surfaces (one on each side of the handle) are disposed so as to couple the front and back surfaces of the handle on opposite sides of the handle. The remaining limitations of claim element 8[k] are disclosed by Feng for the same reasons that claim element 1[f] was. Thus, Feng discloses this element.

8[l] the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil;

228. This element is identical to claim element 1[g] and is accordingly disclosed by Feng for the same reasons that claim element 1[g] was.

8[m] the fork back surface, the spoon back surface, and the handle back surface collectively defining a single back surface of the utensil;

229. This element is identical to claim element 1[h] and is accordingly disclosed by Feng for the same reasons that claim element 1[h] was.

8[n] the first fork side surface, the first spoon side surface, and the first handle side surface collectively defining a single first side surface of the utensil; and

230. The claim limitations of element 8[n] are the limitations of claim element 1[i] with the exception of referring to a “first” side surface, “first” spoon side surface, and a “first” handle side surface. As shown in the analysis of claim element 1[i] in view of Feng, Feng discloses at least one side surface, spoon side surface, and handle side surface. Accordingly, Feng discloses the limitations of

claim element 8[n] for the same reasons it discloses the limitations of claim element 1[i].

8[o] the second fork side surface, the second spoon side surface, and the second handle side surface collectively defining a single second side surface of the utensil.

231. The limitations of claim element 8[o] are identical to those of element 8[n] save replacing “first” with “second.” As discussed in the analysis of element 8[h], Feng teaches a configuration with the same knife edge 4 disposed on both side of the fork head. As the configuration of Feng with a single chamfer on the fork disclosed all of the limitations regarding the first fork side surface, the first spoon side surface, and the first handle side surface (i.e., element 8[n]), and these are the same respective limitations recited for the first fork side surface, the first spoon side surface, and the first handle side surface, a POSITA would recognize that the teaching of Feng to provide a second knife edge on the other side of the fork discloses and/or renders obvious the limitations of claim element 8[o].

232. Accordingly, for at least the reasons described above, each and every limitation of claim 8 is disclosed by or rendered obvious over Feng.

9. Claim 9

9[preamble] An eating utensil comprising:

233. As described in my analysis of Claim 1, Feng discloses an eating utensil: “The present utility model discloses a silverware that combines a knife, fork, and a spoon.”¹⁶¹ Thus, Feng discloses this element.

9[a] a first head having a first front surface and a first back surface both partially defining a plurality of tines and

¹⁶¹ Ex. 1004, Abstract.

234. The limitations of claim element 9[a] are identical to those of claim element 1[a] with the exception of reciting the more general “first head,” “first front surface,” and “first back surface” as opposed to a “fork head,” “fork front surface,” and “fork back surface.” Accordingly, as Feng discloses a fork head practicing the limitations of claim element 1[a], it also discloses a “first head,” “first front surface,” and “first back surface” of claim element 9[a].

9[b] a first concave bowl portion, an outer one of the tines and the first concave bowl portion being further defined by a chamfer and a first curved side surface coupled to the chamfer,

235. The limitations of claim element 9[b] are identical to those of claim element 1[b] with the exception of reciting the more general “first concave bowl portion” and “first curved side surface” as opposed to a “concave fork bowl portion” and “curved side surface.” Accordingly, as Feng discloses a fork bowl portion, chamfer, and curved side surface practicing the limitations of claim element 1[a], it also discloses a “first concave bowl portion,” chamfer, and “first curved side surface” practicing the limitations of claim element 9[b].

9[c] the chamfer coupling the first front surface with the first curved side surface,

236. As demonstrated in my analysis of Claim 1, Feng includes a chamfer (knife edge 4) disposed on the outside edge of one of the fork tines. As was shown, this chamfer is coupled directly to the (first) curved side surface. As the fork front surface (the first front surface of Claim 9) comprises the outer fork tine surface which transitions into the chamfer and the chamfer is directly coupled to the (first) curved side surface, a POSITA would recognize that the chamfer couples the first front surface with the first curved side surface. See also, claim element 8[c].

9[d] the first curved side surface coupling the chamfer with the first back surface, and the chamfer is oblique in relation to the first curved side surface;

237. The limitations of claim element 9[d] are contained within the limitations of claim element 1[c] with the addition of the “first” modifier (i.e., first curved side surface and first back surface.) As Feng discloses at least one side surface coupling the chamfer with at least one back surface, the chamfer being oblique in relation to at least one first curved side surface (i.e., claim element 1[c]), Feng also discloses the first curved side surface coupling the chamfer with the first back surface, and the chamfer is oblique in relation to the first curved side surface.

9[e] a second head having a second front surface, a second back surface, and a second side surface coupling the second front surface with the second back surface,

238. The limitations of claim element 9[e] are identical to those of claim element 1[d] with the exception of reciting the more general “second head,” “second front surface,” and “second back surface” as opposed to a “spoon head,” “spoon front surface,” and “spoon back surface.” Accordingly, as Feng discloses a spoon head practicing the limitations of claim element 1[d], it also discloses a “second head,” “second front surface,” and “second back surface” of claim element 9[e].

9[f] the second front surface, the second back surface, the second side surface partially defining a second concave bowl portion, the second concave bowl portion faces the same way as the first concave bowl portion;

239. The limitations of claim element 9[f] are identical to those of claim element 1[e] with the exception of reciting the more general “second front surface,” “second back surface,” “second concave bowl portion,” and “first

concave bowl portion” as opposed to a “spoon front surface,” “spoon back surface,” “concave spoon bowl portion,” and “concave fork bowl portion.” Accordingly, as Feng discloses a “spoon front surface,” “spoon back surface,” “concave spoon bowl portion,” and “concave fork bowl portion” practicing the limitations of claim element 1[e], it also discloses the “second front surface,” “second back surface,” “second concave bowl portion,” and “first concave bowl portion” of claim element 9[f].

9[g] a handle that couples the second head to the first head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

240. The limitations of claim element 9[g] are identical to those of claim element 1[f] with the exception of reciting the more general “first head” and “second head” as opposed to “fork head” and “spoon head.” Accordingly, as Feng discloses a handle, spoon, and fork head practicing the limitations of claim element 1[f], it also discloses the more general handle, first head, and second head of claim element 9[g].

9[h] the first front surface, the second front surface, and the handle front surface collectively defining a single front surface of the utensil;

241. The limitations of claim element 9[h] are identical to those of claim element 1[g] with the exception of reciting the more general “first front surface” and “second front surface” as opposed to “fork front surface” and “spoon front surface.” Accordingly, as Feng discloses a handle front surface, spoon front surface, and fork front surface practicing the limitations of claim element 1[g], it also discloses the more general handle front surface, first front surface, and second front surface of claim element 9[h].

9[i] the first back surface, the second back surface , and the handle back surface collectively defining a single back surface of the utensil; and

242. The limitations of claim element 9[i] are identical to those of claim element 1[h] with the exception of reciting the more general “first back surface” and “second back surface” as opposed to “fork back surface” and “spoon back surface.” Accordingly, as Feng discloses a handle back surface, spoon back surface, and fork back surface practicing the limitations of claim element 1[h], it also discloses the more general handle back surface, first back surface, and second back surface of claim element 9[i].

9[j] the first side surface, the second side surface, and the handle side surface collectively defining a single side surface of the utensil.

243. The limitations of claim element 9[j] are identical to those of claim element 1[i] with the exception of reciting the more general “first side surface” and “second side surface” as opposed to “fork side surface” and “spoon side surface.” Accordingly, as Feng discloses a handle side surface, spoon side surface, and fork side surface practicing the limitations of claim element 1[i], it also discloses the more general handle side surface, first side surface, and second side surface of claim element 9[j].

244. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 9 of the '629 Patent is disclosed by or would have been obvious over Feng.

10. Claim 10

The eating utensil as recited in claim 9, wherein the handle, the first head, and the second head are integrally formed.

245. As shown above, the limitations of Claim 9 of the '629 Patent are disclosed by or would have been obvious over Feng.

246. Furthermore, Feng discloses that the handle, first head, and second head are integrally formed. Feng teaches: “the handle 1, the spoon head 2, and the fork head 3 are made integrally of stainless steel, and the blade 4 is formed by sharpening one side of the fork head.”¹⁶²

247. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 10 of the '629 Patent is disclosed by or would have been obvious over Feng.

11. Claim 11

The eating utensil as recited in claim 9, wherein an inner one of the tines is substantially straight.

248. As shown above, the limitations of Claim 9 of the '629 Patent are disclosed by or would have been obvious over Feng.

249. Claim 2 modifies Claim 1 of the '629 Patent by requiring “inner ones of the plurality of tines each has a pair of substantially straight side edges.” As shown in the analysis of Claim 2 in view of Feng, Feng discloses inner tines which are substantially straight. *See, e.g.,* Figure 25.

250. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 11 of the '629 Patent is disclosed by or would have been obvious over Feng.

¹⁶² Ex. 1004, Claim 2.

12. Claim 12

The eating utensil as recited in claim 9, wherein the outer ones of the tines is further defined by a substantially straight inner edge.

251. As shown above, the limitations of Claim 9 of the '629 Patent are disclosed by or would have been obvious over Feng.

252. Feng discloses an outer tine defined by a substantially straight inner edge, for example, *see* Figure 25.

253. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 12 of the '629 Patent is disclosed by or would have been obvious over Feng.

13. Claim 13

The eating utensil as recited in claim 9, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

254. Claim 13 modifies Claim 9 in the same way that Claim 7 modifies Claim 1. As shown above, Feng discloses or renders the limitations of each of Claims 1, 7, and 9 obvious. Therefore, the limitations of Claim 13 are also disclosed or rendered obvious by Feng.

14. Claim 14

14[preamble] The eating utensil as recited in claim 9,

255. As shown above, the limitations of Claim 9 of the '629 Patent are disclosed by or would have been obvious over Feng.

14[a] wherein the second concave bowl portion is further defined by a plurality of substantially flat side edges,

14[b] wherein one of the substantially flat side edges further defines the single side surface of the utensil.

256. Claim 14 modifies Claim 9 in the same way that Claim 6 modifies Claim 1. As shown above, Feng discloses or renders the limitation of each of Claims 1, 6, and 9 obvious. Therefore, the limitations of Claim 14 are also disclosed or rendered obvious by Feng.

15. Claim 15

15[preamble] An eating utensil comprising:

257. As described in my analysis of Claim 1, Feng discloses an eating utensil: “The present utility model discloses a silverware that combines a knife, a fork, and a spoon [...]”¹⁶³ Thus, Feng discloses this element.

15[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

258. This element is identical to claim element 1[a] and is accordingly disclosed by Feng for the same reasons that claim element 1[a] was.

15[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer,

259. This element is identical to claim element 1[b] and is accordingly disclosed by Feng for the same reasons that claim element 1[b] was.

15[c] the chamfer coupling the fork front surface with the curved side surface,

¹⁶³ Ex. 1004, Abstract.

260. As demonstrated in my analysis of Claim 1, Feng includes a first chamfer (knife edge 4) disposed on the outside edge of one of the fork tines. Also, as was shown, this chamfer is coupled directly to the curved side surface. As the fork front surface comprises the outer fork tine surface which transitions into the chamfer and the chamfer is directly coupled to the curved side surface, a POSITA would recognize that the chamfer couples the fork front surface to the curved side surface. See also, claim analysis of element 8[c].

15[d] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the chamfer and the curved side surface defines a curved splitting feature;

261. This element is identical to claim element 1[c] and is accordingly disclosed by Feng for the same reasons that claim element 1[c] was.

15[e] a handle coupled to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

262. The analysis of claim element 1[f] demonstrated that Feng discloses a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface. Accordingly, Feng at least includes a handle coupled to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface.

15[f] the fork front surface and the handle front surface defining a single front surface of the utensil;

263. The analysis of claim element 1[g] demonstrated that Feng discloses “the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil.” Accordingly, Feng at least discloses “the fork front surface and the handle front surface defining a single front surface of the utensil.”

15[g] the fork back surface and the handle back surface defining a single back surface of the utensil; and

264. The analysis of claim element 1[h] demonstrated that Feng discloses “the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil.” Accordingly, Feng at least discloses “the fork back surface and the handle back surface defining a single back surface of the utensil.”

15[h] the fork side surface and the handle side surface defining a single side surface of the utensil.

265. The analysis of claim element 1[i] demonstrated that Feng discloses “the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.” Accordingly, Feng at least discloses “the fork side surface and the handle side surface defining a single side surface of the utensil.”

266. Accordingly, for at least the above reasons, each and every limitation of Claim 15 of the '629 Patent is disclosed by or would have been obvious over Feng.

16. Claim 16

16[preamble] The eating utensil as recited in claim 15,

267. As shown above, each and every limitation of Claim 15 is disclosed by or would have been obvious over Feng.

16[a] further comprising a spoon head coupled to the handle on an opposite side from where the fork head is coupled to the handle,

268. Feng teaches: “The specific construction of the present utility model is as follows: a three-purpose silverware, characterized in that one end of a handle 1 is installed with a spoon head 2, the other end thereof is installed with a fork head 3 [...].”¹⁶⁴ This is further demonstrated by the figure of Feng.

269. Accordingly, Feng discloses a spoon head coupled to the handle on an opposite side from where the fork head is coupled to the handle.

16[b] the spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface,

270. This element is identical to claim element 1[d] and is accordingly disclosed by Feng for the same reasons that claim element 1[d] was.

16[c] wherein the spoon front surface, the spoon back surface, and the spoon side surface defining a concave spoon bowl portion;

271. This element is included within claim element 1[e] and is accordingly disclosed by Feng for the same reasons that claim element 1[e] was.

16[d] the spoon front surface further defining the single front surface of the utensil;

272. The analysis of claim element 1[g] demonstrated that Feng discloses “the fork front surface, the spoon front surface, and the handle front surface

¹⁶⁴ Ex. 1004, Description.

collectively defining a single front surface of the utensil.” Accordingly, Feng at least discloses “the spoon front surface further defining the single front surface of the utensil.”

16[e] the spoon back surface further defining the single back surface of the utensil; and

273. The analysis of claim element 1[h] demonstrated that Feng discloses “the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil.” Accordingly, Feng at least discloses “the spoon back surface further defining the single back surface of the utensil.”

16[f] the spoon side surface further defining the single side surface of the utensil.

274. The analysis of claim element 1[i] demonstrated that Feng discloses “the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.” Accordingly, Feng at least discloses “the spoon side surface further defining the single side surface of the utensil.”

275. Accordingly, for at least the above reasons, each and every limitation of Claim 16 of the ’629 Patent is disclosed by or would have been obvious over Feng.

17. Claim 17

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is tilted in relation to the handle front surface at an angle of about 20-25 degrees.

276. As shown above, each and every limitation of Claim 16 is disclosed by or would have been obvious over Feng.

277. With regard to the limitations of Claim 17, the '629 Patent teaches: “the bowl 112 is angled upward to form a deeper bowl, which can be more efficient when scooping liquids, such as soups. In a particular embodiment, the bowl is angled upward at an angle of about 20-25 degrees, and preferably about 23 degrees.”¹⁶⁵ However, the '629 Patent does not disclose exactly why the specific range of angle between 20-25 degrees provides any claimed benefit that, e.g., a bowl angled upwards at an angle of 30-35 degrees would not, nor whether this angle (30-35 degrees) would be considered “about 20-25 degrees” within the context of the claimed invention. Accordingly, a POSITA would not perceive that the '629 Patent has taught any functional benefit to the limitations of Claim 17 and would interpret the limitations of Claim 17 as being aesthetic design choices.

278. A POSITA would understand that the angle of the bowl portion with respect to the handle in a spoon could fall within a wide range of angles; a POSITA would interpret the relative angle between the spoon bowl and the handle as being among a finite number of identifiable design choices which a POSITA would pick and choose from with a more than reasonable chance of success, each of them having predictable outcomes (*see* section IV.B.1.).

279. Accordingly, the limitations of Claim 17 would have been obvious over Feng.

18. Claim 18

18[preamble] The eating utensil as recited in claim 16,

280. As shown above, each and every limitation of Claim 16 is disclosed by or would have been obvious over Feng.

¹⁶⁵ Ex. 1001, 5:41-45.

18[a] wherein the concave spoon bowl portion is further defined by a substantially flat side edge,

18[b] wherein the substantially flat side edge further defines the single side surface of the utensil.

281. Claim 18 modifies Claim 16 in the same way that Claim 6 modifies Claim 1, with the exception that Claim 18 only requires a single substantially flat side edge as opposed to a plurality of substantially flat side edges. Accordingly, the limitations of Claim 18 would be a subset of Claim 6. As shown above, Feng discloses or renders the limitation of each of Claims 1, 6, and 16 obvious. Therefore, the limitations of Claim 18 are also disclosed or rendered obvious by Feng.

19. Claim 19

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is further defined by a substantially flat end edge.

282. As discussed in the analysis of Claim 6 in view of Feng, it would not have been entirely clear from the teachings of the '629 Patent what exactly qualifies as “substantially flat,” as the specification and drawings refer to figures showing surfaces (such as the side and end edges) which only contain sub-sections which could be considered flat.

283. As can be seen in Figure 36, to the extent that the end edge of the '629 Patent drawings is considered to be “substantially flat,” Feng also discloses a substantially flat end edge.

284. Alternatively, to the extent that the “substantially flat” limitation is determined to represent a characteristic of the end edge which Feng does not read on, the '629 Patent specification provides no justification for this alleged benefit,

i.e., the patent does not explain why, exactly, a “substantially flat end edge” would “allow” scraping food from the side of a container.¹⁶⁶

285. Based on my experience with the use of utensils to eat from a variety of containers, I am not aware of any reason that the “substantially flat end edge” of the claimed invention would “allow” scraping as opposed to, e.g., the end edge of the concave spoon bowl being curved and not flat. Furthermore, to the extent that the ’629 Patent specification is meant to suggest that the flat end edge would provide a more complete mating with the interior of a container for “scraping,” this would only be the case when the overall curvature of the flat side edge of the utensil is substantially matched to the interior surface of the container. This matching is certainly not claimed nor discussed within the ’629 Patent nor would such a teaching be feasible to accomplish for every conceivable eating container given the variance in the shapes of eating containers generally.

286. Accordingly, a POSITA would understand that having a substantially flat end edge would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Feng does not show a concave spoon bowl portion defined by a substantially flat end edge, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success. Thus, in the alternative, this claim would be obvious over Feng.

20. Claim 20

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion has a substantially pentagonal shape.

¹⁶⁶ See Ex. 1001, 10:20-24.

287. As a preliminary matter, while the '629 Patent specification refers to the “substantially elongated pentagonal shape”¹⁶⁷ of the alleged invention, as can be seen in Figure 39, the overall shape of the disclosed spoon in the '629 Patent figures is six-sided (i.e., hexagonal) as opposed to 5-sided (pentagonal).

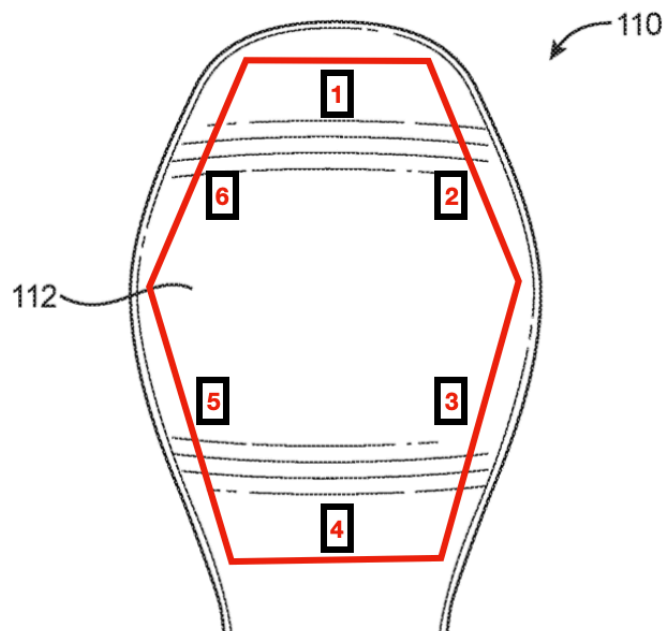


Figure 39. An annotated version of Figure 5b of the '629 Patent. As can be seen, the overall shape of the disclosed spoon head would have been considered as hexagonal (6-sided) as opposed to pentagonal (5-sided).

288. Accordingly, as with other claims within the '629 Patent, it would not have been entirely clear to a POSITA what the claims of the '629 Patent were reciting based on the specification and figures.

289. That notwithstanding, and also similarly to many other claimed elements of the '629 Patent, the specification does not teach any functional benefit to the recited “pentagonal” shape.

¹⁶⁷ See, e.g., Ex. 1001, 10:28-30.

290. Accordingly, to the extent that the '629 Patent discloses a “pentagonal” shape for the spoon head, a POSITA would understand that having such a shape would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Feng does not show a substantially pentagonal spoon head, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success. Thus, in the alternative, this claim is obvious over Feng.

21. Claim 21

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is further defined by at least three substantially flat side edges with rounded corners connecting the flat side edges, wherein one of the flat side edges further defines the single side surface of the utensil.

291. Claim 21 modifies Claim 16 in the same way that Claim 4 modifies Claim 1. As shown above, Feng discloses or renders the limitation of each of Claims 1, 4, and 16 obvious. Therefore, the limitations of Claim 21 are also disclosed or rendered obvious over Feng.

22. Claim 22

The eating utensil as recited in claim 15, wherein the handle front surface has a diagonal ridge.

292. The claim term “diagonal ridge” does not appear within the specification of the '629 Patent. Accordingly, a POSITA would not understand whether the '629 Patent is claiming, e.g., a diagonal ridge which runs the entire length of the handle or any diagonal ridge on the front surface. A POSITA would

then be left to conclude that any diagonal ridge would read on the limitations of Claim 22.

293. Therefore, a POSITA would recognize that Feng discloses a plurality of diagonal ridges as can be seen in Feng's drawing showing fish scales either embossed or stamped on the front surface of the handle of Feng. *See*, Figure 40.

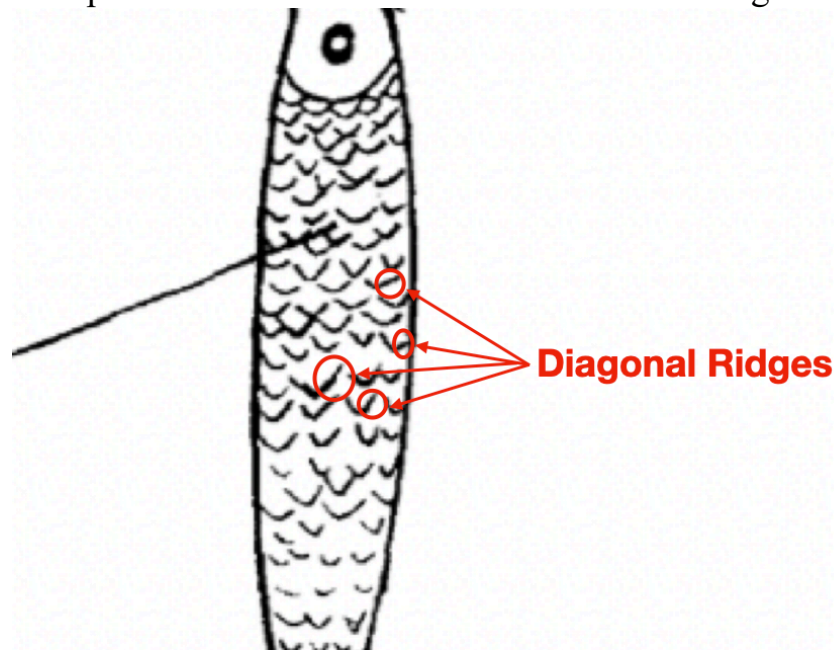


Figure 40. The figure of Feng showing the embossed fish scales which a POSITA would interpret as comprising diagonal ridges on the front surface of the handle.

294. Alternatively, to the extent that Feng is determined to not include diagonal ridges on the front surface of the handle, the '629 Patent specification provides no justification for any alleged function or benefit to the recited "diagonal ridges."

295. Accordingly, a POSITA would understand that including diagonal ridges on the front surface of the handle of Feng would be purely an aesthetic design consideration and would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Feng does not include a handle front surface with diagonal ridges,

modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success. Thus, in the alternative, this element would be obvious over Feng.

23. Claim 23

The eating utensil as recited in claim 15, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

296. Claim 23 modifies Claim 15 in the same way that Claim 7 modifies Claim 1. As shown above, Feng discloses or renders the limitation of each of Claims 1, 7, and 15 obvious. Therefore, the limitations of Claim 23 are also disclosed or rendered obvious over Feng in view of the knowledge of a POSITA.

H. Claims 1-23 of the '629 Patent are Obvious over Feng in View of Kristiansson

1. Claim 1

1[preamble] An eating utensil comprising

297. As shown in my analysis of Claim 1 in view of Feng and the knowledge of a POSITA, Feng discloses an eating utensil.

1[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

298. As shown in my analysis of Claim 1 in view of Feng and the knowledge of a POSITA, Feng discloses a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines.

1[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer, the chamfer coupling the fork front surface with the curved side surface,

299. As shown in my analysis of Claim 1 in view of Feng, to the extent that a POSITA would not have assumed that the fork of Feng includes a concave fork bowl, in looking to improve Feng, a POSITA certainly would have included a concave fork bowl portion based on what was very well known in the art.

300. Furthermore, Feng discloses a curved side surface coupled to a chamfered tine; the chamfered tine further coupling the fork front surface with the curved side surface, *see* ¶¶159-163. Thus, Feng discloses or renders obvious this element.

301. To the extent Feng does not disclose nor render obvious this element, Kristiansson further discloses a much thicker outer fork tine, and a POSITA would have realized that a thicker outer tine would increase the stability under load while cutting. Furthermore, a POSITA would have also realized that a more pronounced curve on the outer tine (knife edge) which extends to the end of the tine, as taught by Kristiansson, would both improve rigidity of the device and improve the ability to rock back and forth on the knife edge so as to increase cutting ability while maintaining a relatively dull cutting surface. A POSITA would also be motivated to replace the fork bowl portion of Feng with that of Kristiansson so as to improve the scooping ability of Feng; furthermore, the tine ends of Kristiansson could be incorporated into Feng and blunted slightly (i.e., rounded tips) so as to both improve the ability of Feng to spear and secure food, as well as keeping with the taught application of Feng to provide utensils for young children, *see* Figure 41.

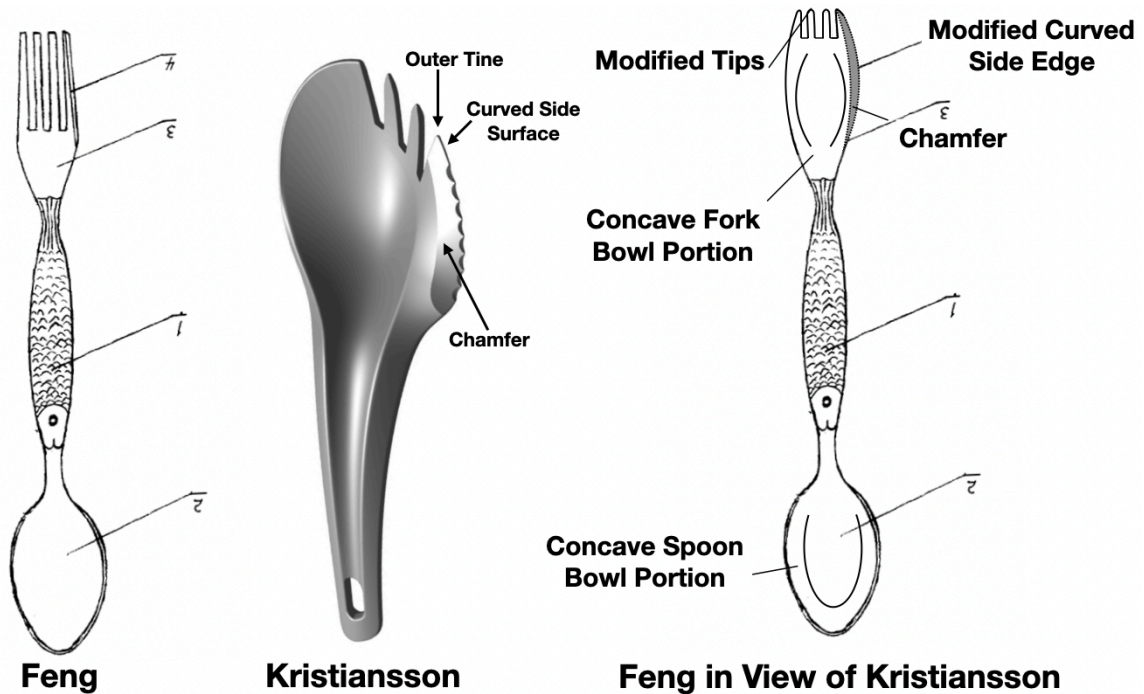


Figure 41. Annotated images of Kristiansson and Feng (left and center, respectively) and a conception of Feng as modified by Kristiansson.

302. To the extent that it is determined that a chamfer as disclosed in the '629 Patent requires a blunted cutting edge, a POSITA would have recognized that Feng teaches towards the use of a blunted edge as Feng discloses that its invention is directed towards “children in kindergartens.”¹⁶⁸ Accordingly, in view of this teaching of Feng, a POSITA would know to use a blunted edge (as opposed to the serrated edge of Kristiansson) for the modified knife edge of Feng in view of Kristiansson.

1[c] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the chamfer and the curved side surface defines a curved splitting feature;

¹⁶⁸ Ex. 1004, Abstract.

303. As can be seen in Figure 41, Feng as modified by Kristiansson discloses a knife edge (chamfer) formed on the side of one of the outer tines, coupled to what a POSITA would understand to be a side surface of the fork and the side surface being coupled to the back surface. A POSITA would understand that the coupling between a knife surface and a side surface would represent a splitting or cutting feature in the sense that the combination could be used to split food.

304. Feng also teaches a device that is directed towards children: “The present utility model is suitable for use in situations such as traveling, picnics, and the like, and can also be used for group dining of children in kindergartens.”¹⁶⁹ Accordingly, a POSITA would realize that the modified knife edge of Feng would not be particularly sharp as would be the case if the angle between the knife edge and the side surface was 90° (i.e., non-oblique), *see* Figure 27. Feng, therefore, suggests that the chamfer be oblique relative to the curved side surface. Thus, this element would be obvious over Feng in view of Kristiansson.

¹⁶⁹ Ex. 1004, Abstract.

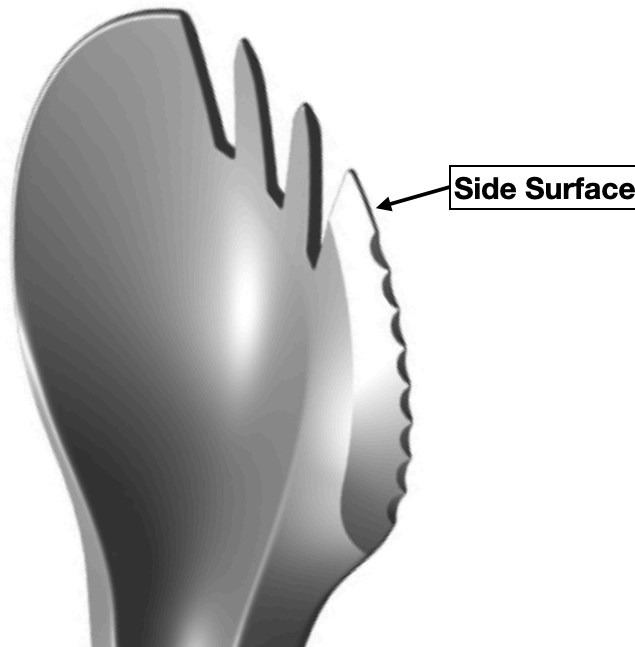


Figure 42: An annotated image of Kristiansson showing the side surface of the device.

1[d] a spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface,

305. As shown in Figure 28, Feng discloses a spoon head coupled to the handle: “two ends of a handle are respectively provided with a fork head and a spoon head.”¹⁷⁰ A POSITA would understand that a spoon has a front and back surface as well as an intervening side surface between front and back surfaces. A POSITA would recognize the raised portion of the drawing of the spoon in Feng as the spoon side surface, shown highlighted in red in Figure 28. None of the suggested changes of Feng in view of Kristiansson would affect the spoon properties of Feng. Thus, Feng discloses this element.

1[e] the spoon front surface, the spoon back surface, and the spoon side surface partially defining a concave spoon

¹⁷⁰ Ex. 1004, Description.

bowl portion, the spoon bowl portion facing a same way as the concave fork bowl portion;

306. A POSITA would understand that spoons include concave bowl portions defined by the front, side, and back surfaces and would recognize that, by simply disclosing a spoon, Feng discloses a concave bowl portion.

307. As shown in the above analysis, a POSITA would understand that the figure of Feng discloses a spoon bowl portion facing upwards, the same direction that a POSITA would understand the fork bowl portion to be facing, *see* Figure 29. Thus, Feng discloses this element.

308. The '629 Patent teaches an alleged benefit to having the fork and spoon bowl face the same direction: "With the spoon head 112 and the fork head 141 oriented the same way, the fork head 141 does not get in the way of the user's hand when the combination utensil is being used as a spoon and when the combination utensil is being used as a fork, the spoon head 112 does not get in the way of the user's hand."¹⁷¹ However, the '629 Patent provides no further detail on why this would be the case. In my opinion, the justification provided by the '629 Patent for a specific benefit to having the spoon and fork heads face the same direction is lacking; for example, in my experience there is no benefit to a user in terms of the implement elements "getting in the way" of a user's hand which would not exist with, e.g., the fork and spoon bowls facing opposite directions.

309. Accordingly, to the extent that Feng does not show the fork and spoon bowl portions facing the same direction, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success. For example, while Kristiansson discloses a fork-spoon-knife combination with both spoon and fork head co-located, the fork and spoon bowl portions in Kristiansson face the

¹⁷¹ Ex. 1001, 9:27-32.

same direction. A POSITA would be motivated to replace the fork bowl portion of Feng with that of Kristiansson so as to improve the scooping ability of Feng; furthermore, the tine ends of Kristiansson could be incorporated into Feng and blunted slightly (i.e., rounded tips) so as to both improve the ability of Feng to spear and secure food, as well as keeping with the taught application of Feng to provide utensils for young children.

310. Configuring a combination utensil with fork and spoon bowl portions disposed on opposite ends of a handle was well-known and said portions facing the same direction was known within the art, for example, *see* Figure 43.

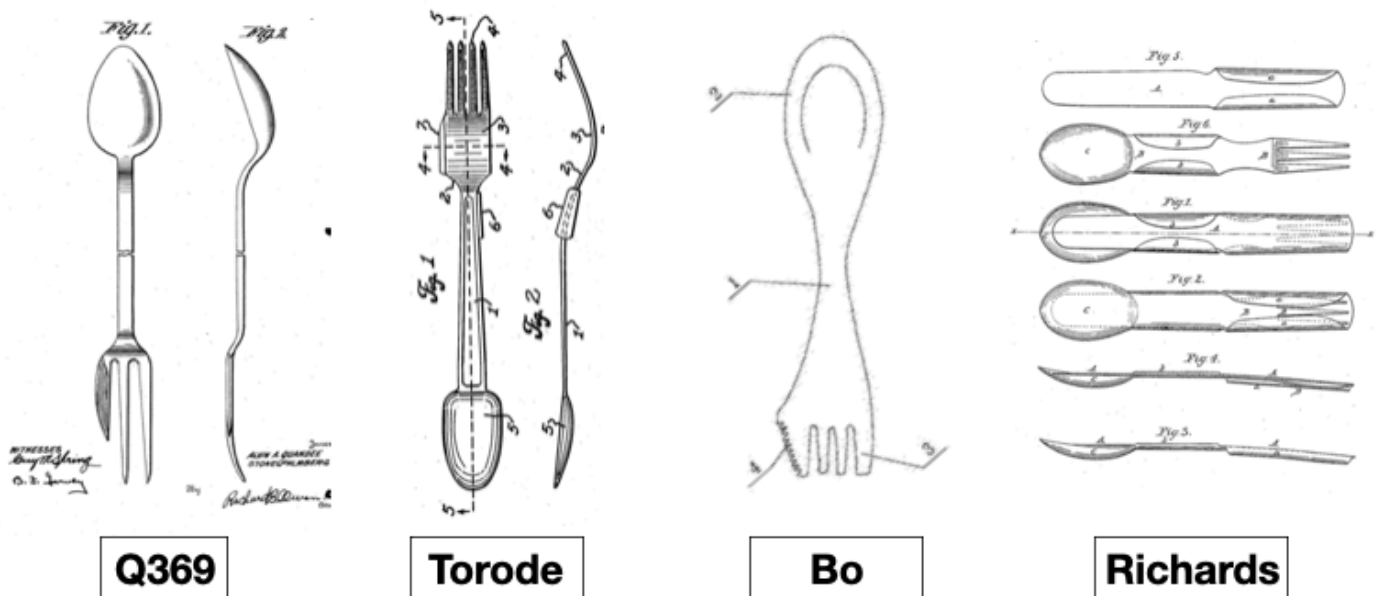


Figure 43. Various combination prior art utensils which have fork and spoon heads disposed on opposite ends of a handle, several of which (Torode and Richards) are configured with the fork and spoon bowl portions facing the same direction.

311. None of the suggested changes of Feng in view of Kristiansson would affect the spoon properties of Feng, nor would the suggested changes alter the ability of a POSITA to position the spoon head of Feng to face the same direction as the modified fork head of Feng in view of Kristiansson. A representation of how Feng would appear given the modifications in view of Kristiansson is shown in

Figure 41. Thus, in the alternative, this element would be obvious over Feng in view of Kristiansson.

1[f] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

312. Feng discloses the handle coupling the spoon head to the fork head of Claim 1[f]: “The specific construction of the present utility model is as follows: a three-purpose silverware, characterized in that one end of a handle 1 is installed with a spoon head 2, the other end thereof is installed with a fork head 3, and one or two sides of the fork head 3 are formed with a blade 4.”¹⁷²

313. A POSITA would understand that the handle of Feng would necessarily require a front and back surface with a side surface providing coupling between these two. None of the suggested changes of Feng in view of Kristiansson would affect the properties of Feng which disclose the limitations of claim element 1[f]. Thus, Feng discloses this element.

1[g] the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil;

1[h] the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil; and

1[i] the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.

314. Claim elements 1[g]-1[i] can be analyzed simultaneously. As described above, the combination utensil of Feng discloses these elements.

¹⁷² Ex. 1004, Description.

315. To the extent that Feng does not disclose fork and spoon bowl portions facing the same direction, a POSITA would view modifying Feng to be so configured as one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success.

316. With the fork and spoon bowl portions facing the same way, a POSITA would recognize that the fork front surface, the spoon front surface, and the handle front surface would collectively define a single front surface of the utensil and that the fork back surface, the spoon surface, and the handle back surface would collectively define a single back surface of the utensil. Furthermore, a POSITA would recognize that, Feng alone (without the potential modification of changing the directions of the fork or spoon bowl portions) would have a single side surface defined by the side surface of each of the fork, spoon, and handle collectively. None of the suggested changes of Feng in view of Kristiansson would affect the properties of Feng which disclose the limitations of claim element 1[g]-1[i].

317. All told, the suggested modifications of Feng (to the extent that Feng does not already disclose or render obvious the features) in view of Kristiansson is represented in Figure 41. Each of the modifications discussed in the above analysis (including those shown in Figure 41) would have been well within the skill level of a POSITA at the time of the '629 Patent filing and would have been well-motivated to improve the performance of Feng in view of Kristiansson. Thus, in the alternative, these elements would be obvious over Feng in view of Kristiansson.

318. Accordingly, for at least the above reasons, Claim 1 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

2. Claim 2

An eating utensil as recited in claim 1, wherein inner ones of the plurality of tines each has a pair of substantially straight side edges and a pointed distal tip.

319. As shown above, each and every limitation of Claim 1 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

320. Furthermore, as can be seen in, e.g., Figure 41, at least one of the inner tines of Feng has substantially straight side edges. To the extent that the tines of Feng do not have pointed distal tips, modifying Feng with the pointed fork tines of Kristiansson would have been an obvious modification. The tine ends of Kristiansson could be incorporated into Feng and blunted slightly (i.e., rounded tips) so as to both improve the ability of Feng to spear and secure food, as well as keeping with the taught application of Feng to provide utensils for young children, *see* Figure 41.

321. Such a modification of Feng would have been an obvious improvement achieved by applying a known technique; for example, it was widely known at the time of the '629 Patent filing to use pointed tips on the ends of forks, *see* Figure 31.

322. Accordingly, the limitations of Claim 2 would have been obvious over Feng in view of Kristiansson.

3. Claim 3

An eating utensil as recited in claim 2, wherein the outer one of the tines has a wider base end than the inner ones of the tines.

323. As shown above, each and every limitation of Claim 2 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

324. As shown in Figure 41, Feng as modified by Kristiansson would be configured with the outer tine carrying the chamfer having a base end which is wider than both of the inner tines, *see* Figure 41.

325. Accordingly, the limitations of Claim 3 would have been obvious over Feng in view of Kristiansson.

4. Claim 4

4[preamble] An eating utensil as recited in claim 1,

326. As shown above, each and every limitation of Claim 1 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

4[a] wherein the concave spoon bowl portion is further defined by at least three substantially flat side edges with rounded corners connecting the flat side edges,

327. As discussed above in the analysis of Claim 4 in view of Feng, to the extent that edges 118 and 118b are taught to be substantially flat (from left to right sides of the spoon in Figure 35 (right)), the side edges of Feng would also be considered to be substantially flat as they each contain locally flat sections. Thus, this limitation is disclosed by Feng.

328. Alternatively, to the extent that the “substantially flat” limitation is determined to represent a characteristic of the side and front edges which Feng does not read on, the '629 Patent specification provides no justification for this alleged benefit, i.e., the patent does not explain why, exactly, a “substantially straight side edge” would “allow” scraping food from the side of a container; nor why three edges specifically would provide a benefit not accomplished by some other number.

329. Accordingly, a POSITA would understand that having a plurality of (for example, three) substantially flat side edges would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Feng does not show a concave spoon bowl portion defined by three substantially flat side edges, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success. Thus, in the alternative, this element would be obvious over Feng.

4[b] wherein one of the flat side edges further defines the single side surface of the utensil.

330. As discussed previously, Feng discloses an intervening side surface between front and back surfaces of the concave spoon bowl portion, *see* Figure 28. This side surface similarly intervenes between front and back surfaces of the concave fork bowl portion and handle coupling the spoon and concave fork bowl portions and, accordingly, defines the single side surface of the utensil. Thus, this element is disclosed by Feng.

331. To the extent that Feng does not disclose “substantially flat side edges,” modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success as discussed in relation to limitation 4[a]. By incorporating the design choice in Claim 4[a], the modified version of Feng would also necessarily then disclose the limitations of Claim 4[b] because the connection between the handle and spoon side surface is a continuous surface. Furthermore, none of the suggested changes of Feng in view of Kristiansson would affect the properties of Feng which disclose the limitations of claim element 4[b]. Thus, in the alternative, this element would be obvious over Feng.

332. Accordingly, for at least the reasons above, each and every limitation of Claim 4 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

5. Claim 5

5[preamble] An eating utensil as recited in claim 1,

333. As shown above, each and every limitation of Claim 1 of the '629 Patent would have been obvious over Feng in view of Kristiansson and the knowledge of a POSITA.

5[a] wherein the concave spoon bowl portion is tilted at a first angle relative to the handle front surface and

5[b] the concave fork bowl portion is tilted at a second angle relative to the handle front surface

334. The limitations of Claims 5[a] and 5[b] (i.e., the fork and spoon bowls being tilted with respect to the handle front surface) are not described in the specification of the '629 Patent, accordingly, a POSITA would be left to assume that the “tilting” is part and parcel of both of the fork and spoons having concave bowls.

335. As shown in Figure 41, Feng as modified by Kristiansson and the knowledge of a POSITA would include both fork and spoon bowl portions which are concave. To the extent that these concave fork and bowl portions are required to be tilted at two different angles with respect to the handle, such a feature would be purely aesthetic and not offer any specific functional value whatsoever. It is also noted that the concave spoon and fork bowls of the modified Feng utensil in view of Kristiansson would be “at an angle” to the handle connecting the bowls. Thus, this element would be obvious over Feng in view of Kristiansson.

5[c] such that at least a portion of each of the bowl portions extend forward from the handle front surface.

336. Similar to the tilting limitations above, the '629 Patent discloses little guidance regarding limitation 5[c] which requires at least a portion of each of the fork and spoon bowl portions extend forward from the handle front surface.

337. That notwithstanding, the '629 Patent discloses that the recited utensil of the claimed invention has a “substantially wide U-shaped configuration” and teaches: “the combination spoon and fork system 100 has a substantially wide U-shaped configuration, as shown in FIG. 6D. It will be appreciated that the U-shaped configuration is comfortable for a user to hold and manipulate.”¹⁷³ However, the '629 Patent specification provides no justification for this statement, i.e., the patent does not explain why, exactly, a wide U-shaped configuration would be more comfortable for a user to manipulate. Based on my experience with eating utensils in a variety of contexts, I am not aware of any *a priori* reason that overall U-shaped configuration of the claimed invention would be considered easier to use than if, e.g., the bowl portions of the fork and spoon did not extend at all from the front surface of the handle.

338. Accordingly, a POSITA would not recognize any utility to the limitations of Claim 5[c] and accordingly view the limitation as purely aesthetic. A POSITA would understand that having a portion of the bowl portions of each of the fork and spoon extend forward from the handle would be one of a number of possible configurations from which they could choose based purely on design considerations (*see* section IV.B.1). Accordingly, to the extent that Feng does not show a portion of each of the bowl portions of the fork and spoon extending forward from the handle front surface, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick

¹⁷³ Ex. 1001, 9:21-27.

and choose from with a more than reasonable chance of success. Thus, this element would be obvious over Feng in view of Kristiansson.

339. Therefore, for at least the reasons above, each and every limitation of Claim 5 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

6. Claim 6

6[preamble] An eating utensil as recited in claim 1,

340. As shown above, each and every limitation of Claim 1 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

6[a] wherein the concave spoon bowl portion is further defined by a plurality of substantially flat side edges,

341. As discussed above in reference to Claim 4, to the extent that edges 118 and 118b are taught to be substantially flat (from left to right sides of the spoon in Figure 35 (right)), the side edges of Feng would also be considered to be substantially flat as they each contain locally flat sections.

342. Alternatively, to the extent that the “substantially flat” limitation is determined to represent a characteristic of the side and front edges which Feng does not read on, the '629 Patent specification provides no justification for this alleged benefit, i.e., the patent does not explain why, exactly, a “substantially straight side edge” would “allow” scraping food from the side of a container.

343. Accordingly, a POSITA would understand that having a plurality of substantially flat side edges would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Feng does not show a concave spoon bowl portion defined by a plurality of substantially flat side edges, modifying Feng to do so would be one of

a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success. Thus, in the alternative, this element would be obvious over Feng.

6[b] wherein one of the substantially flat side edges further defines the single side surface of the utensil.

344. As discussed previously, Feng discloses an intervening side surface between front and back surfaces of the concave spoon bowl portion, *see* Figure 28. This side surface similarly intervenes between front and back surfaces of the concave fork bowl portion and handle coupling the spoon and concave fork bowl portions, and accordingly, defines the single side surface of the utensil.

345. To the extent that Feng does not disclose “substantially flat side edges,” modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success as discussed in relation to limitation 6[a]. By incorporating the design choice in Claim 6[a], the modified version of Feng would also necessarily then disclose the limitations of Claim 6[b] because the connection between the handle and spoon side surface is a continuous surface.

346. Accordingly, for at least the reasons above, each and every limitation of Claim 6 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

7. Claim 7

7[preamble] An eating utensil as recited in claim 1,

347. As shown above, each and every limitation of Claim 1 of the '629 Patent would have been obvious over Feng in view of Kristiansson and the knowledge of a POSITA.

7[a] wherein the eating utensil is formed of a glass reinforced thermoplastic material.

348. As described above, Feng discloses that its utensil can be integrally formed using “plastic material.”¹⁷⁴ To the extent that Feng is not explicit regarding a glass reinforced thermoplastic material, it would have been obvious to a POSITA to use a glass filled plastic material. As Feng additionally contemplates the use of steel to fabricate Feng’s utensil (i.e., alternative materials), it would be obvious for a POSITA to try glass reinforced thermoplastic as a known material to improve properties of the utensil.¹⁷⁵ The addition of glass to thermoplastic materials was known at the time of the ’629 Patent to improve various physical and mechanical properties of plastics, such as chemical resistance, heat resistance, tensile strength, dimensional stability, and moisture resistance.¹⁷⁶ These improved properties would be beneficial to the utensil of Feng that is designed to be used for “traveling, picnics, dining of children in kindergartens, and regular family uses.”¹⁷⁷ The modification of Feng by Kristiansson, e.g., shown in Figure 41, would benefit from the use of a glass reinforced thermoplastic for the same reasons as Feng.

349. Accordingly, the limitations of Claim 7 of the ’972 Patent would have been obvious over Feng in view of Kristiansson.

8. Claim 8

8[preamble] An eating utensil formed from a glass filled nylon thermoplastic material, the eating utensil comprising:

¹⁷⁴ Ex. 1004, Description.

¹⁷⁵ Rosato, Donald. Designing with plastics and composites: a handbook. Springer Science & Business Media, 2013 at pp. 77-78.

¹⁷⁶ *Id.*, pp. 79-80, 82.

¹⁷⁷ Ex. 1004, Description.

350. As described in my analysis of Claim 1, Feng discloses an eating utensil: “The present utility model discloses a silverware that combines a knife, a fork, and a spoon.”¹⁷⁸

351. As shown in the analysis of Claim 7, a POSITA would have been motivated to use a glass-filled thermoplastic material, as the addition of glass to thermoplastics is known to improve various physical and mechanical properties of thermoplastics that would be advantageous for utensils. More specifically, a POSITA would be motivated to use nylon as the base thermoplastic material, as it is commonly used as a metal replacement,¹⁷⁹ and Feng additionally contemplates the use of metal to fabricate its utensil.¹⁸⁰ As similarly discussed above with respect to Claim 7, glass-filled nylon thermoplastic materials were known at the time of the '629 Patent to provide heat resistance, odor resistance, structural stability, and overall durability.^{181,182} The modification of Feng by Kristiansson, e.g., shown in Figure 41, would benefit from the use of a glass-reinforced nylon thermoplastic material for the same reasons as Feng.

352. Accordingly, a POSITA would have found it obvious to use a glass-reinforced nylon thermoplastic material for the utensil of Feng and/or the utensil of Feng as modified by Kristiansson.

8[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

¹⁷⁸ Ex. 1004, Abstract.

¹⁷⁹ Mark, Herman. *Encyclopedia of Polymer Science and Technology*, 3rd Edition. Volume 3: Polyamides, Plastics. John Wiley & Sons, Inc. 2004, p. 618.

¹⁸⁰ Ex. 1004, Description.

¹⁸¹ Rosato, Donald. *Designing with plastics and composites: a handbook*. Springer Science & Business Media, 2013, pp. 424-425.

¹⁸² Mark, Herman. *Encyclopedia of Polymer Science and Technology*, 3rd Edition. Volume 3: Polyamides, Plastics, pp. 630-631.

353. This element is identical to claim element 1[a] and is accordingly obvious over by Feng in view of Kristiansson for the same reasons that claim element 1[a] was.

8[b] a concave fork bowl portion, a first outer one of the tines and the concave fork bowl portion being further defined by a first chamfer and a first curved side surface coupled to the first chamfer,

354. This element is identical to claim element 1[b] except for referring to a “first” chamfer and “first” curve side surface. As the analysis of claim element 1[b] demonstrated that at least one chamfer and curved side surface is included in Feng and/or Feng as modified by Kristiansson, the limitations of claim element 8[b] are also included in Feng and/or would have been obvious over Feng in view of Kristiansson. *See* Figure 41.

8[c] the first chamfer coupling the fork front surface with the first curved side surface,

355. As demonstrated in my analysis of Claim 1, Feng in view of Kristiansson includes a first chamfer disposed on the outside edge of one of the fork tines. Also, as was shown this first chamfer is coupled directly to the first curved side surface, *see* Figure 41. As the fork front surface comprises the outer fork tine surface which transitions into the first chamfer and the first chamfer is directly coupled to the first curved side surface, a POSITA would recognize that the first chamfer couples the fork front surface to the first curved side surface.

8[d] the first curved side surface coupling the first chamfer with the fork back surface,

356. The limitations of claim element 8[d] are contained within the limitations of claim element 1[c], with the difference being the references to the

“first curved side surface” and “first chamfer.” As the analysis of element 1[c] demonstrated that Feng in view of Kristiansson includes at least one curved side surface coupling at least one chamfer with the fork back surface, “the first curved side surface coupling the first chamfer with the fork back surface” of element 8[d] is also obvious over Feng in view of Kristiansson. *See* Figure 41.

8[e] the first chamfer is oblique in relation to the first curved side surface and the coupling between the first chamfer and the first curved side surface defines a first curved splitting feature,

357. The limitations of claim element 8[e] are contained within the limitations of claim element 1[c], with the difference being the references to the “first curved side surface,” “first chamfer,” and “first curved splitting feature.” As the analysis of element 1[c] demonstrated that Feng in view of Kristiansson renders obvious at least one chamfer being disposed obliquely in relation to a curved side surface and the coupling between at least one chamfer and the said side surface defines a curved splitting feature, Feng in view of Kristiansson also renders obvious “the first chamfer is oblique in relation to the first curved side surface and the coupling between the first chamfer and the first curved side surface defines first curved splitting feature” as recited in element 8[e]. *See* Figure 41.

8[f] a second outer one of the tines and the concave fork bowl portion being further defined by a second chamfer and a second curved side surface coupled to the second chamfer,

8[g] the second chamfer coupling the fork front surface with the second curved side surface,

8[h] the second curved side surface coupling the second chamfer with the fork back surface, the second chamfer is oblique in relation to the second curved side surface and

the coupling between the second chamfer and the second curved side surface defines a second curved splitting feature;

358. Claim elements 8[f]-8[h] can be analyzed simultaneously and disclose a second chamfer, second curved side surface, and a second curve splitting feature that respectively disclose the same limitations as disclosed by the first chamfer, first curved side surface, and first curved splitting feature discussed above.

359. Feng teaches that it's combination fork, spoon, and knife can be configured with either one or two knife edges on either one or two sides of the fork (emphasis added): “[t]he technical key point of the present utility model is as follows: two ends of a handle are respectively provided with a fork head and a spoon head, **and one or two sides of the fork are made into a blade** [...].”¹⁸³

360. When seeking to modify Feng in view of Kristiansson, a POSITA would recognize this teaching of Feng as desirable so as to make the resulting utensil useable by both right and left-handed individuals. Accordingly, when modifying Feng to include the curved side surface and chamfer of Kristiansson, a POSITA would be motivated to dispose an equal and opposite version of the curved side surface and chamfer taught by Kristiansson on the opposite side of the fork of Feng, *see* Figure 44.

361. As the configuration of Feng modified by Kristiansson with a single chamfer on the fork disclosed all of the limitations regarding a first chamfer, first curved side surface, and first curved splitting feature, and these are the same respective limitations recited for the second chamfer, second curved side surface, and second curved splitting feature, a POSITA would recognize that the version of Feng as modified by Kristiansson to provide a second knife edge on the other side

¹⁸³ Ex. 1004, Description.

of the fork discloses and/or renders obvious the limitations of claim elements 8[f]-8[h].

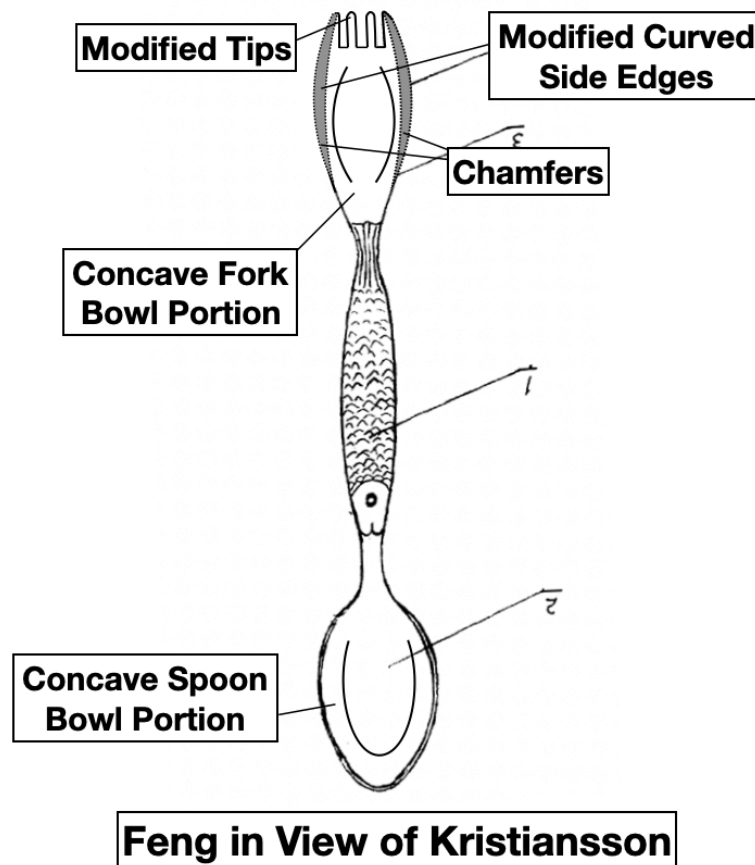


Figure 44. Feng as modified by Kristiansson with the curved side surfaces and chamfers disposed on both sides of the fork head, as taught by Feng.

8[i] a spoon head having a spoon front surface, a spoon back surface, and first and second spoon side surfaces coupling the spoon front surface with the spoon back surface,

362. As discussed above with respect to claim element 1[d], a POSITA would understand that a spoon has a front and back surface as well as an intervening side surface, shown in highlighted in red in Figure 28, between front

and back surfaces. This intervening side surface can be further distinguished as first and second side surfaces, as shown in Figure 38.

8[j] wherein the spoon front surface, the spoon back surface, and the first and second spoon side surfaces defining a concave spoon bowl portion, the spoon bowl portion faces the same way as the concave fork bowl portion;

363. This element is identical to claim element 1[e] and is accordingly disclosed and/or rendered obvious by Feng in view of Kristiansson for the same reasons that claim element 1[e] was.

8[k] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a first and second handle side surface coupling the handle front surface to the handle back surface;

364. This element is identical to claim element 1[f] with the exception of reciting “first and second” side surface of the handle, as opposed to “a” side surface of the handle. As was shown in the analysis of claim element 1[f] in view of Feng, Feng discloses a handle with front and back surfaces, and a POSITA would recognize that at least two side surfaces (one on each side of the handle) are disposed so as to couple the front and back surfaces of the handle on opposite sides of the handle. The remaining limitations of claim element 8[k] are disclosed by Feng for the same reasons that claim element 1[f] was. Furthermore, the ability of Feng to teach the limitations of claim element 8[k] would not be affected by the proposed modification to Feng in view of Kristiansson.

8[l] the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil;

365. This element is identical to claim element 1[g] and is accordingly obvious over Feng in view of Kristiansson for the same reasons that claim element 1[g] was.

8[m] the fork back surface, the spoon back surface , and the handle back surface collectively defining a single back surface of the utensil;

366. This element is identical to claim element 1[h] and is accordingly obvious over Feng in view of Kristiansson for the same reasons that claim element 1[h] was.

8[n] the first fork side surface, the first spoon side surface, and the first handle side surface collectively defining a single first side surface of the utensil; and

367. The claim limitations of element 8[n] are the limitations of claim element 1[i] with the exception of referring to a “first” side surface, “first” spoon side surface, and a “first” handle side surface. As shown in the analysis of claim element 1[i] in view of Feng, Feng discloses at least one side surface, spoon side surface, and handle side surface. Accordingly, Feng discloses the limitations of claim element 8[n] for the same reasons it discloses the limitations of claim element 1[i]. Furthermore, the ability of Feng to practice the limitations of claim element 8[n] would not be affected by the proposed modification to Feng in view of Kristiansson.

8[o] the second fork side surface, the second spoon side surface, and the second handle side surface collectively defining a single second side surface of the utensil.

368. The limitations of claim element 8[o] are identical to those of element 8[n] save replacing “first” with “second.” As discussed in the analysis of element 8[h], Feng teaches a configuration with the same knife edge 4 disposed on both

side of the fork head. As the configuration of Feng modified to include the curved side surface and chamfer of Kristiansson practices the limitations regarding the first fork side surface, the first spoon side surface, and the first handle side surface (i.e., element 8[n]), and these are the same respective limitations recited for the first fork side surface, the first spoon side surface, and the first handle side surface, a POSITA would recognize that Feng modified by Kristiansson as shown in Figure 44 (i.e., with the curved side surface and chamfer of Kristiansson disposed on both sides of the fork head of Feng) practices and/or renders obvious the limitations of claim element 8[o].

369. Accordingly, for at least the reasons described above, each and every limitation of Claim 8 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

9. Claim 9

9[preamble] An eating utensil comprising:

370. As described in my analysis of Claim 1, Feng discloses an eating utensil: “The present utility model discloses a silverware that combines a knife, a fork, and a spoon.”¹⁸⁴

9[a] a first head having a first front surface and a first back surface both partially defining a plurality of tines and

371. The limitations of claim element 9[a] are identical to those of claim element 1[a] with the exception of reciting the more general “first head”, “first front surface,” and “first back surface” as opposed to a “fork head,” “fork front surface,” and “fork back surface.” Accordingly, as Feng discloses a fork head

¹⁸⁴ Ex. 1004, Abstract.

practicing the limitations of claim element 1[a], it also discloses a “first head,” first front surface,” and “first back surface” of claim element 9[a].

9[b] a first concave bowl portion, an outer one of the tines and the first concave bowl portion being further defined by a chamfer and a first curved side surface coupled to the chamfer,

372. The limitations of claim element 9[b] are identical to those of claim element 1[b] with the exception of reciting the more general “first concave bowl portion” and “first curved side surface” as opposed to a “concave fork bowl portion” and “curved side surface.” As shown in the analysis of Claim 1[b], Feng in view of Kristiansson discloses a fork bowl portion, chamfer, and curved side surface practicing the limitations of claim element 1[a], accordingly Feng in view of Kristiansson also discloses a “first concave bowl portion,” chamfer, and “first curved side surface” practicing the limitations of claim element 9[b], *see* Figure 41.

9[c] the chamfer coupling the first front surface with the first curved side surface,

373. As demonstrated in my analysis of Claim 1, Feng as modified by Kristiansson includes a chamfer disposed on the outside edge of one of the fork tines. Also, as was shown this chamfer is coupled directly to the (first) curved side surface. As the fork front surface (the first front surface of Claim 9) comprises the outer fork tine surface which transitions into the chamfer and the chamfer is directly coupled to the (first) curved side surface, a POSITA would recognize that the chamfer couples the first front surface with the first curved side surface, *see* Figure 41.

9[d] the first curved side surface coupling the chamfer with the first back surface, and the chamfer is oblique in relation to the first curved side surface;

374. The limitations of claim element 9[d] are contained within the limitations of claim element 1[c] with the addition of the “first” modifier (i.e., first curved side surface and first back surface). As Feng in view of Kristiansson discloses at least one side surface coupling the chamfer with at least one back surface, the chamfer being oblique in relation to at least one first curved side surface (i.e., claim element 1[c]), Feng in view of Kristiansson also discloses the first curved side surface coupling the chamfer with the first back surface, and the chamfer is oblique in relation to the first curved side surface, *see* Figure 41.

9[e] a second head having a second front surface, a second back surface, and a second side surface coupling the second front surface with the second back surface,

375. The limitations of claim element 9[e] are identical to those of claim element 1[d] with the exception of reciting the more general “second head,” “second front surface,” and “second back surface” as opposed to a “spoon head,” “spoon front surface,” and “spoon back surface.” Accordingly, as Feng discloses a spoon head practicing the limitations of claim element 1[d], it also discloses a “second head,” “second front surface,” and “second back surface” of claim element 9[e]. The modification of Feng by Kristiansson would also disclose or render obvious this limitation, *see* Figure 41.

9[f] the second front surface, the second back surface, the second side surface partially defining a second concave bowl portion, the second concave bowl portion faces the same way as the first concave bowl portion;

376. The limitations of claim element 9[f] are identical to those of claim element 1[e] with the exception of reciting the more general “second front surface,” “second back surface,” “second concave bowl portion,” and “first concave bowl portion” as opposed to a “spoon front surface,” “spoon back surface,” “concave spoon bowl portion,” and “concave fork bowl portion.” Accordingly, as Feng discloses a “spoon front surface,” “spoon back surface,” “concave spoon bowl portion,” and “concave fork bowl portion” practicing the limitations of claim element 1[e], it also discloses the “second front surface,” “second back surface,” “second concave bowl portion,” and “first concave bowl portion” of claim element 9[f]. The modification of Feng by Kristiansson would also disclose or render obvious this limitation, *see* Figure 41.

9[g] a handle that couples the second head to the first head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

377. The limitations of claim element 9[g] are identical to those of claim element 1[f] with the exception of reciting the more general “first head” and “second head” as opposed to “fork head” and “spoon head.” Accordingly, as Feng discloses a handle, spoon, and fork head practicing the limitations of claim element 1[f], it also discloses the more general handle, first head, and second head of claim element 9[g]. The modification of Feng by Kristiansson would also disclose or render obvious this limitation, *see* Figure 41.

9[h] the first front surface, the second front surface, and the handle front surface collectively defining a single front surface of the utensil;

378. The limitations of claim element 9[h] are identical to those of claim element 1[g] with the exception of reciting the more general “first front surface”

and “second front surface” as opposed to “fork front surface” and “spoon front surface.” Accordingly, as Feng discloses a handle front surface, spoon front surface, and fork front surface practicing the limitations of claim element 1[g], it also discloses the more general handle front surface, first front surface, and second front surface of claim element 9[h]. The modification of Feng by Kristiansson would also disclose this limitation or render obvious, *see* Figure 41.

9[i] the first back surface, the second back surface , and the handle back surface collectively defining a single back surface of the utensil; and

379. The limitations of claim element 9[i] are identical to those of claim element 1[h] with the exception of reciting the more general “first back surface” and “second back surface” as opposed to “fork back surface” and “spoon back surface.” Accordingly, as Feng discloses a handle back surface, spoon back surface, and fork back surface practicing the limitations of claim element 1[h], it also discloses the more general handle back surface, first back surface, and second back surface of claim element 9[i]. The modification of Feng by Kristiansson would also practice this limitation, *see* Figure 41.

9[j] the first side surface, the second side surface, and the handle side surface collectively defining a single side surface of the utensil.

380. The limitations of claim element 9[j] are identical to those of claim element 1[i] with the exception of reciting the more general “first side surface” and “second side surface” as opposed to “fork side surface” and “spoon side surface.” Accordingly, as Feng discloses a handle side surface, spoon side surface, and fork side surface practicing the limitations of claim element 1[i], it also discloses the more general handle side surface, first side surface, and second side surface of

claim element 9[j]. The modification of Feng by Kristiansson would also disclose or render obvious this limitation, *see* Figure 41.

381. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 9 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

10. Claim 10

The eating utensil as recited in claim 9, wherein the handle, the first head, and the second head are integrally formed.

382. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

383. Furthermore, Feng discloses that the handle, first head, and second head are integrally formed. Feng teaches: “the handle 1, the spoon head 2, and the fork head 3 are made integrally of stainless steel, and the blade 4 is formed by sharpening one side of the fork head.”¹⁸⁵ Accordingly, the modification of Feng by Kristiansson would also disclose or render obvious this limitation, *see* Figure 41.

384. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 10 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

11. Claim 11

The eating utensil as recited in claim 9, wherein an inner one of the tines is substantially straight.

385. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

¹⁸⁵ Ex. 1004, Claim 2.

386. Claim 2 modifies Claim 1 of the '629 Patent by requiring “inner ones of the plurality of tines each has a pair of substantially straight side edges.” As shown in the analysis of Claim 2 in view of Feng in view of Kristiansson, Feng discloses at least one inner tine which is substantially straight. *See, e.g.,* Figure 25; the modification of Feng by Kristiansson would also disclose or render obvious this limitation, *see* Figure 41.

387. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 11 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

12. Claim 12

The eating utensil as recited in claim 9, wherein the outer ones of the tines is further defined by a substantially straight inner edge.

388. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

389. Feng discloses an outer tine defined by a substantially straight inner edge, for example, *see* Figure 25. The modification of Feng by Kristiansson would also disclose or render obvious this limitation, *see* Figure 41.

390. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 12 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

13. Claim 13

The eating utensil as recited in claim 9, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

391. Claim 13 modifies Claim 9 in the same way that Claim 7 modifies Claim 1. As shown above, Claims 1, 7, and 9 are rendered obvious over Feng in view of Kristiansson. Accordingly, Claim 13 is also rendered obvious over Feng in view of Kristiansson.

14. Claim 14

392. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

14[a] wherein the second concave bowl portion is further defined by a plurality of substantially flat side edges,

14[b] wherein one of the substantially flat side edges further defines the single side surface of the utensil.

393. Claim 14 modifies Claim 9 in the same way that Claim 6 modifies Claim 1. As shown above, Feng in view of Kristiansson renders the limitation of each of Claims 1, 6, and 9. Therefore, the limitations of Claim 14 are also rendered obvious over Feng in view of Kristiansson.

15. Claim 15

15[preamble] An eating utensil comprising:

394. As described in my analysis of Claim 1, Feng discloses an eating utensil: “The present utility model discloses a silverware that combines a knife, a fork, and a spoon.”¹⁸⁶

15[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

¹⁸⁶ Ex. 1004, Abstract.

395. This element is identical to claim element 1[a] and is accordingly disclosed by Feng for the same reasons that claim element 1[a] was.

15[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer,

396. This element is identical to claim element 1[b] and is accordingly disclosed or rendered obvious by Feng in view of Kristiansson for the same reasons that claim element 1[b] was. See, for example, Figure 41.

15[c] the chamfer coupling the fork front surface with the curved side surface,

397. As demonstrated in my analysis of Claim 1, Feng in view of Kristiansson includes a first chamfer disposed on the outside edge of one of the fork tines. Also, as was shown this chamfer is coupled directly to the curved side surface. As the fork front surface comprises the outer fork tine surface which transitions into the chamfer and the chamfer is directly coupled to the curved side surface, a POSITA would recognize that the chamfer couples the fork front surface to the curved side surface. *See* Figure 41.

15[d] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the chamfer and the curved side surface defines a curved splitting feature;

398. This element is identical to claim element 1[c] and is accordingly disclosed or rendered obvious by Feng in view of Kristiansson for the same reasons that claim element 1[c] was.

15[e] a handle coupled to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

399. The analysis of claim element 1[f] demonstrated that Feng in view of Kristiansson discloses a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface. Accordingly, Feng in view of Kristiansson at least includes a handle coupled to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface. *See* Figure 41.

15[f] the fork front surface and the handle front surface defining a single front surface of the utensil;

400. The analysis of claim element 1[g] demonstrated that Feng in view of Kristiansson practices “the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil.” Accordingly, Feng at least practices “the fork front surface and the handle front surface defining a single front surface of the utensil.”

15[g] the fork back surface and the handle back surface defining a single back surface of the utensil; and

401. The analysis of claim element 1[h] demonstrated that Feng in view of Kristiansson practices “the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil.” Accordingly, Feng in view of Kristiansson at least practices “the fork back surface and the handle back surface defining a single back surface of the utensil.”

15[h] the fork side surface and the handle side surface defining a single side surface of the utensil.

402. The analysis of claim element 1[i] demonstrated that Feng in view of Kristiansson practices “the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.” Accordingly, Feng in view of Kristiansson at least practices “the fork side surface and the handle side surface defining a single side surface of the utensil.”

403. Accordingly, for at least the above reasons, each and every limitation of Claim 15 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

16. Claim 16

16[preamble] The eating utensil as recited in claim 15,

404. As shown above, the limitations of Claim 15 of the '629 Patent would have been obvious over Feng in view of Kristiansson.

16[a] further comprising a spoon head coupled to the handle on an opposite side from where the fork head is coupled to the handle,

405. Feng teaches: “The specific construction of the present utility model is as follows: a three-purpose silverware, characterized in that one end of a handle 1 is installed with a spoon head 2, the other end thereof is installed with a fork head 3 [...].”¹⁸⁷ This teaching of Feng would have been included in the modified version of Feng in view of Kristiansson, for example, *see* Figure 41.

¹⁸⁷ Ex. 1004, Description.

406. Accordingly, Feng in view of Kristiansson discloses a spoon head coupled to the handle on an opposite side from where the fork head is coupled to the handle.

16[b] the spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface,

407. This element is identical to claim element 1[d] and is accordingly disclosed or rendered obvious by Feng in view of Kristiansson for the same reasons that claim element 1[d] was.

16[c] wherein the spoon front surface, the spoon back surface, and the spoon side surface defining a concave spoon bowl portion;

408. This element is included within claim element 1[e] and is accordingly disclosed or rendered obvious by Feng in view of Kristiansson for the same reasons that claim element 1[e] was.

16[d] the spoon front surface further defining the single front surface of the utensil;

409. The analysis of claim element 1[g] demonstrated that Feng in view of Kristiansson practices “the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil.” Accordingly, Feng in view of Kristiansson at least practices or renders obvious “the spoon front surface further defining the single front surface of the utensil.”

16[e] the spoon back surface further defining the single back surface of the utensil; and

410. The analysis of claim element 1[h] demonstrated that Feng in view of Kristiansson practices “the fork back surface, the spoon surface, and the handle

back surface collectively defining a single back surface of the utensil.”

Accordingly, Feng in view of Kristiansson at least practices or renders obvious “the spoon back surface further defining the single back surface of the utensil.”

16[f] the spoon side surface further defining the single side surface of the utensil.

411. The analysis of claim element 1[i] demonstrated that Feng in view of Kristiansson practices “the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.” Accordingly, Feng in view of Kristiansson at least practices “the spoon side surface further defining the single side surface of the utensil.”

412. Accordingly, for at least the above reasons, each and every limitation of Claim 16 of the ’629 Patent would have been obvious over Feng in view of Kristiansson.

17. Claim 17

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is tilted in relation to the handle front surface at an angle of about 20-25 degrees.

413. As shown above, each and every limitation of Claim 16 would have been obvious over Feng in view of Kristiansson.

414. With regard to the limitations of Claim 17, the ’629 Patent teaches: “the bowl 112 is angled upward to form a deeper bowl, which can be more efficient when scooping liquids, such as soups. In a particular embodiment, the bowl is angled upward at an angle of about 20-25 degrees, and preferably about 23 degrees.”¹⁸⁸ However, the ’629 Patent does not disclose exactly why the specific

¹⁸⁸ Ex. 1001, 5:41-45.

range of angle between 20-25 degrees provides any claimed benefit that, *e.g.*, a bowl angled upwards at an angle of 30-35 degrees would not provide, nor whether such an angle (30-35 degrees) would be considered “about 20-25 degrees” within the context of the claimed invention. Accordingly, a POSITA would not perceive that the ’629 Patent has taught any functional benefit to the limitations of Claim 17 and would interpret the limitations of Claim 17 as being an aesthetic design choice.

415. A POSITA would understand that the angle of the bowl portion with respect to the handle in a spoon could fall within a wide range of angles; a POSITA would interpret the relative angle between the spoon bowl and the handle as being among a finite number of identifiable design choices which a POSITA would pick and choose from with a more than reasonable chance of success, each of them having predictable outcomes.

416. Accordingly, the limitations of Claim 17 would have been obvious over Feng in view of Kristiansson.

18. Claim 18

18[preamble] The eating utensil as recited in claim 16,

417. As shown above, the limitations of Claim 16 of the ’629 Patent would have been obvious over Feng in view of Kristiansson.

18[a] wherein the concave spoon bowl portion is further defined by a substantially flat side edge,

18[b] wherein the substantially flat side edge further defines the single side surface of the utensil.

418. Claim 18 modifies Claim 16 in the same way that Claim 6 modifies Claim 1, with the exception that Claim 18 only requires a single substantially flat side edge as opposed to a plurality of substantially flat side edges. Accordingly, the

limitations of Claim 18 would be a subset of Claim 6. As shown above, Feng in view of Kristiansson renders the limitation of each of Claims 1, 6, and 16 obvious. Therefore, the limitations of Claim 18 are also rendered obvious over Feng in view of Kristiansson.

19. Claim 19

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is further defined by a substantially flat end edge.

419. As discussed in the analysis of Claim 6 in view of Feng, it would not have been entirely clear from the teachings of the '629 Patent what exactly qualifies as “substantially flat”, as the specification and drawings refer to figures showing surfaces (such as the side and end edges) which only contain sub-sections which could be considered flat.

420. As can be seen in Figure 35, to the extent that the end edge of the '629 Patent drawings is considered to be “substantially flat,” Feng also discloses a substantially flat end edge.

421. Alternatively, to the extent that the “substantially flat” limitation is determined to represent a characteristic of the end edge which Feng does not read on, the '629 Patent specification provides no justification for this alleged benefit, i.e., the patent does not explain why, exactly, a “substantially flat end edge” would “allow” scraping food from the side of a container.¹⁸⁹

422. Based on my experience with the use of utensils to eat from a variety of containers, I am not aware of any *a priori* reason that the “substantially flat end edge” of the claimed invention would “allow” scraping as opposed to, e.g., the end edge of the concave spoon bowl being curved and not flat. Furthermore, to the

¹⁸⁹ See Ex. 1001, 10:20-24.

extent that the '629 Patent specification is meant to suggest that flat end edge would provide a more complete mating with the interior of a container for “scraping”, this would only be the case when the overall curvature of the flat side edge substantially matches the interior surface of the container. This matching is certainly not claimed or discussed within the '629 Patent nor would such a teaching be feasible to accomplish for every conceivable eating container.

423. Accordingly, a POSITA would understand that having a substantially flat end edge would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Feng does not show a concave spoon bowl portion defined by a substantially flat end edge, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success. The spoon end edge of Feng would be unaffected by the proposed modification in view of Kristiansson; accordingly, the modification of Feng by Kristiansson would also disclose or render obvious the limitations of Claim 19, *see* Figure 41.

20. Claim 20

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion has a substantially pentagonal shape.

424. As described above in the analysis of Claim 20 in view of Feng and Kristiansson, while the disclosure of a pentagonal shape for the spoon head of the '629 Patent would cause a POSITA some deal of confusion (the figures of the '629 Patent show the spoon to have a hexagonal shape), to the extent that the '629 Patent discloses a “pentagonal” shape for the spoon head, the specification of the '629 Patent does not teach any functional benefit to the recited “pentagonal” shape.

425. To the extent that Feng does not disclose this limitation, a POSITA would understand that having such a shape would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Feng does not show a substantially pentagonal spoon head, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success. The spoon head shape of Feng would be unaffected by the proposed modification in view of Kristiansson; accordingly, the modification of Feng by Kristiansson would also disclose or render obvious the limitations of Claim 20, *see* Figure 41.

21. Claim 21

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is further defined by at least three substantially flat side edges with rounded corners connecting the flat side edges, wherein one of the flat side edges further defines the single side surface of the utensil.

426. Claim 21 modifies Claim 16 in the same way that Claim 4 modifies Claim 1. As shown above, Feng in view of Kristiansson renders the limitation of each of Claims 1, 4, and 16 obvious. Therefore, the limitations of Claim 21 are also rendered obvious over Feng in view of Kristiansson.

22. Claim 22

The eating utensil as recited in claim 15, wherein the handle front surface has a diagonal ridge.

427. The claim term “diagonal ridge” does not appear within the specification of the ’629 Patent. Accordingly, a POSITA would not understand

whether the '629 Patent is claiming, e.g., a diagonal ridge which runs the entire length of the handle or any diagonal ridge on the front surface. A POSITA would then be left to conclude that any diagonal ridge would read on the limitations of Claim 22.

428. Therefore, a POSITA would recognize that Feng discloses a plurality of diagonal ridges as can be seen in Feng's drawing showing fish scales embossed or stamped on the front surface of the handle of Feng. *See* Figure 40.

429. Alternatively, to the extent that Feng is determined to not include diagonal ridges on the front surface of the handle, the '629 Patent specification provides no justification for any alleged function or benefit to the recited "diagonal ridges."

430. Accordingly, a POSITA would understand that including diagonal ridges on the front surface of the handle of Feng would be purely an aesthetic design consideration and would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Feng does not include a handle front surface with diagonal ridges, modifying Feng to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success. Thus, in the alternative, this claim would be obvious over Feng.

23. Claim 23

The eating utensil as recited in claim 15, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

431. Claim 23 modifies Claim 15 in the same way that Claim 7 modifies Claim 1. As shown above, Feng teaches or renders obvious the limitation of each

of Claims 1, 7, and 15. Therefore, the limitations of Claim 23 are also disclosed or rendered obvious by Feng in view of Kristiansson.

I. Claims 1-3, 7-13, 15, 16, 22 and 23 of the '629 Patent are Obvious over Kent in View of Vanderputt and Bo.

1. Claim 1

1[preamble] An eating utensil comprising

432. Kent teaches: “In accordance with the present invention, there is provided a one piece eating utensil that will perform the tasks of a knife, fork, and spoon.”¹⁹⁰ Accordingly, Kent discloses an eating utensil.

1[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

433. Kent discloses a fork head with fork front surface and a fork back surface, both of these surfaces defining a plurality of tines. *See* Figure 45. Thus, Kent discloses this element.

¹⁹⁰ Ex. 1007, [0009].

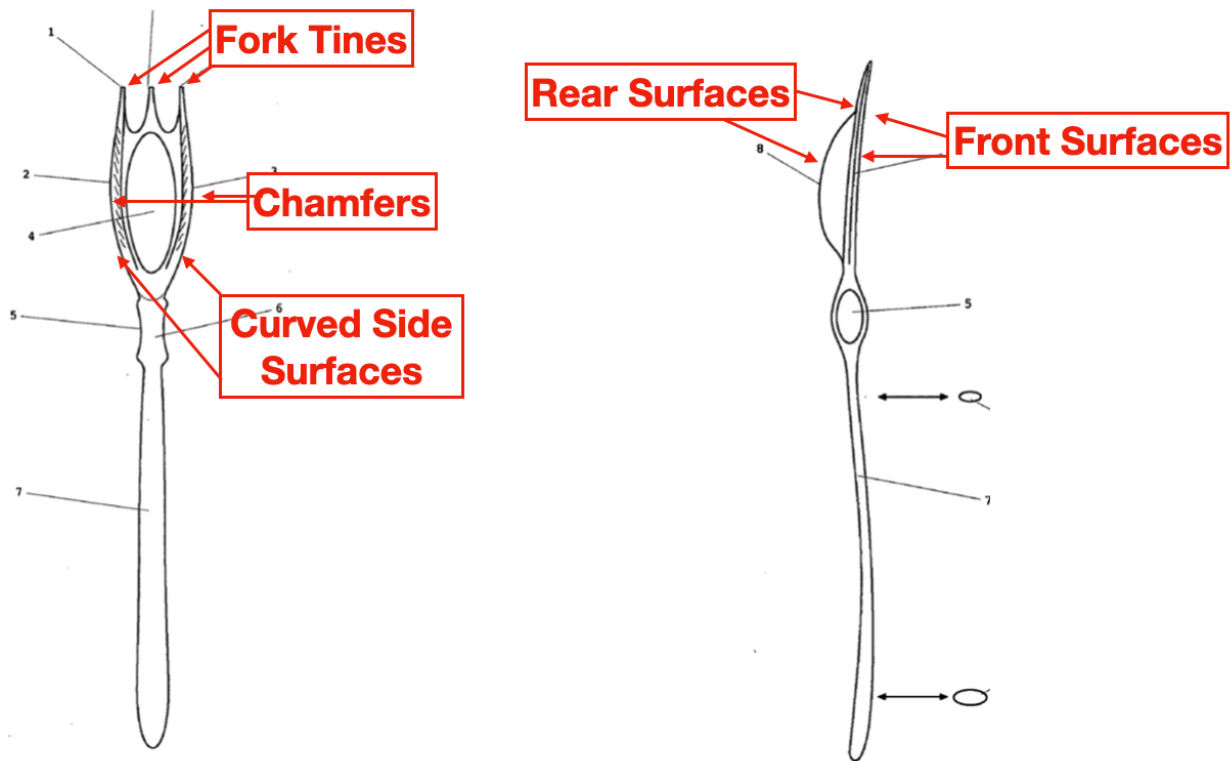


Figure 45. Annotated figures from Kent showing the disclosed elements described in the text.

1[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer, the chamfer coupling the fork front surface with the curved side surface,

434. As can be seen in Figure 45, Kent discloses a concave fork bowl portion which is at least partially defined by chamfers and curved side surfaces coupled to the chamfers on each side of the fork bowl; the chamfers further coupling the fork front surface with the curved side surfaces.

435. Kent teaches: “The invention is constructed in one piece and has a wide upper section that consists of two blunted knife edges that end at the top of the utensil in a three pronged fork.”¹⁹¹

¹⁹¹ Ex. 1007, [0010].

436. As discussed previously, a POSITA would understand that the chamfer disclosed by the '629 Patent encompasses various chamfer angles so long as the chamfered edge results in a surface able to provide cutting or separating of foods. Therefore, in view of the specification and figures of Kent, a POSITA would recognize the blunted knife edges on either side of the fork head in Kent as a chamfer as disclosed in the '629 Patent.

437. Furthermore, as can be seen in Figure 45, each of the chamfers of Kent are coupled to respective curved side surfaces. Thus, Kent discloses this element.

1[c] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the chamfer and the curved side surface defines a curved splitting feature;

438. A POSITA would recognize the figures of Kent as shown in Figure 45 as disclosing that the curved side surfaces of Kent couple the chamfer to the fork back surface. Furthermore, the description of the chamfers of Kent (knife edges) as “blunted” would indicate to a POSITA that the angle of the chamfer is oblique as 90° chamfer on the knife edge would result in an edge that is not blunted, see, for example, Figure 27. The use of the word “knife edge” in Kent would inform a POSITA that such an edge would be used for splitting or cutting. Thus, Kent discloses this element.

1[d] a spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface,

1[e] the spoon front surface, the spoon back surface, and the spoon side surface partially defining a concave spoon bowl portion, the spoon bowl portion facing a same way as the concave fork bowl portion;

439. Claim elements 1[d] and 1[e] can be analyzed simultaneously. As can be seen in Figure 45, Kent includes a spoon bowl portion co-located with the fork bowl portion. However, in looking to improve the prior art, a POSITA would have realized that the design of Kent with the spoon bowl co-located with both the fork bowl portion, as well as adjacent to the knife edges would present significant drawbacks. For example, when eating liquids, a user would typically need to close their entire mouth around the spoon bowl, thus encountering a greater risk of cutting the edges of their mouths (even with the blunted chamfer taught by Kent). Additionally, co-locating the spoon bowl with the fork bowl would increase the likelihood of a user poking their tongue when using the spoon bowl, this especially being a concern for users with movement handicaps, which Kent is at least partially directed to.¹⁹²

440. In view of these shortcomings of Kent, a POSITA would look to other prior art available at the time of priority for solutions, such as Bo which includes a spoon bowl at the opposite end of the fork handle and reduces the probability that a user would injure themselves on either the knife edges or fork tines of Kent while closing their mouths around the spoon bowl. The spoon being at the opposite end of the fork handle has additional benefits, such as enabling a wider variety of foods with a single utensil, among others.

441. Bo is analogous art to Kent as both teach to multi-function cutlery providing a fork, knife, and spoon in a single unitary utensil. Kent and Bo also identify the same desire to provide more efficient and compact eating utensils.¹⁹³

442. A POSITA would have found adequate motivation to include a spoon bowl portion at the opposite end of the utensil handle for at least the reasons given above. Moreover, such designs were well known in the art by the time of priority

¹⁹² See Ex. 1007, [0004].

¹⁹³ See Ex. 1007, [0005] and Ex. 1008, [0005].

of the '629 Patent; see, for example, Figure 30. In view of Bo specifically, a POSITA would be motivated include a spoon bowl portion to the opposite end of the handle of Kent as well as employ the wider (more user friendly for eating liquids) spoon design of Bo. A POSITA would also know to orient the spoon bowl portion in the same direction as the fork bowl portion of Kent so as to reduce the amount of hand operations necessary to switch between fork/knife and spoon, which Kent teaches towards.¹⁹⁴ See Figure 46.

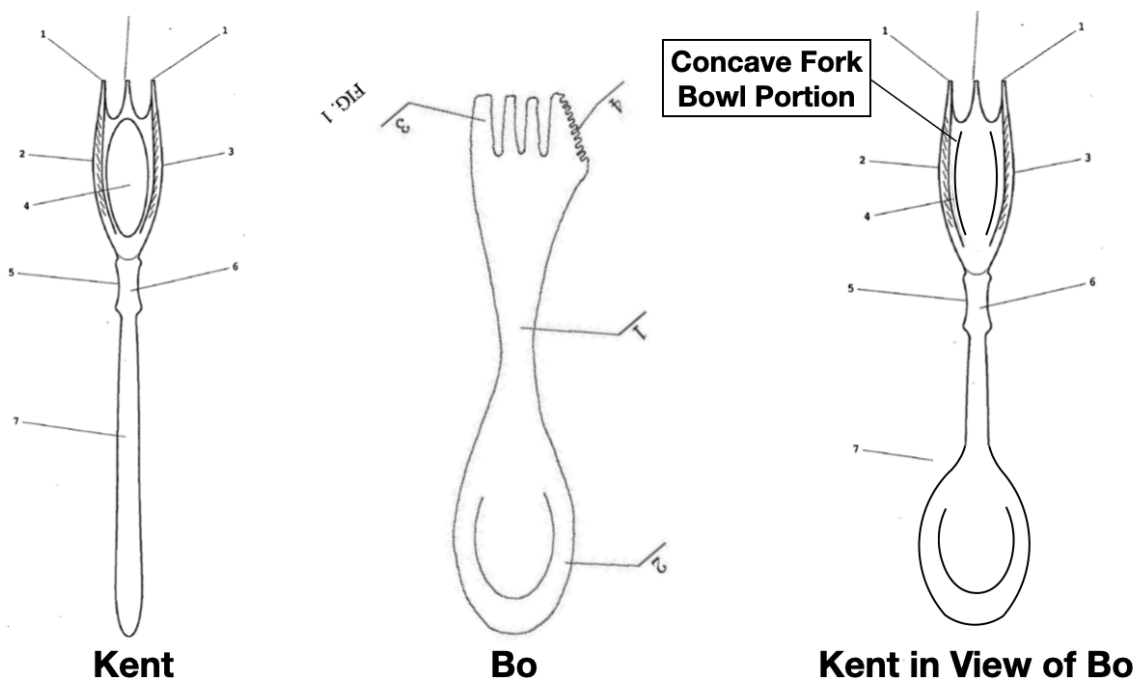


Figure 46. Figures from Bo (left) and Kent (center) showing the respective disclosures. A POSITA would be motivated to combine the teachings of Kent and Bo so as to move the spoon head of Bo to the opposite side of the handle in Kent, represented on the right.

443. Modifying Kent in view of Bo would have amounted to a simple substitution of the elements (incorporating the spoon head design and location of Bo into Kent) to obtain predictable results (eating with a combination utensil with fork and spoon located on opposite sides of the handle was known in the art, see

¹⁹⁴ Ex. 1007, [0004].

Figure 30). Additionally, making such a modification would have presented no technical difficulties to a POSITA and would not have required significant experimentation; the likelihood of success in incorporating the above features of Bo into Kent would have had a more than reasonable likelihood of success.

444. Kent as modified by Bo would include the limitations of claim elements 1[d]-1[e], i.e., a spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface; the spoon front surface, the spoon back surface, and the spoon side surface partially defining a concave spoon bowl portion, the spoon bowl portion facing the same way as the concave fork bowl portion. *See* Figure 46. Thus, this element would be obvious over Kent in view of Bo.

1[f] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

445. As can be seen in Figure 46, Kent as modified by Bo would include a handle coupling the spoon head to the fork head. A POSITA would understand that such a handle would front, rear, and side surfaces with the side surfaces providing coupling between the front surface of the handle and the rear surface of the handle.

1[g] the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil;

1[h] the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil; and

1[i] the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.

446. Claim elements 1[g]-1[i] can be analyzed simultaneously.

447. With the fork and spoon bowl portions facing the same way as in the Kent utensil modified by Bo (*see* Figure 46), a POSITA would recognize that the fork front surface, the spoon front surface, and the handle front surface would collectively define a single front surface of the utensil and that the fork back surface, the spoon surface, and the handle back surface would collectively define a single back surface of the utensil. Furthermore, a POSITA would recognize that Kent as modified by Bo would have a single side surface defined by the side surface of each of the fork, spoon, and handle collectively.

448. Accordingly, for at least the above reasons, Kent in view of Bo practices each and every limitation of Claim 1 of the '629 Patent and, therefore, renders Claim 1 obvious.

2. Claim 2

An eating utensil as recited in claim 1, wherein inner ones of the plurality of tines each has a pair of substantially straight side edges and a pointed distal tip.

449. As shown above, Kent in view of Bo practices each and every limitation of Claim 1.

450. Furthermore, as can be seen in Figure 46, Kent includes a single inner tine with a pointed distal tip and curved side edges. While a POSITA would recognize the utility of pointed tips on fork tines (to spear food), the '629 Patent fails to teach any benefit or functionality of the inner tines having substantially straight side edges. A POSITA would recognize that the shape of the inner tines of a fork could have a variety of shapes and contours, straight being one of them.

451. A POSITA would understand that having a straight (or substantially straight) side edges of the inner fork tines would be one of a number of possible

configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Kent as modified by Bo does not include inner tines with substantially straight side edges, further modifying Kent to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success. For example, fork designs with inner tines having substantially straight edges was a well-known design choice at the time of priority, *see* Figure 47.

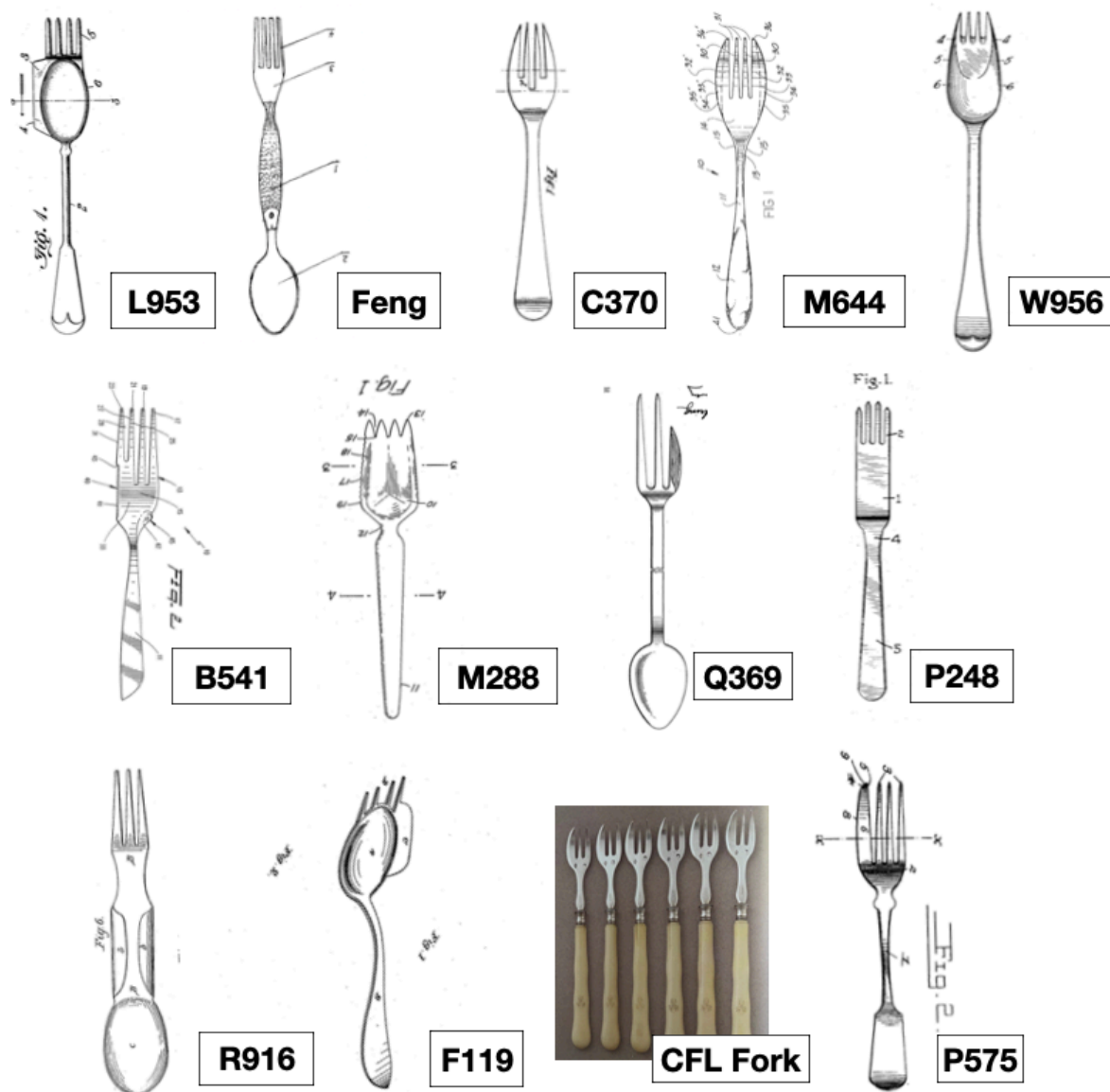


Figure 47. Prior art utensils which incorporating inner fork tines with substantially straight edges. Abbreviations can be found in Table 1.

452. To the extent that Claim 2 requires a plurality of inner tines, this would also have been one of many design choices that a POSITA could have made which was very common in the prior art, *see* Figure 47.

453. Additionally, to the extent that a POSITA would look to a specific reference in order to inform their design choices, a POSITA would have had access to prior art such as Vanderputt. Vanderputt teaches a fork-knife-spoon combination bearing many similarities to Kent. For example, Vanderputt discloses a fork with a plurality of inner and outer tines, the outer tines comprising a beveled cutting surface (chamfer). In looking to further improve the prior art of Kent, a POSITA would look to substantially similar prior art such as Vanderputt.

454. A POSITA would realize that fork heads comprising a plurality of inner tines was both common in the art (as shown in Figure 47) and beneficial to a user so as to provide for a greater ability to spear food. In effect, a POSITA would have realized from references such as Vanderputt that the center (singular) tine of Kent could be replaced with at least two tines if the tines are made slightly thinner and the side edges of the tines were made straight, as opposed to the curved side edge of the tine in Kent. A POSITA would also have realized that by keeping the depth of the plurality of fork tines approximately the same as the single tine in Kent, a modified Kent with multiple inner tines would be provide for an improved ability to spear food while not sacrificing the ability of the fork head to support side loading during cutting operations with the knife edge. A representation of what Kent in view of Bo as further modified by Vanderputt is shown in Figure 48.

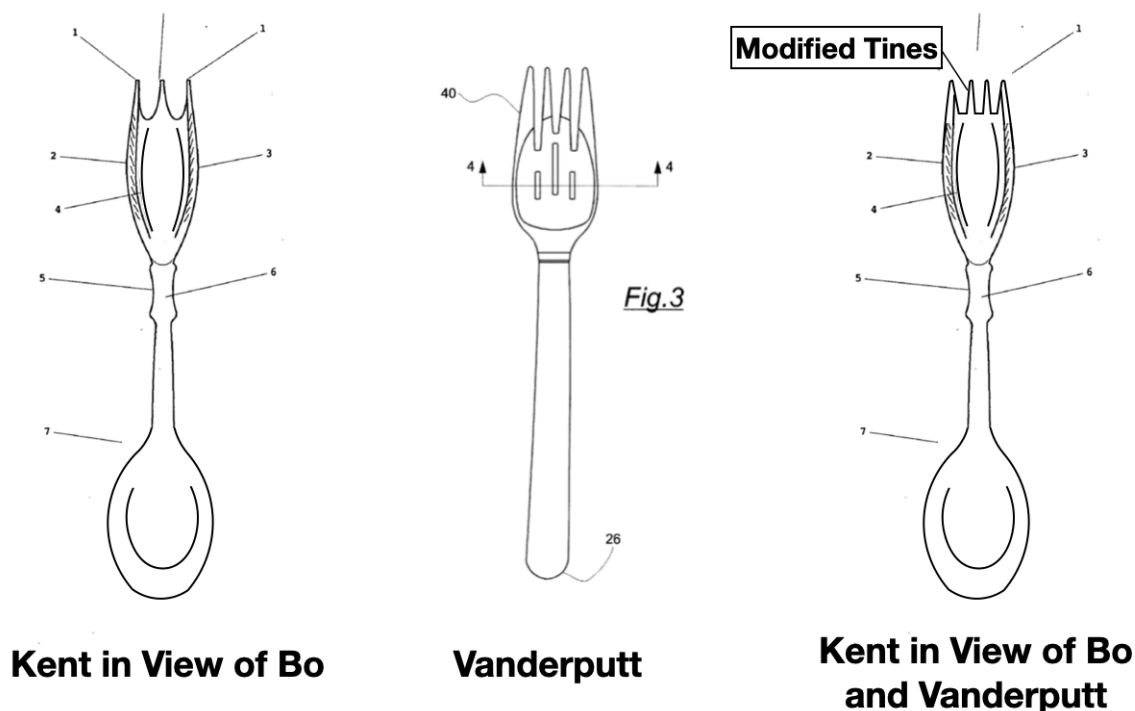


Figure 48. Figures showing Vanderputt (left), Kent as modified by Bo (center), and Kent as modified by Bo and Vanderputt (right) as described in the text.

455. Vanderputt is analogous art to Kent as both teach to multi-function cutlery providing a fork, knife, and spoon in a single unitary utensil, with the fork, spoon, and knife all co-located on the same utensil head. Vanderputt and Kent amount to substantially similar disclosures differing principally by design choices.

456. A POSITA would have found to modify the central tine of Kent with curved side edges to the plurality of central tines with straight side edges as described above and shown in Figure 48. Moreover, such designs were well known in the art by the time of priority of the '629 Patent, as shown in Figure 47.

457. Modifying Kent in view of Vanderputt would have amounted to a simple substitution of the elements (incorporating the plurality of straight tines from Vanderputt into Kent) to obtain predictable results (increasing the number of central tines thus improving the ability of a user to spear food) Additionally, making such a modification would have presented no technical difficulties to a

POSITA and would not have required significant experimentation; the likelihood of success in incorporating the above features of Vanderputt into Kent would have had a more than reasonable likelihood of success.

458. Kent as modified by Bo would include the limitations of Claim 2, i.e., inner ones of the plurality of tines each has a pair of substantially straight side edges and a pointed distal tip, *see* Figure 48.

459. Accordingly, Claim 2 would have been obvious over Kent in view of Bo and Vanderputt.

3. Claim 3

An eating utensil as recited in claim 2, wherein the outer one of the tines has a wider base end than the inner ones of the tines.

460. As described above, a POSITA would be more than adequately motivated to include the tine structure of Vanderputt into Kent (as modified by Bo), *see* Figure 48. Doing so would result in the outer tines with the cutting edge having a wider base than each of the inner tines. Such a design would have been obvious to a POSITA for at least the reasons above as well as ensuring for adequate load bearing support of the outer tines during cutting operations and improved rigidity, while maintaining the ability to provide for a plurality of inner tines.

461. Accordingly, Claim 2 would have been obvious over Kent in view of Bo and Vanderputt.

4. Claim 7

7[preamble] An eating utensil as recited in claim 1,

462. As shown above, Kent in view of Bo practices each and every limitation of Claim 1.

7[a] wherein the eating utensil is formed of a glass reinforced thermoplastic material.

463. Kent discloses that its utensil can be integrally formed¹⁹⁵ using “various materials such as precious metal, metal, wood, compressed wood, plastic, polypropylene, poly vinyl acrylic.”¹⁹⁶ To the extent that Kent does not disclose this limitation, it would have been obvious to a POSITA to practice Kent (and Kent modified by Bo) using a glass filled thermoplastic material. As Kent additionally contemplates the use of both metal and thermoplastic polymers (polypropylene) to fabricate Kent’s utensil, it would be obvious for a POSITA to try glass reinforced thermoplastics as a known technique to improve properties of the utensil.¹⁹⁷ The addition of glass to thermoplastic materials was known at the time of the ’629 Patent to improve various physical and mechanical properties of plastics, such as chemical resistance, heat resistance, tensile strength, dimensional stability, and moisture resistance.¹⁹⁸

464. A POSITA would have known that the improved strength and weight afforded by using a glass-reinforced thermoplastic for Kent would be directly applicable to one of the goals of Kent which teaches an invention directed towards “campers, people working in the field, and our military. These people need to travel as light as possible.”¹⁹⁹

465. Accordingly, Claim 7 would have been obvious over Kent in view of Bo.

¹⁹⁵ Kent describes its invention as “constructed in one piece”, *see* Ex. 1007, [0010].

¹⁹⁶ Ex. 1007, [0011].

¹⁹⁷ Rosato, Donald. *Designing with plastics and composites: a handbook*. Springer Science & Business Media, 2013, pp. 77-78.

¹⁹⁸ *Id.*, pp. 79-80, 82.

¹⁹⁹ Ex. 1007, [0005].

5. Claim 8

8[preamble] An eating utensil formed from a glass filled nylon thermoplastic material, the eating utensil comprising:

466. As described in my analysis of Claim 1, Kent teaches: “In accordance with the present invention, there is provided a one piece eating utensil that will perform the tasks of a knife, fork, and spoon.”²⁰⁰ Accordingly, Kent discloses an eating utensil.

467. As shown in the analysis of Claim 7, a POSITA would have been motivated to practice Kent using a glass-filled thermoplastic material, as the addition of glass to thermoplastics is known to improve various physical and mechanical properties of thermoplastics and the resulting utensil including thermoplastic. More specifically, a POSITA would be motivated to use nylon as the base thermoplastic material, as it is commonly used as a metal replacement²⁰¹ and Kent additionally contemplates the use of both metal and thermoplastic to fabricate its utensil.²⁰² As similarly discussed above with respect to Claim 7, glass-filled nylon thermoplastic materials were known at the time of the '629 Patent to provide heat resistance, odor resistance, structural stability, and overall good durability.^{203,204}

468. Accordingly, a POSITA would have found it obvious to practice Kent, as well as Kent using a glass-reinforced nylon thermoplastic material.

²⁰⁰ Ex. 1007, [0009].

²⁰¹ Mark, Herman. Encyclopedia of Polymer Science and Technology, 3rd Edition. Volume 3: Polyamides, Plastics. John Wiley & Sons, Inc. 2004, p. 618.

²⁰² Ex. 1007, [0011].

²⁰³ Rosato, Donald. Designing with plastics and composites: a handbook. Springer Science & Business Media, 2013, pp. 424-425.

²⁰⁴ Mark, Herman. Encyclopedia of Polymer Science and Technology, 3rd Edition. Volume 3: Polyamides, Plastics, pp. 630-631.

8[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

469. This element is identical to claim element 1[a] and is accordingly disclosed by Kent for the same reasons that claim element 1[a] was.

8[b] a concave fork bowl portion, a first outer one of the tines and the concave fork bowl portion being further defined by a first chamfer and a first curved side surface coupled to the first chamfer,

470. This element is identical to claim element 1[b] except for referring to a “first” chamfer and “first” curve side surface. As the analysis of claim element 1[b] demonstrated that at least one chamfer and curved side surface is included in Kent, the limitations of claim element 8[b] are also included in Kent. *See Figure 45.*

8[c] the first chamfer coupling the fork front surface with the first curved side surface,

471. As demonstrated in my analysis of Claim 1, Kent includes a first chamfer disposed on the outside edge of one of the fork tines. As was shown, this first chamfer is coupled directly to the first curved side surface, *see Figure 45.* As the fork front surface comprises the outer fork tine surface which transitions into the first chamfer and the first chamfer is directly coupled to the first curved side surface, a POSITA would recognize that the first chamfer couples the fork front surface to the first curved side surface.

8[d] the first curved side surface coupling the first chamfer with the fork back surface,

472. The limitations of claim element 8[d] are contained within the limitations of claim element 1[c], with the difference being the references to the

“first curved side surface” and “first chamfer.” As the analysis of element 1[c] demonstrated that Kent includes at least one curved side surface coupling at least one chamfer with the fork back surface, “the first curved side surface coupling the first chamfer with the fork back surface” of element 8[d] is also disclosed by Kent. *See* Figure 45.

8[e] the first chamfer is oblique in relation to the first curved side surface and the coupling between the first chamfer and the first curved side surface defines a first curved splitting feature,

473. The limitations of claim element 8[e] are contained within the limitations of claim element 1[c], with the difference being the references to the “first curved side surface,” “first chamfer,” and “first curved splitting feature.” As the analysis of element 1[c] demonstrated that Kent includes at least one chamfer being disposed obliquely in relation to a curved side surface and the coupling between at least one chamfer and the said side surface defines a curved splitting feature, Kent also includes “the first chamfer is oblique in relation to the first curved side surface and the coupling between the first chamfer and the first curved side surface defines first curved splitting feature” as recited in element 8[e]. *See* Figure 45.

8[f] a second outer one of the tines and the concave fork bowl portion being further defined by a second chamfer and a second curved side surface coupled to the second chamfer,

8[g] the second chamfer coupling the fork front surface with the second curved side surface,

8[h] the second curved side surface coupling the second chamfer with the fork back surface, the second chamfer is oblique in relation to the second curved side surface and the coupling between the second chamfer and the second

curved side surface defines a second curved splitting feature;

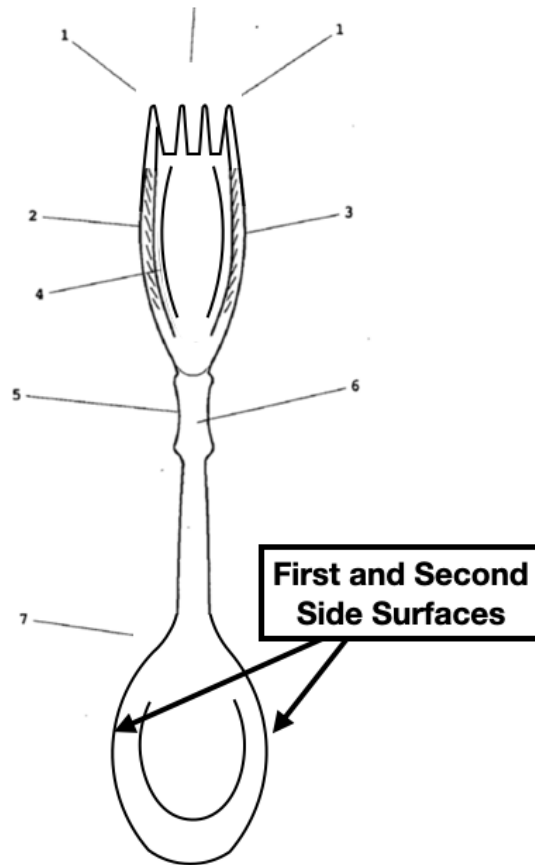
474. Claim elements 8[f]-8[h] can be analyzed simultaneously and disclose a second chamfer, second curved side surface, and a second curve splitting feature that respectively disclose the same limitations as disclosed by the first chamfer, first curved side surface, and first curved splitting feature.

475. Kent teaches that its combination fork, spoon, and knife is configured with two “blunted knife edges” on either side of the fork head.²⁰⁵ As discussed above, a first blunted knife edge disclosed all of the limitations regarding a first chamfer, first curved side surface, and first curved splitting feature. The same respective limitations are recited for the second chamfer, second curved side surface, and second curved splitting feature. The second blunted knife edge recited by Kent is functionally identical to the first blunted knife edge and, therefore, discloses and/or renders obvious the limitations of claim elements 8[f]-8[h]. *See* Figure 45.

8[i] a spoon head having a spoon front surface, a spoon back surface, and first and second spoon side surfaces coupling the spoon front surface with the spoon back surface,

476. As discussed above with respect to claim element 1[d], a POSITA would understand that a spoon has a front and back surface as well as an intervening side surface between front and back surfaces. This intervening side surface can be further distinguished as first and second side surfaces, as shown in Figure 49, below.

²⁰⁵ Ex. 1007, [0010].



Kent in View of Bo and Vanderputt

Figure 49. The first and second side surfaces of Kent as modified by Bo and Vanderputt.

8[j] wherein the spoon front surface, the spoon back surface, and the first and second spoon side surfaces defining a concave spoon bowl portion, the spoon bowl portion faces the same way as the concave fork bowl portion;

477. This element is identical to claim element 1[e] and is accordingly rendered obvious by Kent in view of Bo for the same reasons that claim element 1[e] was.

8[k] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a first and second handle side surface coupling the handle front surface to the handle back surface;

478. This element is identical to claim element 1[f] with the exception of reciting “first and second” side surface of the handle, as opposed to “a” side surface of the handle. As was shown in the analysis of claim element 1[f], Kent as modified by Bo discloses a handle with front and back surface, a POSITA would recognize that at least two side surfaces (one on each side of the handle) are disposed so as to couple the front and back surfaces of the handle on opposite sides of the handle. The remaining limitations of claim element 8[k] are disclosed by Kent in view of Bo for the same reasons that claim element 1[f] was.

8[l] the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil;

479. This element is identical to claim element 1[g] and is accordingly disclosed by Kent in view of Bo for the same reasons that claim element 1[g] was.

8[m] the fork back surface, the spoon back surface, and the handle back surface collectively defining a single back surface of the utensil;

480. This element is identical to claim element 1[h] and is accordingly disclosed by Kent in view of Bo for the same reasons that claim element 1[h] was.

8[n] the first fork side surface, the first spoon side surface, and the first handle side surface collectively defining a single first side surface of the utensil; and

481. The claim limitations of element 8[n] are the limitations of claim element 1[i] with the exception of referring to a “first” side surface, “first” spoon

side surface, and a “first” handle side surface. As shown in the analysis of claim element 1[i], Kent as modified by Bo discloses at least one side surface, spoon side surface, and handle side surface. Accordingly, Kent as modified by Bo discloses the limitations of claim element 8[n] for the same reasons it discloses the limitations of claim element 1[i].

8[o] the second fork side surface, the second spoon side surface, and the second handle side surface collectively defining a single second side surface of the utensil.

482. The limitations of claim element 8[o] are identical to those of element 8[n] save replacing “first” with “second.” As Kent as modified by Bo discloses the limitations regarding the first fork side surface, the first spoon side surface, and the first handle side surface (i.e. element 8[n]), and these are the same respective limitations recited for the second fork side surface, the second spoon side surface, and the second handle side surface, a POSITA would recognize that Kent in view of Bo renders obvious the limitations of claim element 8[o]. *See* Figure 46.

483. Accordingly, for at least the reasons described above, each and every limitation of Claim 8 of the ’629 Patent would have been obvious over Kent in view of Bo.

6. Claim 9

9[preamble] An eating utensil comprising:

484. As described in my analysis of Claim 1, Kent teaches: “In accordance with the present invention, there is provided a one piece eating utensil that will perform the tasks of a knife, fork, and spoon.”²⁰⁶ Accordingly, Kent discloses an eating utensil.

²⁰⁶ Ex. 1007, [0009].

9[a] a first head having a first front surface and a first back surface both partially defining a plurality of tines and

485. The limitations of claim element 9[a] are identical to those of claim element 1[a] with the exception of reciting the more general “first head,” “first front surface,” and “first back surface” as opposed to a “fork head,” “fork front surface,” and “fork back surface.” Accordingly, as Kent discloses a fork head practicing the limitations of claim element 1[a], it also discloses a “first head,” first front surface,” and “first back surface” of claim element 9[a].

9[b] a first concave bowl portion, an outer one of the tines and the first concave bowl portion being further defined by a chamfer and a first curved side surface coupled to the chamfer,

486. The limitations of claim element 9[b] are identical to those of claim element 1[b] with the exception of reciting the more general “first concave bowl portion” and “first curved side surface” as opposed to a “concave fork bowl portion” and “curved side surface.” As shown in the analysis of Claim 1[b], Kent discloses a fork bowl portion, chamfer, and curved side surface practicing the limitations of claim element 1[a], accordingly Kent also discloses a “first concave bowl portion,” chamfer, and “first curved side surface” practicing the limitations of claim element 9[b], *see* Figure 45.

9[c] the chamfer coupling the first front surface with the first curved side surface,

487. As demonstrated in my analysis of Claim 1, Kent includes a chamfer disposed on the outside edge of one of the fork tines. As was shown, this chamfer is coupled directly to the (first) curved side surface. As the fork front surface (the first front surface of Claim 9) comprises the outer fork tine surface which transitions into the chamfer and the chamfer is directly coupled to the (first) curved

side surface, a POSITA would recognize that the chamfer couples the first front surface with the first curved side surface, *see* Figure 45.

9[d] the first curved side surface coupling the chamfer with the first back surface, and the chamfer is oblique in relation to the first curved side surface;

488. The limitations of claim element 9[d] are contained within the limitations of claim element 1[c] with the addition of the “first” modifier (i.e., first curved side surface and first back surface). As Kent discloses at least one side surface coupling the chamfer with at least one back surface, the chamfer being oblique in relation to at least one first curved side surface (i.e., claim element 1[c]), Kent also discloses the first curved side surface coupling the chamfer with the first back surface, and the chamfer is oblique in relation to the first curved side surface, *see* Figure 45.

9[e] a second head having a second front surface, a second back surface, and a second side surface coupling the second front surface with the second back surface,

489. The limitations of claim element 9[e] are identical to those of claim element 1[d] with the exception of reciting the more general “second head,” “second front surface” and “second back surface” as opposed to a “spoon head,” “spoon front surface,” and “spoon back surface”. Accordingly, as Kent in view of Bo discloses a spoon head practicing the limitations of claim element 1[d], it also discloses a “second head,” “second front surface,” and “second back surface” of claim element 9[e]. *See* Figure 46.

9[f] the second front surface, the second back surface, the second side surface partially defining a second concave bowl portion, the second concave bowl portion faces the same way as the first concave bowl portion;

490. The limitations of claim element 9[f] are identical to those of claim element 1[e] with the exception of reciting the more general “second front surface,” “second back surface,” “second concave bowl portion,” and “first concave bowl portion” as opposed to a “spoon front surface,” “spoon back surface,” “concave spoon bowl portion,” and “concave fork bowl portion.” Accordingly, as Kent in view of Bo discloses a “spoon front surface,” “spoon back surface,” “concave spoon bowl portion,” and “concave fork bowl portion” practicing the limitations of claim element 1[e], it also discloses the “second front surface,” “second back surface,” “second concave bowl portion,” and “first concave bowl portion” of claim element 9[f]. *See* Figure 46.

9[g] a handle that couples the second head to the first head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

491. The limitations of claim element 9[g] are identical to those of claim element 1[f] with the exception of reciting the more general “first head” and “second head” as opposed to “fork head” and “spoon head.” Accordingly, as Kent in view of Bo discloses a handle, spoon, and fork head practicing the limitations of claim element 1[f], it also discloses the more general handle, first head, and second head of claim element 9[g]. *See* Figure 46.

9[h] the first front surface, the second front surface, and the handle front surface collectively defining a single front surface of the utensil;

492. The limitations of claim element 9[h] are identical to those of claim element 1[g] with the exception of reciting the more general “first front surface” and “second front surface” as opposed to “fork front surface” and “spoon front surface.” Accordingly, as Kent in view of Bo discloses a handle front surface,

spoon front surface, and fork front surface practicing the limitations of claim element 1[g], it also discloses the more general handle front surface, first front surface, and second front surface of claim element 9[h]. *See* Figure 46.

9[i] the first back surface, the second back surface, and the handle back surface collectively defining a single back surface of the utensil; and

493. The limitations of claim element 9[i] are identical to those of claim element 1[h] with the exception of reciting the more general “first back surface” and “second back surface” as opposed to “fork back surface” and “spoon back surface.” Accordingly, as Kent in view of Bo discloses a handle back surface, spoon back surface, and fork back surface practicing the limitations of claim element 1[h], it also discloses the more general handle back surface, first back surface, and second back surface of claim element 9[i]. *See* Figure 46.

9[j] the first side surface, the second side surface, and the handle side surface collectively defining a single side surface of the utensil.

494. The limitations of claim element 9[j] are identical to those of claim element 1[i] with the exception of reciting the more general “first side surface” and “second side surface” as opposed to “fork side surface” and “spoon side surface.” Accordingly, as Kent in view of Bo discloses a handle side surface, spoon side surface, and fork side surface practicing the limitations of claim element 1[i], it also discloses the more general handle side surface, first side surface, and second side surface of claim element 9[j]. *See* Figure 46.

495. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 9 of the ’629 Patent would have been obvious over Kent in view of Bo.

7. Claim 10

The eating utensil as recited in claim 9, wherein the handle, the first head, and the second head are integrally formed.

496. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Kent in view of Bo.

497. Furthermore, Kent in view of Bo discloses that the handle, first head, and second head are integrally formed. Bo teaches: “the head (2) and the fork (3) are integrally formed with the spoon handle (1).”²⁰⁷ Accordingly, in modifying Kent to include Bo, a POSITA would recognize that the first head, second head, and spoon handle form a unitary (integrally formed) utensil that has advantages relative to separate utensils. *See* Figure 46.

498. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 10 of the '629 Patent would have been obvious over Kent in view of Bo.

8. Claim 11

The eating utensil as recited in claim 9, wherein an inner one of the tines is substantially straight.

499. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Kent in view of Bo.

500. Claim 2 modifies Claim 1 of the '629 Patent by requiring “inner ones of the plurality of tines each has a pair of substantially straight side edges.” As shown in the analysis of Claim 2, Kent in view of Bo and Vanderputt discloses a plurality of inner tines, all of which are substantially straight. *See* Figure 48.

²⁰⁷ Ex. 1008, Claim 1.

501. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 11 of the '629 Patent would have been obvious over Kent in view of Bo and Vanderputt.

9. Claim 12

The eating utensil as recited in claim 9, wherein the outer ones of the tines is further defined by a substantially straight inner edge.

502. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Kent in view of Bo.

503. Furthermore, as can be seen in, e.g., Figure 48, Kent in view of Bo alone includes a substantially straight inner edge on each of the outer tines. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 12 of the '629 Patent would have been obvious over Kent in view of Bo.

10. Claim 13

The eating utensil as recited in claim 9, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

504. Claim 13 modifies Claim 9 in the same way that Claim 7 modifies Claim 1. As shown above, Claims 1, 7, and 9 are rendered obvious over Kent in view of Bo. Accordingly, Claim 13 is also rendered obvious over Kent in view of Bo.

11. Claim 15

15[preamble] An eating utensil comprising:

505. As described in my analysis of Claim 1, Kent teaches: “In accordance with the present invention, there is provided a one piece eating utensil that will perform the tasks of a knife, fork, and spoon.”²⁰⁸ Accordingly, Kent discloses an eating utensil.

15[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

506. This element is identical to claim element 1[a] and is accordingly disclosed by Kent for the same reasons that claim element 1[a] was.

15[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer,

507. This element is identical to claim element 1[b] and is accordingly disclosed by Kent for the same reasons that claim element 1[b] was. *See* Figure 45.

15[c] the chamfer coupling the fork front surface with the curved side surface,

508. As demonstrated in my analysis of Claim 1, Kent includes a first chamfer disposed on the outside edge of one of the fork tines. Also, as was shown this chamfer is coupled directly to the curved side surface. As the fork front surface comprises the outer fork tine surface which transitions into the chamfer and the chamfer is directly coupled to the curved side surface, a POSITA would recognize that the chamfer couples the fork front surface to the curved side surface. *See* Figure 45.

15[d] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the

²⁰⁸ Ex. 1007, [0009].

chamfer and the curved side surface defines a curved splitting feature;

509. This element is identical to claim element 1[c] and is accordingly disclosed by Kent for the same reasons that claim element 1[c] was.

15[e] a handle coupled to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

510. The analysis of claim element 1[f] demonstrated that Kent in view of Bo discloses a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface. Accordingly, Kent in view of Bo at least includes a handle coupled to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface. *See* Figure 46.

15[f] the fork front surface and the handle front surface defining a single front surface of the utensil;

511. The analysis of claim element 1[g] demonstrated that Kent in view of Bo discloses “the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil.” Accordingly, Kent in view of Bo at least discloses “the fork front surface and the handle front surface defining a single front surface of the utensil.”

15[g] the fork back surface and the handle back surface defining a single back surface of the utensil; and

512. The analysis of claim element 1[h] demonstrated that Kent in view of Bo discloses “the fork back surface, the spoon surface, and the handle back surface

collectively defining a single back surface of the utensil.” Accordingly, Kent in view of Bo at least discloses “the fork back surface and the handle back surface defining a single back surface of the utensil.”

15[h] the fork side surface and the handle side surface defining a single side surface of the utensil.

513. The analysis of claim element 1[i] demonstrated that Kent in view of Bo discloses “the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.” Accordingly, Kent in view of Bo at least discloses “the fork side surface and the handle side surface defining a single side surface of the utensil.”

514. Accordingly, for at least the above reasons, each and every limitation of Claim 15 of the ’629 Patent would have been obvious over Kent in view of Bo.

12. Claim 16

16[preamble] The eating utensil as recited in claim 15,

515. As shown above, the limitations of Claim 15 of the ’629 Patent would have been obvious over Kent in view of Bo.

16[a] further comprising a spoon head coupled to the handle on an opposite side from where the fork head is coupled to the handle,

516. Bo teaches: “A multifunctional spoon is characterized in that it comprises a handle (1), a spoon head (2) is arranged at one end of the handle (1), and a fork (3) is arranged at the other end of the handle (1).”²⁰⁹ This teaching of Bo would have been included in the modified version of Kent in view of Bo, for example, *see* Figure 46.

²⁰⁹ Ex. 1008, Claim 1.

517. Accordingly, Kent in view of Bo discloses a spoon head coupled to the handle on an opposite side from where the fork head is coupled to the handle.

16[b] the spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface,

518. This element is identical to claim element 1[d] and is accordingly disclosed by Kent in view of Bo for the same reasons that claim element 1[d] was.

16[c] wherein the spoon front surface, the spoon back surface, and the spoon side surface defining a concave spoon bowl portion;

519. This element is included within claim element 1[e] and is accordingly disclosed by Kent in view of Bo for the same reasons that claim element 1[e] was.

16[d] the spoon front surface further defining the single front surface of the utensil;

520. The analysis of claim element 1[g] demonstrated that Kent in view of Bo discloses “the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil.” Accordingly, Kent in view of Bo at least discloses “the spoon front surface further defining the single front surface of the utensil.” *See* Figure 46.

16[e] the spoon back surface further defining the single back surface of the utensil; and

521. The analysis of claim element 1[h] demonstrated that Kent in view of Bo discloses “the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil.” Accordingly, Kent in view of Bo at least discloses “the spoon back surface further defining the single back surface of the utensil.” *See* Figure 46.

16[f] the spoon side surface further defining the single side surface of the utensil.

522. The analysis of claim element 1[i] demonstrated that Kent in view of Bo discloses “the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.” Accordingly, Kent in view of Bo at least discloses “the spoon side surface further defining the single side surface of the utensil.”

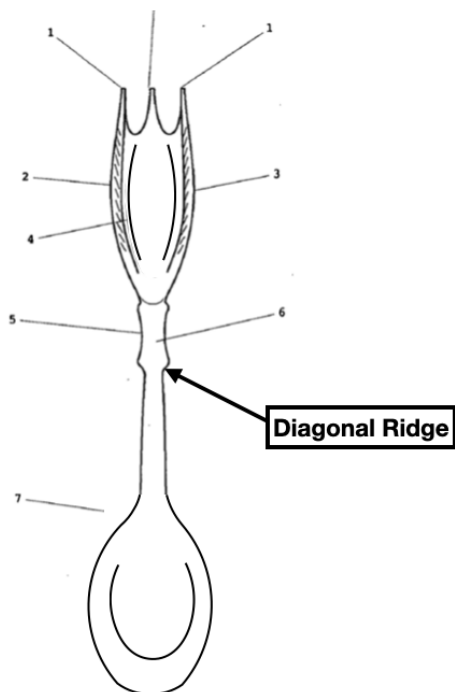
523. Accordingly, for at least the above reasons, each and every limitation of Claim 16 of the '629 Patent would have been obvious over Kent in view of Bo.

13. Claim 22

The eating utensil as recited in claim 15, wherein the handle front surface has a diagonal ridge.

524. The claim term “diagonal ridge” does not appear within the specification of the '629 Patent. Accordingly, a POSITA would not understand whether the '629 Patent is claiming, e.g., a diagonal ridge which runs the entire length of the handle or any diagonal ridge on the front surface. A POSITA would then be left to conclude that any diagonal ridge would read on the limitations of Claim 22.

525. Therefore, a POSITA would recognize that Kent as modified by Bo discloses a diagonal ridge as can be seen in Figure 50.



Kent in View of Bo

Figure 50: A representation of Kent as modified by Bo. As can be seen the handle of Kent includes a diagonal ridge.

526. Alternatively, to the extent that Kent as modified by Bo is determined to not include a diagonal ridge on the front surface of the handle, the '629 Patent specification provides no justification for any alleged function or benefit to the recited “diagonal ridge.”

527. Accordingly, a POSITA would understand that including one or more diagonal ridges on the front surface of the handle of Kent in view of Bo would be purely an aesthetic design consideration and would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Kent in view of Bo does not include a handle front surface with diagonal ridges, modifying Kent in view of Bo to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success.

528. Accordingly, each and every limitation of Claim 22 would have been obvious over Kent in view of Bo.

14. Claim 23

The eating utensil as recited in claim 15, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

529. Claim 23 modifies Claim 15 in the same way that Claim 7 modifies Claim 1. As shown above, Kent in view of Bo renders the limitation of each of Claims 1, 7, and 15. Therefore, the limitations of Claim 23 are also rendered obvious over Kent in view of Bo.

J. Claims 1-23 of the '629 Patent are Obvious over Torode in View of the CFL Fork and Nelson

1. Claim 1

1[preamble] An eating utensil comprising

530. Torode discloses “a utensil” that combines a knife, fork, and spoon for eating purposes.²¹⁰ Accordingly, Torode discloses an eating utensil.

1[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

531. Torode discloses a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines.²¹¹ See Figure 18.

1[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the

²¹⁰ Ex. 1009, 1:1-8.

²¹¹ Ex. 1009, 2:1-7.

chamfer, the chamfer coupling the fork front surface with the curved side surface,

532. A POSITA would recognize that Torode discloses a curved front fork surface. To the extent that Torode does not disclose a concave fork bowl portion as taught in the '629 Patent, a POSITA would have been motivated to modify Torode to include a concave fork bowl. A POSITA would have realized that a concave fork bowl increases the food handling capabilities of the eating utensil, for example, by enabling the eating utensil to contain small, spherical food items (e.g., peas).

533. For example, in recounting the history of the fork, the California Academy of Sciences states:

“In late 17th Century France, larger forks with four curved tines were developed. The additional tines made diners less likely to drop food, and the curved tines served as a scoop so people did not have to constantly switch to a spoon while eating.”²¹²

534. Accordingly, it was well known in the art to have curved fork bowl in a fork. As can be seen in Figure 24, the prior art include a plurality of examples of utensils with concave fork bowl portions.

535. A POSITA would have found it obvious to add a slight concavity to the sides of the fork portion in order to increase the ability of the fork portion to retain food.

536. To the extent that a POSITA would require a separate reference for adding a concavity to the fork portion, a POSITA would have looked to prior art such as Nelson. Nelson teaches: “Referring now to the drawings, and more specifically to FIG. 1, a combination non-disposable table utensil 10 has an

²¹² <https://research.calacademy.org/research/anthropology/utensil/forks.htm>.

elongated handle 12 having a concavo-complex scoop 13 at one end. The scoop 13 has a curved surface forming a basin bowl 14 for retention of food materials.”²¹³

537. In view of Nelson, a POSITA would have been motivated to include a concave fork bowl portion in Torode to improve the food retention ability of the fork as taught by Nelson, *see* Figure 52 for a conception of the inclusion of a fork bowl portion similar into Torode.

538. The fork surface of Torode is also defined by a chamfer coupled with a curved side surface disposed on the left-hand side of the fork portion; the chamfer further coupling the fork front surface with the curved side surface, *see* Figure 18. The “knife blade portion 7”²¹⁴ would have been recognized as the chamfer taught in the ’629 Patent. As discussed above (see ¶¶160-162), the chamfer taught by the ’629 Patent encompasses a wide variety of beveled edges that provide the function of cutting or splitting.

539. To the extent that the term “chamfer” is considered to be limited to the blunted edge surface shown in the figures of the ’629 Patent, a POSITA would have recognized the value in providing a duller knife edge in Torode as it was known in the art that the sides of knives can cut a user’s mouth when disposed in a multi-function utensil. For example, Nelson recognizes that knife edges disposed on the sides of combinations utensils stand the risk of cutting a user’s mouth.²¹⁵

540. Furthermore, Torode teaches²¹⁶ that user must bear down onto “finger pressure arm 6” and that “[i]t is understood that in order to use knife portion 7 adequate pressure may be exerted upon arm 6 for this purpose.” Accordingly, a POSITA would realize that the disclosed chamfer (knife edge 7) would not be

²¹³ Ex. 1011, 2:23-28.

²¹⁴ Ex. 1009, 2:14.

²¹⁵ *See, e.g.*, Ex. 1011, 1:19-21, 2:38-40.

²¹⁶ *See* Ex. 1009, 2:10-19.

particularly sharp and could have the blunted shape shown in the figures of the '629 Patent.

541. Furthermore, a POSITA would know that the chamfer of Torode could be extended along the full length of the tines as a POSITA would understand that by doing so, a longer lever arm would be created between finger pressure arm 6 and the chamfer, thus decreasing the force needed to be exerted on finger pressure arm 6 to cut food. Such a modification would also reduce the required sharpness of the chamfer of Torode so as to reduce the possibility of cutting a user's mouth during use, as considered by Nelson.

542. Furthermore, a POSITA would have realized that accentuating the curve of the chamfer along the extended length of the chamfer would increase the ability of a user to rock back and forth on the chamfer edge to cut food. It was well known in the art at the time of the '629 Patent filing to provide a beveled cutting or splitting feature to the curved side of a fork tine, *see* Figure 51. For example, Nelson teaches: "It has therefore been found desirable to provide a combination utensil which has a nonserrated edge capable, upon rocking action, of severing food material."²¹⁷ A POSITA would have realized the utility of extending the chamfer along the side of Torode to the end of the tines as was readily known in the prior art.

²¹⁷ Ex. 1011, 1:22-24.



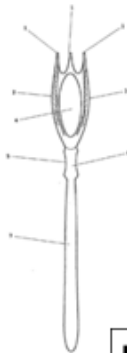
C370



F119



CFL Fork



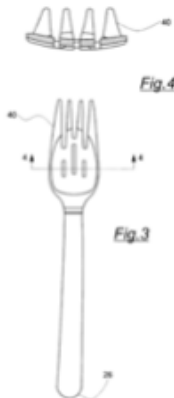
Kent



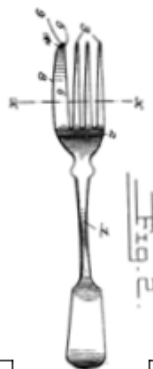
M644



Kristiansson



Vanderputt



P575



Q369

Figure 51. Figures showing prior art forks with cutting surfaces coupled to curved side surfaces on the tines. Patent numbers corresponding to these abbreviations can be found in Table 1.

543. To the extent that a POSITA would require a specific reference to teach the extension of the curved edge and chamfer to the end of the fork tine, a

POSITA would have been aware of prior art such as the CFL Fork which provides such a disclosure, *see* Figure 52. The CFL Fork discloses a wider outer tine with a curved side surface and a sharpened edge that extends over an entirety of the fork from the fork body to the tip of the outer tine. The sharpened edge of the CFL Fork is illustrated as a chamfer according to the '629 Patent.

544. Accordingly, Torode in view of both the CFL Fork and Nelson would include the limitation of a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer as recited by claim element 1[b].

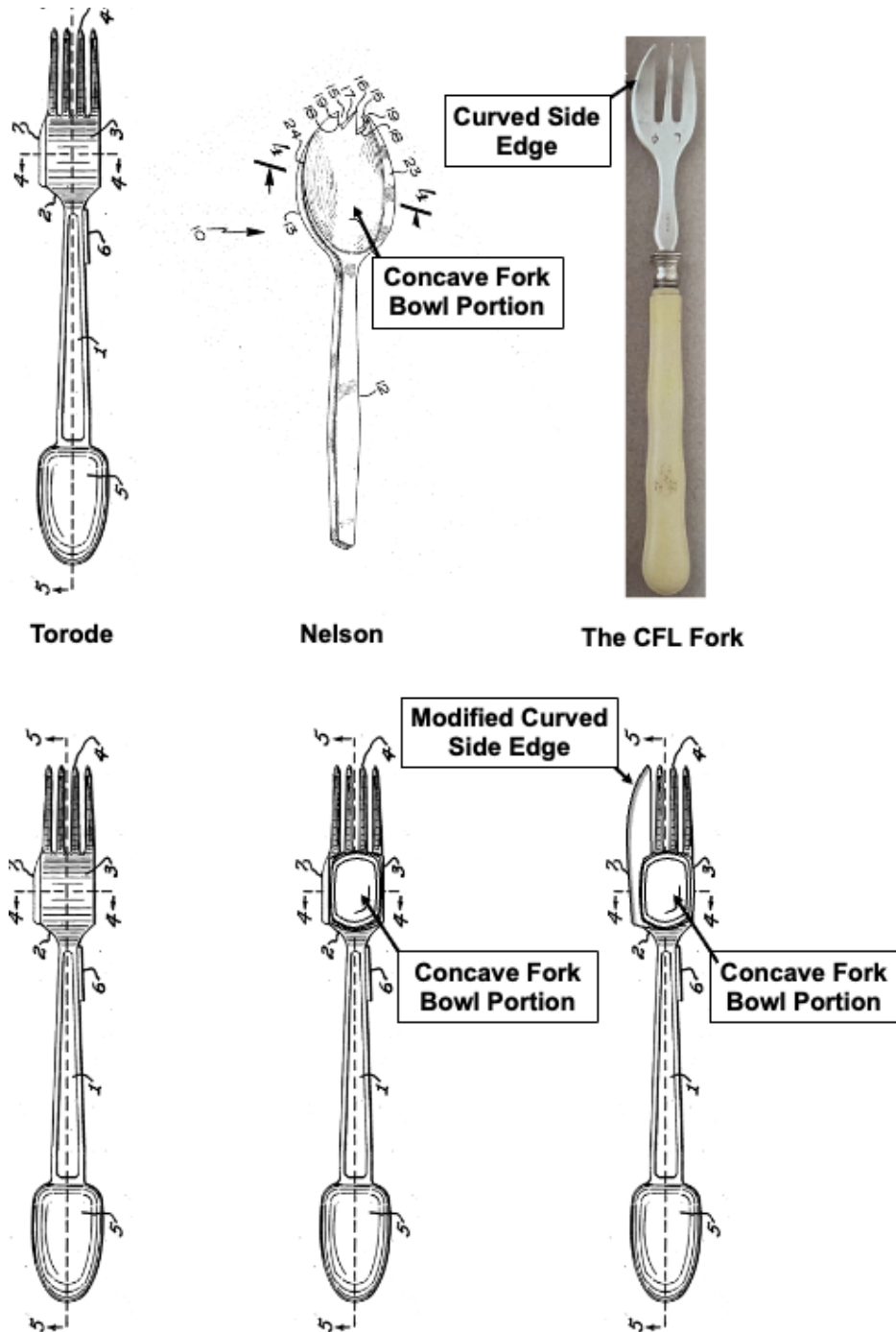


Figure 52. Annotated images of Torode, Nelson, and the CFL Fork (top row; left, center, and right, respectively) and Torode, a conception of Torode as modified by Nelson, and a conception of Torode as modified by the CFL Fork and Nelson (bottom row; left, center, and right, respectively).

1[c] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the chamfer and the curved side surface defines a curved splitting feature;

545. As can be seen in Figure 52, Torode in view of the CFL Fork and Nelson discloses a knife edge (chamfer) formed on the side of one of the tines, coupled to what a POSITA would understand to be a side surface of the fork, the side surface being coupled to the back surface, *see* Figure 52. A POSITA would understand that the coupling between a knife surface (chamfer) and a side surface would represent a splitting or cutting feature.

546. Torode also teaches a device that is directed towards a wide audience, including the disabled, students, and those in hospitals or sanitariums.²¹⁸ Furthermore, as described above, Nelson recognizes that knife edges disposed on the sides of combinations utensils stand the risk of cutting a user's mouth²¹⁹. Accordingly, a POSITA would realize that the chamfer/side surface combined cutting/splitting feature would not be made particularly sharp as would be the case if the angle between the knife edge and the side surface was 90° (i.e., not oblique), *see*, e.g, Figure 27.

1[d] a spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface,

547. As shown in Figure 18, Torode discloses a spoon head coupled to the handle: "The opposite end of handle portion 1 terminates to spoon bowl 5 as shown."²²⁰ A POSITA would understand that a spoon has a front and back surface as well as an intervening side surface coupling the front and back surfaces.

²¹⁸ *See* Ex. 1009, 1:9-21.

²¹⁹ *See*, e.g., Ex. 1011, 1:19-21, 2:38-40.

²²⁰ Ex. 1009, 2:8-9.

1[e] the spoon front surface, the spoon back surface, and the spoon side surface partially defining a concave spoon bowl portion, the spoon bowl portion facing a same way as the concave fork bowl portion;

548. A POSITA would understand that spoons include concave bowl portions defined by the front, side, and back surfaces and would recognize that, by simply disclosing a spoon, Torode discloses a concave bowl portion.

549. Figure 18 of Torode discloses a concave spoon bowl portion facing the same direction that the fork bowl portion is facing.

1[f] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

550. As shown in Figure 52, Torode discloses a handle which couples the spoon head to the fork head: “In further carrying out the invention, and with particular reference to Figure 1, the same comprises handle portion 1, being tapered as shown and having one of its ends terminating to neck 2, then extending and forming fork body 3, one end of said body terminating to a series of spaced apart tines 4. The opposite end of handle portion 1 terminates to spoon bowl 5 as shown.”²²¹ A POSITA would understand that the handle portion 1 has a front and back surface as well as an intervening side surface between front and back surfaces which couples the front surface of the handle to the rear surface of the handle.

1[g] the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil;

²²¹ Ex. 1009, 2:1-9.

1[h] the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil; and

1[i] the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.

551. Claim elements 1[g]-1[i] can be addressed simultaneously.

552. As shown above (e.g., *see* Figure 52), Torode in view of the CFL Fork and Nelson includes a spoon and fork head connected by a handle. A POSITA would recognize that the fork front surface, the spoon front surface, and the handle front surface would collectively define a single front surface of the utensil and that the fork back surface, the spoon surface, and the handle back surface would collectively define a single back surface of the utensil. Furthermore, a POSITA would recognize that, Torode alone would have a single side surface defined by the side surface of each of the fork, spoon, and handle collectively and such side surface would remain following modification by Nelson and/or the CFL Fork.

553. Accordingly, for at least the above reasons, Claim 1 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

2. Claim 2

An eating utensil as recited in claim 1, wherein inner ones of the plurality of tines each has a pair of substantially straight side edges and a pointed distal tip.

554. As shown above, Torode in view of the CFL Fork and Nelson discloses or renders obvious each and every limitation of Claim 1.

555. Furthermore, as can be seen in Figure 52, each of the inner fork tines of Torode as modified by the CFL Fork and Nelson has a pair of substantially straight edges and a pointed distal tip.

556. Accordingly, for at least the above reasons, Claim 2 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

3. Claim 3

An eating utensil as recited in claim 2, wherein the outer one of the tines has a wider base end than the inner ones of the tines.

557. As shown above, Torode in view of the CFL Fork and Nelson discloses or renders obvious each and every limitation of Claim 1.

558. Furthermore, as can be seen in Figure 52, Torode as modified by the CFL Fork and Nelson includes an outer tine (the tine coupled to the chamfer and curved side surface) has a wider base than each of the inner tines.

559. Accordingly, for at least the above reasons, Claim 3 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

4. Claim 4

4[preamble] An eating utensil as recited in claim 1,

560. As shown above, Torode in view of the CFL Fork and Nelson discloses or renders obvious each and every limitation of Claim 1.

4[a] wherein the concave spoon bowl portion is further defined by at least three substantially flat side edges with rounded corners connecting the flat side edges,

561. To the extent that edges 118 and 118b are taught to be substantially flat (from left to right sides of the spoon in Figure 35 (right)) the side edges of Torode would also be considered to be substantially flat as they each contain locally flat sections.

562. Alternatively, to the extent that the “substantially flat” limitation is determined to represent a characteristic of the side and front edges which Torode does not read on, the ’629 Patent specification provides no justification for this alleged benefit, i.e., the patent does not explain why, exactly, a “substantially straight side edge” would “allow” scraping food from the side of a container; nor why three edges specifically would provide a benefit not accomplished by some other number.

563. Accordingly, a POSITA would understand that having a plurality of (for example, three) substantially flat side edges would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Torode does not show a concave spoon bowl portion defined by three substantially flat side edges, modifying Torode to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success.

4[b] wherein one of the flat side edges further defines the single side surface of the utensil.

564. As discussed previously, Torode discloses an intervening side surface between front and back surfaces of the concave spoon bowl portion. This side surface similarly intervenes between front and back surfaces of the concave fork bowl portion and handle coupling the spoon and concave fork bowl portions, *see* Figure 52, and accordingly, defines the single side surface of the utensil.

565. To the extent that the spoon of Torode does not disclose “substantially flat side edges,” modifying Torode to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success as discussed in relation to limitation

4[a]. By incorporating the design choice in Claim 4[a], the modified version of Torode would also necessarily then practice the limitations of Claim 4[b] because the connection between the handle and spoon side surface is a continuous surface.

566. Accordingly, for at least the reasons above, each and every limitation of Claim 4 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

5. Claim 5

5[preamble] An eating utensil as recited in claim 1,

567. As shown above, Torode in view of the CFL Fork and Nelson discloses each and every limitation of Claim 1.

5[a] wherein the concave spoon bowl portion is tilted at a first angle relative to the handle front surface and

5[b] the concave fork bowl portion is tilted at a second angle relative to the handle front surface

568. Claim elements 5[a] and 5[b] can be addressed simultaneously.

569. As can be seen in Figure 53, both of the fork and spoon bowl portions of Torode are tilted at respective angles relative to the handle front surface. The modifications of Torode in view of the CFL Fork and Nelson would also include this feature.

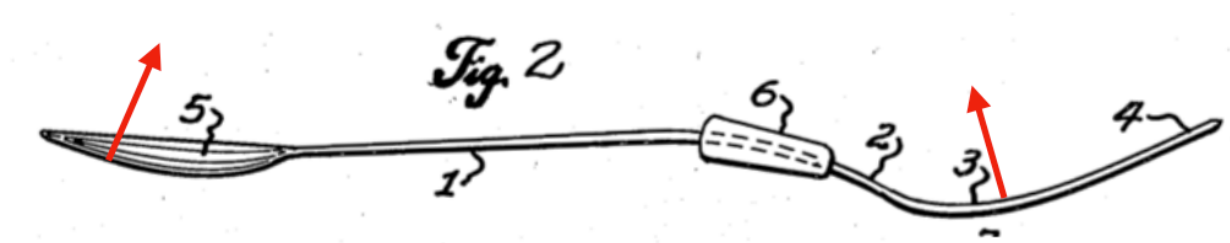


Figure 53. Annotated Figure 2 of Torode showing the spoon and fork bowl portions of Torode tilted at respective angles with respect to the front handle surface.

5[c] such that at least a portion of each of the bowl portions extend forward from the handle front surface.

570. Torode includes a spoon bowl portion wherein a portion extends forward from the front surface of the handle; Torode in view of the CFL Fork and Nelson would also practice this limitation. To the extent that the fork bowl portion of Torode in view of the CFL Fork and Nelson does not have a portion extending from the front surface of the handle, a POSITA would have found it obvious to modify Torode in view of the CFL Fork and Nelson to practice this limitation based on the teaching in Torode to provide a spoon bowl that extends forward from the handle front surface. Such a modification would be a mere repetition of parts based on the teachings of Torode.

571. The '629 Patent discloses that the recited utensil of the claimed invention has a “substantially wide U-shaped configuration” and teaches: “the combination spoon and fork system 100 has a substantially wide U-shaped configuration, as shown in FIG. 6D. It will be appreciated that the U-shaped configuration is comfortable for a user to hold and manipulate.”²²² However, the '629 Patent specification provides no justification for this statement, i.e., the patent does not explain why, exactly, a wide U-shaped configuration would be more comfortable for a user to manipulate. Based on my experience with eating utensils in a variety of contexts, I am not aware of any *a priori* reason that overall U-shaped configuration of the claimed invention would be considered easier to use than if, e.g., the bowl portions of the fork and spoon did not extend at all from the front surface of the handle.

572. Accordingly, a POSITA would not recognize any utility to the limitations of Claim 5[c] and accordingly view the limitation as purely aesthetic. A POSITA would understand that having a portion of the bowl portions of each of

²²² Ex. 1001, 9:21-27.

the fork and spoon extend forward from the handle would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Torode does not show a portion of each of the bowl portions of the fork and spoon extending forward from the handle front surface, modifying Torode to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success.

573. Therefore, for at least the reasons above, each and every limitation of Claim 5 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

6. Claim 6

6[preamble] An eating utensil as recited in claim 1,

574. As shown above, Torode in view of the CFL Fork and Nelson discloses each and every limitation of Claim 1.

6[a] wherein the concave spoon bowl portion is further defined by a plurality of substantially flat side edges,

575. As discussed above in reference to Claim 4, to the extent that edges 118 and 118b are taught to be substantially flat (from left to right sides of the spoon in Figure 35 (right)) the side edges of Torode would also be considered to be substantially flat as they each contain locally flat sections.

576. Alternatively, to the extent that the “substantially flat” limitation is determined to represent a characteristic of the side and front edges which Torode does not read on, the '629 Patent specification provides no justification for this alleged benefit, i.e., the patent does not explain why, exactly, a “substantially straight side edge” would “allow” scraping food from the side of a container.

577. Accordingly, a POSITA would understand that having a plurality of substantially flat side edges would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Torode does not show a concave spoon bowl portion defined by a plurality of substantially flat side edges, modifying Torode to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success.

6[b] wherein one of the substantially flat side edges further defines the single side surface of the utensil.

578. As discussed previously, Torode discloses an intervening side surface between front and back surfaces of the concave spoon bowl portion, *see* Figure 28. This side surface similarly intervenes between front and back surfaces of the concave fork bowl portion and handle coupling the spoon and concave fork bowl portions (*see* Figure 52) and, accordingly, defines the single side surface of the utensil.

579. To the extent that Torode does not disclose “substantially flat side edges,” modifying Torode to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success as discussed in relation to limitation 6[a]. By incorporating the design choice in Claim 6[a], the modified version of Torode in view of the CFL Fork and Nelson would also necessarily then practice the limitations of Claim 6[b] because the connection between the handle and spoon side surface is a continuous surface.

580. Accordingly, for at least the reasons above, each and every limitation of Claim 6 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

7. Claim 7

7[preamble] An eating utensil as recited in claim 1,

581. As shown above, Torode in view of the CFL Fork and Nelson discloses each and every limitation of Claim 1.

7[a] wherein the eating utensil is formed of a glass reinforced thermoplastic material.

582. A POSITA would have realized that Torode as modified by the CFL Fork and Nelson could be constructed from a variety of materials. Furthermore, Nelson specifically suggests a rigid thermoplastic: “It is, therefore, further desirable to provide a combination utensil which is non-disposable, is injection molded of lightweight plastic, such as polystyrene, and has sufficient rigidity to withstand repeated manual pressure.”²²³

583. It would have been obvious to a POSITA to practice Torode as modified by the CFL Fork and Nelson using a glass filled plastic material. As Nelson additionally contemplates the use of a stiff thermoplastic to fabricate Nelson’s utensil, it would be obvious for a POSITA to try glass reinforced plastic as a known technique to improve properties of thermoplastic materials.²²⁴ The addition of glass to thermoplastic materials was known at the time of the ’629 Patent to improve various physical and mechanical properties of plastics, such as chemical resistance, heat resistance, tensile strength, dimensional stability, and moisture resistance.²²⁵ These improved properties would be beneficial to the utensil of Torode as modified by the CFL Fork and Nelson that is designed to be used in a

²²³ Ex. 1011, 1:36-40.

²²⁴ Rosato, Donald. *Designing with plastics and composites: a handbook*. Springer Science & Business Media, 2013, pp. 77-78.

²²⁵ *Id.*, pp. 79-80, 82.

wide variety of environments.²²⁶ Accordingly, a POSITA would perceive the value in practicing Torode in view of the CFL Fork and Nelson (shown in Figure 52) using a glass reinforced thermoplastic.

584. Accordingly, for at least the reasons above, each and every limitation of Claim 7 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

8. Claim 8

8[preamble] An eating utensil formed from a glass filled nylon thermoplastic material, the eating utensil comprising:

585. As described in my analysis of Claim 1, Torode discloses “a utensil” that combines a knife, fork, and spoon for eating purposes.²²⁷

586. As shown in the analysis of Claim 7, a POSITA would have been motivated to practice Torode as modified by the CFL Fork and Nelson using a glass-filled thermoplastic material, as the addition of glass to thermoplastics is known to improve various physical and mechanical properties of thermoplastics. More specifically, a POSITA would be motivated to use nylon as the base thermoplastic material, as it is commonly used as a metal replacement²²⁸ which are commonly used to fabricate utensil (for example the CFL Fork). As similarly discussed above with respect to Claim 7, glass-filled nylon thermoplastic materials were known at the time of the '629 Patent to provide heat resistance, odor

²²⁶ Ex. 1009, 1:17-22.

²²⁷ Ex. 1009, 1:1-8.

²²⁸ Mark, Herman. Encyclopedia of Polymer Science and Technology, 3rd Edition. Volume 3: Polyamides, Plastics. John Wiley & Sons, Inc. 2004, p. 618.

resistance, structural stability, and overall good durability.^{229,230} Accordingly, a POSITA would understand that the modification of Torode in view of the CFL Fork and Nelson, e.g., shown in Figure 52, would benefit from the use of a glass-reinforced nylon thermoplastic material.

8[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

587. This element is identical to claim element 1[a] and is accordingly disclosed by Torode for the same reasons that claim element 1[a] was.

8[b] a concave fork bowl portion, a first outer one of the tines and the concave fork bowl portion being further defined by a first chamfer and a first curved side surface coupled to the first chamfer,

588. This element is identical to claim element 1[b] except for referring to a “first” chamfer and “first” curve side surface. As the analysis of claim element 1[b] demonstrated that at least one chamfer and curved side surface is included in Torode as modified by the CFL Fork and Nelson, the limitations of claim element 8[b] are also included in Torode as modified by the CFL Fork and Nelson. *See* Figure 52.

8[c] the first chamfer coupling the fork front surface with the first curved side surface,

589. As demonstrated in my analysis of Claim 1, Torode in view of the CFL Fork and Nelson includes a first chamfer disposed on the outside edge of one of the fork tines. Also, as was shown this first chamfer is coupled directly to the first curved side surface, *see* Figure 52.

²²⁹ Rosato, Donald. *Designing with plastics and composites: a handbook*. Springer Science & Business Media, 2013, pp. 424-425.

²³⁰ Mark, Herman. *Encyclopedia of Polymer Science and Technology*, 3rd Edition. Volume 3: Polyamides, Plastics, pp. 630-631.

590. As the fork front surface comprises the outer fork tine surface which transitions into the first chamfer and the first chamfer is directly coupled to the first curved side surface, a POSITA would recognize that the first chamfer couples the fork front surface to the first curved side surface.

8[d] the first curved side surface coupling the first chamfer with the fork back surface,

591. The limitations of claim element 8[d] are contained within the limitations of claim element 1[c], with the difference being the references to the “first curved side surface” and “first chamfer.” As the analysis of element 1[c] demonstrated that Torode in view of the CFL Fork and Nelson includes at least one curved side surface coupling at least one chamfer with the fork back surface, “the first curved side surface coupling the first chamfer with the fork back surface” of element 8[d] is also disclosed by Torode in view of Nelson. *See* Figure 52.

8[e] the first chamfer is oblique in relation to the first curved side surface and the coupling between the first chamfer and the first curved side surface defines a first curved splitting feature,

592. The limitations of claim element 8[e] are contained within the limitations of claim element 1[c], with the difference being the references to the “first curved side surface,” “first chamfer,” and “first curved splitting feature.” As the analysis of element 1[c] demonstrated that Torode in view of the CFL Fork and Nelson renders obvious at least one chamfer being disposed obliquely in relation to a curved side surface and the coupling between at least one chamfer and the said side surface defines a curved splitting feature, Torode in view of the CFL Fork and Nelson also renders obvious “the first chamfer is oblique in relation to the first curved side surface and the coupling between the first chamfer and the first curved

side surface defines first curved splitting feature” as recited in element 8[e]. *See* Figure 52.

8[f] a second outer one of the tines and the concave fork bowl portion being further defined by a second chamfer and a second curved side surface coupled to the second chamfer,

8[g] the second chamfer coupling the fork front surface with the second curved side surface,

8[h] the second curved side surface coupling the second chamfer with the fork back surface, the second chamfer is oblique in relation to the second curved side surface and the coupling between the second chamfer and the second curved side surface defines a second curved splitting feature;

593. Claim elements 8[f]-8[h] can be analyzed simultaneously and disclose a second chamfer, second curved side surface, and a second curved splitting feature that respectively practice the same limitations as disclosed by the first chamfer, first curved side surface, and first curved splitting feature.

594. When seeking to modify Torode in view of the CFL Fork and Nelson, a POSITA would recognize that it would be desirable to make the resulting utensil useable by both right and left handed individuals. Accordingly, when modifying Torode to include the extended side surface and chamfer of the CFL Fork, a POSITA would be motivated to dispose an equal and opposite version of the curved side surface and chamfer taught by the CFL Fork on the opposite side of the fork of Torode in view of Nelson, *see* Figure 54.

595. As the configuration of Torode in view of the CFL Fork and Nelson with a single chamfer on the fork disclosed all of the limitations regarding a first chamfer, first curved side surface, and first curved splitting feature, and these are the same respective limitations recited for the second chamfer, second curved side

surface, and second curved splitting feature, a POSITA would recognize that the version of Torode in view of the CFL Fork and Nelson to provide a second knife edge on the other side of the fork discloses the limitations of claim elements 8[f]-8[h].

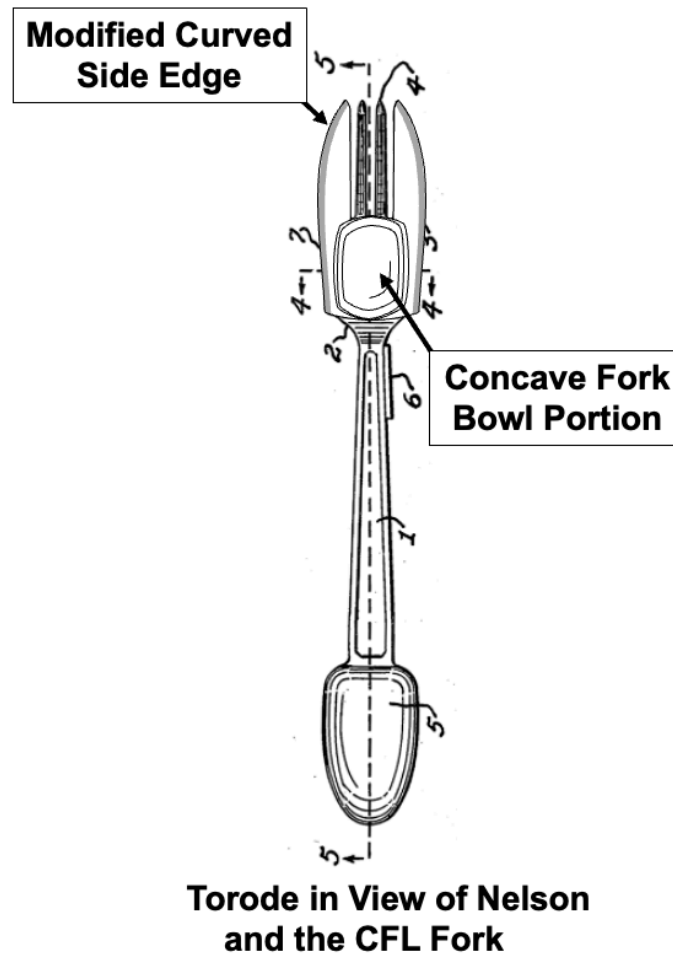


Figure 54. A conception of Torode as modified by the CFL Fork and Nelson so as to provide for both left and right-handed users.

8[i] a spoon head having a spoon front surface, a spoon back surface, and first and second spoon side surfaces coupling the spoon front surface with the spoon back surface,

596. As discussed above with respect to claim element 1[d], a POSITA would understand that a spoon has a front and back surface as well as an intervening side surface between front and back surfaces. This intervening side surface can be further distinguished as first and second side surfaces, as shown in Figure 55, below.

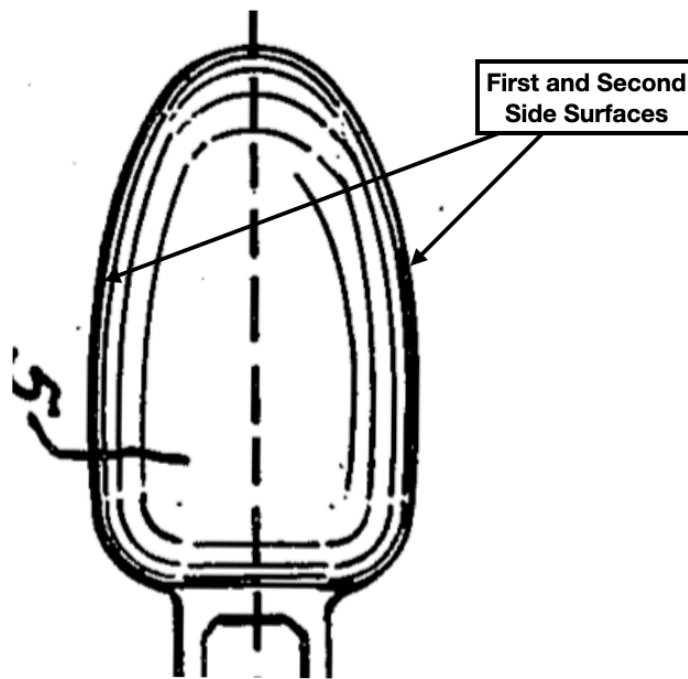


Figure 55. The spoon head of Torode with first and second side surfaces of the spoon head indicated.

8[j] wherein the spoon front surface, the spoon back surface, and the first and second spoon side surfaces defining a concave spoon bowl portion, the spoon bowl portion faces the same way as the concave fork bowl portion;

597. This element is identical to claim element 1[e] and is accordingly disclosed and/or rendered obvious by Torode in view of the CFL Fork and Nelson for the same reasons that claim element 1[e] was.

8[k] a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a first and second handle side surface coupling the handle front surface to the handle back surface;

598. This element is identical to claim element 1[f] with the exception of reciting “first and second” side surface of the handle, as opposed to “a” side surface of the handle. As was shown in the analysis of claim element 1[f] in view of Torode, Torode discloses a handle with front and back surface, a POSITA would recognize that at least two side surfaces (one on each side of the handle) are disposed so as to couple the front and back surfaces of the handle on opposite sides of the handle. The remaining limitations of claim element 8[k] are disclosed by Torode for the same reasons that claim element 1[f] was. Furthermore, the ability of Torode to practice the limitations of claim element 8[k] would not be affected by the proposed modification to Torode in view of the CFL Fork and Nelson.

8[l] the fork front surface, the spoon front surface , and the handle front surface collectively defining a single front surface of the utensil;

599. This element is identical to claim element 1[g] and is accordingly disclosed by Torode in view of the CFL Fork and Nelson for the same reasons that claim element 1[g] was.

8[m] the fork back surface, the spoon back surface , and the handle back surface collectively defining a single back surface of the utensil;

600. This element is identical to claim element 1[h] and is accordingly disclosed by Torode in view of the CFL Fork and Nelson for the same reasons that claim element 1[h] was.

8[n] the first fork side surface, the first spoon side surface, and the first handle side surface collectively defining a single first side surface of the utensil; and

601. The claim limitations of element 8[n] are the limitations of claim element 1[i] with the exception of referring to a “first” side surface, “first” spoon side surface, and a “first” handle side surface. As shown in the analysis of claim element 1[i] in view of Torode, Torode discloses at least one side surface, spoon side surface, and handle side surface. Accordingly, Torode discloses the limitations of claim element 8[n] for the same reasons it discloses the limitations of claim element 1[i]. Furthermore, the ability of Torode to practice the limitations of claim element 8[k] would not be affected by the proposed modification to Torode in view of the CFL Fork and Nelson.

8[o] the second fork side surface, the second spoon side surface, and the second handle side surface collectively defining a single second side surface of the utensil.

602. The limitations of claim element 8[o] are identical to those of element 8[n] save replacing “first” with “second.” As discussed in the analysis of element 8[h], a POSITA would have found it obvious to dispose an equal and opposite chamfer and curved side surface (as taught by the CFL Fork) on both sides of Torode so as to accommodate both left and right-handed users.

603. As the configuration of Torode modified by the CFL Fork and Nelson discloses the limitations regarding the first fork side surface, the first spoon side surface, and the first handle side surface (i.e., element 8[n]), and these are the same respective limitations recited for the first fork side surface, the first spoon side surface, and the first handle side surface, a POSITA would recognize that Torode as modified by the CFL Fork and Nelson as shown in Figure 54 (i.e., with the

curved side surface and chamfer of the CFL Fork disposed on both sides of the fork head of Torode) renders obvious the limitations of claim element 8[o].

604. Accordingly, for at least the reasons described above, each and every limitation of Claim 8 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

9. Claim 9

9[preamble] An eating utensil comprising:

605. As described in my analysis of Claim 1, Torode discloses “a utensil” that combines a knife, fork, and spoon for eating purposes.²³¹

9[a] a first head having a first front surface and a first back surface both partially defining a plurality of tines and

606. The limitations of claim element 9[a] are identical to those of claim element 1[a] with the exception of reciting the more general “first head,” “first front surface,” and “first back surface” as opposed to a “fork head,” “fork front surface,” and “fork back surface.” Accordingly, as Torode discloses a fork head practicing the limitations of claim element 1[a], it also discloses a “first head,” first front surface,” and “first back surface” of claim element 9[a].

9[b] a first concave bowl portion, an outer one of the tines and the first concave bowl portion being further defined by a chamfer and a first curved side surface coupled to the chamfer,

607. The limitations of claim element 9[b] are identical to those of claim element 1[b] with the exception of reciting the more general “first concave bowl portion” and “first curved side surface” as opposed to a “concave fork bowl

²³¹ Ex. 1009, 1:1-8.

portion” and “curved side surface.” As shown in the analysis of Claim 1[b], Torode in view of the CFL Fork and Nelson discloses a fork bowl portion, chamfer, and curved side surface practicing the limitations of claim element 1[a], accordingly Torode in view of the CFL Fork and Nelson also discloses a “first concave bowl portion,” chamfer, and “first curved side surface” practicing the limitations of claim element 9[b], *see* Figure 52.

9[c] the chamfer coupling the first front surface with the first curved side surface,

608. As demonstrated in my analysis of Claim 1, Torode in view of the CFL Fork and Nelson includes a chamfer disposed on the outside edge of one of the fork tines. Also, as was shown this chamfer is coupled directly to the (first) curved side surface. As the fork front surface (the first front surface of Claim 9) comprises the outer fork tine surface which transitions into the chamfer and the chamfer is directly coupled to the (first) curved side surface, a POSITA would recognize that the chamfer couples the first front surface with the first curved side surface, *see* Figure 52.

9[d] the first curved side surface coupling the chamfer with the first back surface, and the chamfer is oblique in relation to the first curved side surface;

609. The limitations of claim element 9[d] are contained within the limitations of claim element 1[c] with the addition of the “first” modifier (i.e., first curved side surface and first back surface.) As Torode in view of the CFL Fork and Nelson discloses at least one side surface coupling the chamfer with at least one back surface, the chamfer being oblique in relation to at least one first curved side surface (i.e., claim element 1[c]), Torode in view of the CFL Fork and Nelson also discloses the first curved side surface coupling the chamfer with the first back

surface, and the chamfer is oblique in relation to the first curved side surface, *see* Figure 52.

9[e] a second head having a second front surface, a second back surface, and a second side surface coupling the second front surface with the second back surface,

610. The limitations of claim element 9[e] are identical to those of claim element 1[d] with the exception of reciting the more general “second head,” “second front surface” and “second back surface” as opposed to a “spoon head,” “spoon front surface,” and “spoon back surface.” Accordingly, as Torode in view of the CFL Fork and Nelson discloses a spoon head practicing the limitations of claim element 1[d], it also discloses a “second head,” “second front surface,” and “second back surface” of claim element 9[e]. The modification of Torode in view of the CFL Fork and Nelson would also practice this limitation, *see* Figure 52.

9[f] the second front surface, the second back surface, the second side surface partially defining a second concave bowl portion, the second concave bowl portion faces the same way as the first concave bowl portion;

611. The limitations of claim element 9[f] are identical to those of claim element 1[e] with the exception of reciting the more general “second front surface,” “second back surface,” “second concave bowl portion,” and “first concave bowl portion” as opposed to a “spoon front surface,” “spoon back surface,” “concave spoon bowl portion,” and “concave fork bowl portion.” Accordingly, as Torode in view of the CFL Fork and Nelson discloses a “spoon front surface,” “spoon back surface,” “concave spoon bowl portion,” and “concave fork bowl portion” practicing the limitations of claim element 1[e], it also discloses the “second front surface,” “second back surface,” “second concave bowl portion,” and “first concave bowl portion” of claim element 9[f]. The modification of

Torode in view of the CFL Fork and Nelson would also practice this limitation, *see* Figure 52.

9[g] a handle that couples the second head to the first head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

612. The limitations of claim element 9[g] are identical to those of claim element 1[f] with the exception of reciting the more general “first head” and “second head” as opposed to “fork head” and “spoon head.” Accordingly, as Torode in view of the CFL Fork and Nelson discloses a handle, spoon, and fork head practicing the limitations of claim element 1[f], it also discloses the more general handle, first head, and second head of claim element 9[g]. The modification of Torode in view of the CFL Fork and Nelson would also practice this limitation, *see* Figure 52.

9[h] the first front surface, the second front surface, and the handle front surface collectively defining a single front surface of the utensil;

613. The limitations of claim element 9[h] are identical to those of claim element 1[g] with the exception of reciting the more general “first front surface” and “second front surface” as opposed to “fork front surface” and “spoon front surface.” Accordingly, as Torode in view of the CFL Fork and Nelson discloses a handle front surface, spoon front surface, and fork front surface practicing the limitations of claim element 1[g], it also discloses the more general handle front surface, first front surface, and second front surface of claim element 9[h]. The modification of Torode in view of the CFL Fork and Nelson would also practice this limitation, *see* Figure 52.

9[i] the first back surface, the second back surface , and the handle back surface collectively defining a single back surface of the utensil; and

614. The limitations of claim element 9[i] are identical to those of claim element 1[h] with the exception of reciting the more general “first back surface” and “second back surface” as opposed to “fork back surface” and “spoon back surface.” Accordingly, as Torode in view of the CFL Fork and Nelson discloses a handle back surface, spoon back surface, and fork back surface practicing the limitations of claim element 1[h], it also discloses the more general handle back surface, first back surface, and second back surface of claim element 9[i]. The modification of Torode in view of the CFL Fork and Nelson would also practice this limitation, *see* Figure 52.

9[j] the first side surface, the second side surface, and the handle side surface collectively defining a single side surface of the utensil.

615. The limitations of claim element 9[j] are identical to those of claim element 1[i] with the exception of reciting the more general “first side surface” and “second side surface” as opposed to “fork side surface” and “spoon side surface.” Accordingly, as Torode in view of the CFL Fork and Nelson discloses a handle side surface, spoon side surface, and fork side surface practicing the limitations of claim element 1[i], it also discloses the more general handle side surface, first side surface, and second side surface of claim element 9[j]. The modification of Torode in view of the CFL Fork and Nelson would also practice this limitation, *see* Figure 52.

616. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 9 of the ’629 Patent would have been obvious Torode in view of the CFL Fork and Nelson.

10. Claim 10

The eating utensil as recited in claim 9, wherein the handle, the first head, and the second head are integrally formed.

617. As described in my analysis of Claim 1, Torode discloses “a utensil” that combines a knife, fork, and spoon for eating purposes.²³²

618. Torode discloses a utensil which is integrally formed, namely: “[i]n further carrying out the invention, and with particular reference to Figure 1, the same comprises handle portion 1, being tapered as shown and having one of its ends terminating to neck 2, then extending and forming fork body 3, one end of said body terminating to a series of spaced apart tines 4. The opposite end of handle portion 1 terminates to spoon bowl 5 as shown.”²³³

619. Accordingly, Torode in view of the CFL Fork and Nelson would also be integrally formed. Therefore, each and every limitation of Claim 10 of the ’629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

11. Claim 11

The eating utensil as recited in claim 9, wherein an inner one of the tines is substantially straight.

620. As shown above, the limitations of Claim 9 of the ’629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

621. Claim 2 modifies Claim 1 of the ’629 Patent by requiring “inner ones of the plurality of tines each has a pair of substantially straight side edges.” As shown in the analysis of Claim 2 in view of Torode in view of the CFL Fork and Nelson, Torode discloses at least one inner tine which is substantially straight. The

²³² Ex. 1009, 1:1-8.

²³³ Ex. 1009, 2:1-9.

modification of Torode by the CFL Fork and Nelson would also practice this limitation, *see* Figure 52.

622. Accordingly, Torode in view of the CFL Fork and Nelson would also be integrally formed. Therefore, each and every limitation of Claim 11 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

12. Claim 12

The eating utensil as recited in claim 9, wherein the outer ones of the tines is further defined by a substantially straight inner edge.

623. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

624. Torode discloses an outer tine defined by a substantially straight inner edge. The modification of Torode in view of the CFL Fork and Nelson would also practice this limitation, *see* Figure 52.

625. Accordingly, for at least the reasons demonstrated above, each and every limitation of Claim 12 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

13. Claim 13

The eating utensil as recited in claim 9, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

626. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

627. Claim 13 modifies Claim 9 in the same way that Claim 7 modifies Claim 1. As shown above, Claims 1, 7, and 9 are rendered obvious over Torode in

view of the CFL Fork and Nelson. Accordingly, Claim 13 is also rendered obvious over Torode in view of the CFL Fork and Nelson.

14. Claim 14

14[preamble] The eating utensil as recited in claim 9,

628. As shown above, the limitations of Claim 9 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

14[a] wherein the second concave bowl portion is further defined by a plurality of substantially flat side edges,

14[b] wherein one of the substantially flat side edges further defines the single side surface of the utensil.

629. Claim elements 14[a] and 14[b] can be analyzed simultaneously. Claim 14 modifies Claim 9 in the same way that Claim 6 modifies Claim 1. As shown above, Torode in view of the CFL Fork and Nelson renders the limitation of each of Claims 1, 6, and 9. Therefore, the limitations of Claim 14 are also rendered obvious over Torode in view of the CFL Fork and Nelson.

15. Claim 15

15[preamble] An eating utensil comprising:

630. As described in my analysis of Claim 1, Torode discloses “a utensil” that combines a knife, fork, and spoon for eating purposes.²³⁴

15[a] a fork head having a fork front surface and a fork back surface both partially defining a plurality of tines and

²³⁴ Ex. 1009, 1:1-8.

631. This element is identical to claim element 1[a] and is accordingly disclosed by Torode for the same reasons that claim element 1[a] was.

15[b] a concave fork bowl portion, an outer one of the tines and the concave fork bowl portion being further defined by a chamfer and a curved side surface coupled to the chamfer,

632. This element is identical to claim element 1[b] and is accordingly disclosed by Torode in view of the CFL Fork and Nelson for the same reasons that claim element 1[b] was. *See*, for example, Figure 52.

15[c] the chamfer coupling the fork front surface with the curved side surface,

633. As demonstrated in my analysis of Claim 1, Torode in view of the CFL Fork and Nelson includes a first chamfer disposed on the outside edge of one of the fork tines. Also, as was shown this chamfer is coupled directly to the curved side surface. As the fork front surface comprises the outer fork tine surface which transitions into the chamfer and the chamfer is directly coupled to the curved side surface, a POSITA would recognize that the chamfer couples the fork front surface to the curved side surface. *See* Figure 52.

15[d] the curved side surface coupling the chamfer with the fork back surface, the chamfer is oblique in relation to the curved side surface and the coupling between the chamfer and the curved side surface defines a curved splitting feature;

634. This element is identical to claim element 1[c] and is accordingly disclosed by Torode in view of the CFL Fork and Nelson for the same reasons that claim element 1[c] was. *See* Figure 52.

15[e] a handle coupled to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface;

635. The analysis of claim element 1[f] demonstrated that Torode in view of the CFL Fork and Nelson discloses a handle that couples the spoon head to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface. Accordingly, Torode in view of the CFL Fork and Nelson at least includes a handle coupled to the fork head, the handle having a handle front surface, a handle back surface, and a handle side surface coupling the handle front surface to the handle back surface. *See* Figure 52.

15[f] the fork front surface and the handle front surface defining a single front surface of the utensil;

636. The analysis of claim element 1[g] demonstrated that Torode in view of the CFL Fork and Nelson discloses “the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil.” Accordingly, Torode in view of the CFL Fork and Nelson at least discloses “the fork front surface and the handle front surface defining a single front surface of the utensil.” *See* Figure 52.

15[g] the fork back surface and the handle back surface defining a single back surface of the utensil; and

637. The analysis of claim element 1[h] demonstrated that Torode in view of the CFL Fork and Nelson discloses “the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil.” Accordingly, Torode in view of the CFL Fork and Nelson at least

discloses “the fork back surface and the handle back surface defining a single back surface of the utensil.” *See* Figure 52.

15[h] the fork side surface and the handle side surface defining a single side surface of the utensil.

638. The analysis of claim element 1[i] demonstrated that Torode in view of the CFL Fork and Nelson discloses “the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.” Accordingly, Torode in view of the CFL Fork and Nelson at least discloses “the fork side surface and the handle side surface defining a single side surface of the utensil.”

639. Accordingly, for at least the above reasons, each and every limitation of Claim 15 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

16. Claim 16

16[preamble] The eating utensil as recited in claim 15,

640. As shown above, Torode in view of the CFL Fork and Nelson discloses each and every limitation of Claim 15.

16[a] further comprising a spoon head coupled to the handle on an opposite side from where the fork head is coupled to the handle,

641. Torode in view of the CFL Fork and Nelson discloses spoon and fork heads respectively coupled to a handle on opposite side of said handle. *See* Figure 52.

16[b] the spoon head having a spoon front surface, a spoon back surface, and a spoon side surface coupling the spoon front surface with the spoon back surface,

642. This element is identical to claim element 1[d] and is accordingly disclosed by Torode in view of the CFL Fork and Nelson for the same reasons that claim element 1[d] was.

16[c] wherein the spoon front surface, the spoon back surface, and the spoon side surface defining a concave spoon bowl portion;

643. This element is included within claim element 1[e] and is accordingly disclosed or rendered obvious by Torode in view of the CFL Fork and Nelson for the same reasons that claim element 1[e] was.

16[d] the spoon front surface further defining the single front surface of the utensil;

644. The analysis of claim element 1[g] demonstrated that Torode in view of the CFL Fork and Nelson discloses “the fork front surface, the spoon front surface, and the handle front surface collectively defining a single front surface of the utensil.” Accordingly, Torode in view of the CFL Fork and Nelson at least discloses “the spoon front surface further defining the single front surface of the utensil.”

16[e] the spoon back surface further defining the single back surface of the utensil; and

645. The analysis of claim element 1[h] demonstrated that Torode in view of the CFL Fork and Nelson discloses “the fork back surface, the spoon surface, and the handle back surface collectively defining a single back surface of the utensil.” Accordingly, Torode in view of the CFL Fork and Nelson at least

discloses “the spoon back surface further defining the single back surface of the utensil.”

16[f] the spoon side surface further defining the single side surface of the utensil.

646. The analysis of claim element 1[i] demonstrated that Torode in view of the CFL Fork and Nelson discloses “the fork side surface, the spoon side surface, and the handle side surface collectively defining a single side surface of the utensil.” Accordingly, Torode in view of the CFL Fork and Nelson at least discloses “the spoon side surface further defining the single side surface of the utensil.”

647. Accordingly, for at least the above reasons, each and every limitation of Claim 16 of the '629 Patent would have been obvious over Torode in view of the CFL Fork and Nelson.

17. Claim 17

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is tilted in relation to the handle front surface at an angle of about 20-25 degrees.

648. As shown above, each and every limitation of Claim 16 would have been obvious over Torode in view of the CFL Fork and Nelson.

649. With regard to the limitations of Claim 17, the spoon bowl of Torode is tilted forward from the front surface of the handle at an angle that may approximate about 20-25 degrees, although Torode is not specific in this regard. The '629 Patent teaches: “the bowl 112 is angled upward to form a deeper bowl, which can be more efficient when scooping liquids, such as soups. In a particular embodiment, the bowl is angled upward at an angle of about 20-25 degrees, and

preferably about 23 degrees.”²³⁵ However, the ’629 Patent does not disclose exactly why the specific range of angle between 20-25 degrees provides any claimed benefit that, e.g., a bowl angled upwards at an angle of 30-35 degrees would not provide, nor whether even such an angle (30-35 degrees) would be considered “about 20-25 degrees” within the context of the claimed invention. Accordingly, a POSITA would not perceive that the ’629 Patent has taught any functional benefit to the limitations of Claim 17 and would interpret the limitations of Claim 17 as being aesthetic design choices.

650. Thus, to the extent that Torode does not disclose the indicated angle, a POSITA would understand that the angle of the bowl portion with respect to the handle in a spoon could fall within a wide range of angles; a POSITA would not interpret the relative angle between the spoon bowl and the handle as being among a finite number of identifiable design choices which a POSITA would pick and choose from with a more than reasonable chance of success, each of them having predictable outcomes. Thus, in the alternative, this element would be obvious over Torode in view of the CFL Fork and Nelson.

651. Accordingly, the limitations of Claim 17 would have been obvious over Torode in view of the CFL Fork and Nelson.

18. Claim 18

18[preamble] The eating utensil as recited in claim 16,

652. As shown above, each and every limitation of Claim 16 would have been obvious over Torode in view of the CFL Fork and Nelson.

18[a] wherein the concave spoon bowl portion is further defined by a substantially flat side edge,

²³⁵ Ex. 1001, 5:41-45.

18[b] wherein the substantially flat side edge further defines the single side surface of the utensil.

653. Claim elements 18[a]-18[b] can be analyzed simultaneously.

654. Claim 18 modifies Claim 16 in the same way that Claim 6 modifies Claim 1, with the exception that Claim 18 only requires a single substantially flat side edge as opposed to a plurality of substantially flat side edges. Accordingly, the limitations of Claim 18 would be a subset of Claim 6. As shown above, Torode in view of the CFL Fork and Nelson renders the limitation of each of Claims 1, 6, and 16 obvious. Therefore, the limitations of Claim 18 are also rendered obvious over Torode in view of the CFL Fork and Nelson.

19. Claim 19

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is further defined by a substantially flat end edge.

655. As shown above, each and every limitation of Claim 16 would have been obvious over Torode in view of the CFL Fork and Nelson.

656. As discussed in the analysis of Claim 6 in view of Torode, it would not have been entirely clear from the teachings of the '629 Patent what exactly qualifies as "substantially flat," as the specification and drawings refer to figures showing surfaces (such as the side and end edges) which only contain sub-sections which could be considered flat.

657. As can be seen in Figure 18, to the extent that the end edge of the '629 Patent drawings is considered to be "substantially flat." Torode also discloses a substantially flat end edge.

658. Alternatively, to the extent that the "substantially flat" limitation is determined to represent a characteristic of the end edge which Torode does not

read on, the '629 Patent specification provides no justification for this alleged benefit, i.e., the patent does not explain why, exactly, a “substantially flat end edge” would “allow” scraping food from the side of a container.²³⁶

659. Based on my experience with the use of utensils to eat from a variety of containers, I am not aware of any *a priori* reason that the “substantially flat end edge” of the claimed invention would “allow” scraping as opposed to, e.g., the end edge of the concave spoon bowl being curved and not flat. Furthermore, to the extent that the '629 Patent specification is meant to suggest that flat end edge would provide a more complete mating with the interior of a container for “scraping,” this would only be the case when the overall curvature of the flat side edge substantially matches the interior surface of the container. This matching is certainly not claimed or discussed within the '629 Patent nor would such a teaching be feasible to accomplish for every conceivable eating container.

660. Accordingly, a POSITA would understand that having a substantially flat end edge would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that Torode does not show a concave spoon bowl portion defined by a substantially flat end edge, modifying Torode in view of the CFL Fork and Nelson to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a more than reasonable chance of success. Accordingly, Torode in view of the CFL Fork and Nelson would also practice the limitations of Claim 19, *see* Figure 52.

²³⁶ See '629 Patent, 10:20-24.

20. Claim 20

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion has a substantially pentagonal shape.

661. As shown above, each and every limitation of Claim 16 would have been obvious over Torode in view of the CFL Fork and Nelson.

662. As described above in the analysis, while the disclosure of a pentagonal shape for the spoon head of the '629 Patent would cause a POSITA some deal of confusion (the figures of the '629 Patent show the spoon to have a hexagonal shape), to the extent that the '629 Patent discloses a “pentagonal” shape for the spoon head, so does Torode. As can be seen in Figure 56 below, Torode discloses a spoon with a hexagonal shape, comporting with the “pentagonal” shape claimed in the '629 Patent. This choice of shapes, which would be an aesthetic design choice, could be employed in Torode as modified by the CFL Fork and Nelson based on the express teachings of Torode.

663. Accordingly, Torode as modified by the CFL Fork and Nelson would practice or render obvious the limitations of Claim 20, *see* Figure 56.

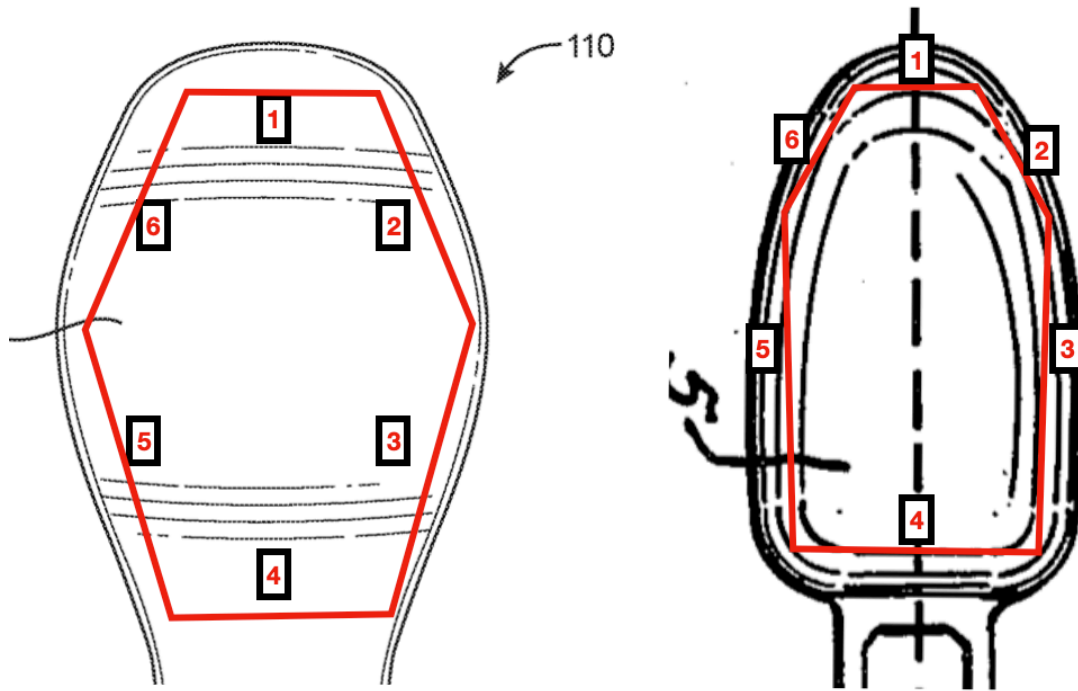


Figure 56. Annotated figures of the spoon heads from the '629 Patent (left) and Torode (right). To the extent that the '629 Patent discloses a spoon head with a “substantially pentagonal shape”, so does Torode.

21. Claim 21

The eating utensil as recited in claim 16, wherein the concave spoon bowl portion is further defined by at least three substantially flat side edges with rounded corners connecting the flat side edges, wherein one of the flat side edges further defines the single side surface of the utensil.

664. Claim 21 modifies Claim 16 in the same way that Claim 4 modifies Claim 1. As shown above, Torode in view of the CFL Fork and Nelson renders the limitation of each of Claims 1, 4, and 16 obvious. Therefore, the limitations of Claim 21 are also rendered obvious over Torode in view of the CFL Fork and Nelson.

22. Claim 22

The eating utensil as recited in claim 15, wherein the handle front surface has a diagonal ridge.

665. The claim term “diagonal ridge” does not appear within the specification of the ’629 Patent. Accordingly, a POSITA would not understand whether the ’629 Patent is claiming, e.g., a diagonal ridge which runs the entire length of the handle or any diagonal ridge on the front surface. A POSITA would then be left to conclude that any diagonal ridge would read on the limitations of Claim 22.

666. Therefore, a POSITA would recognize that each of Torode, Nelson, and the CFL Fork disclose structures on their handles which could be recognized as diagonal ridges, *see* Figure 52.

667. In the alternative, to the extent Torode, Nelson, and/or the CFL Fork do not disclose diagonal ridges on the handles, because the ’629 Patent specification provides no justification for any alleged function or benefit to the recited “diagonal ridges,” a POSITA would understand that including diagonal ridges on the front surface of the handle of Torode would be purely an aesthetic design consideration and would be one of a number of possible configurations from which they could choose based purely on design considerations. Accordingly, to the extent that it is determined that none of Torode, Nelson, and the CFL Fork includes a handle front surface with diagonal ridges, modifying Torode in view of the CFL Fork and Nelson to do so would be one of a finite number of identifiable, predictable solutions which a POSITA would pick and choose from with a reasonable chance of success.

668. Accordingly, for at least the above reasons, each and every limitation of Claim 22 would have been obvious over Torode in view of Nelson and the CFL Fork.

23. Claim 23

The eating utensil as recited in claim 15, wherein the eating utensil is formed of a glass reinforced thermoplastic material.

669. Claim 23 modifies Claim 15 in the same way that Claim 7 modifies Claim 1. As shown above, Torode in view of the CFL Fork and Nelson renders the limitation of each of Claims 1, 7, and 15. Therefore, the limitations of Claim 23 are also rendered obvious over Torode in view of the CFL Fork and Nelson.

V. SECONDARY CONSIDERATIONS OF NON-OBVIOUSNESS

670. I am not aware of any evidence of secondary considerations that supports the non-obviousness of the claims of the '629 Patent. I reserve the right to respond to any evidence or assertions of alleged secondary considerations if they are presented at a later date.

VI. CONCLUSION

671. In signing below, I recognize that this declaration may be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will cooperate to the best of my ability to appear for cross-examination within the United States during the time allotted for cross-examination.

672. I reserve the right to supplement my opinions in response to any arguments that the Patent Owner raises and to consider new information as it becomes available to me.

673. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and correct; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

674. I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 10, 2023 at Chicago, Illinois.



Andrew W. Smith, Ph.D., P.E.

APPENDIX A – CURRICULUM VITAE



Exponent®
Engineering & Scientific Consulting

Andrew W. Smith, Ph.D., P.E.

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Professional Profile

Dr. Smith is a mechanical engineer with extensive experience in investigating the performance of industrial machinery and consumer products within the context of both accident investigations and intellectual property disputes.

Leveraging his experience in investigating workplace accidents (including industrial lathes, lifts, mixers, molding equipment, baggers, and conveyors) Dr. Smith regularly assists clients by synthesizing complex sources of information, physical evidence, and regulatory requirements yielding valuable insights into both accident causation and prevention.

Dr. Smith also assists clients in investigating technical issues related to many types of intellectual property disputes. Drawing on his background in both experimental physics and mechanical engineering, he has provided analysis related to both patent infringement and validity for a wide variety of technology including industrial vehicles, exercise equipment, textile production machinery, aerospace fasteners, and remote sensing technology. These analyses have been used in district court, PTAB filings, and trade secret litigation.

Prior to joining Exponent, Dr. Smith's research in experimental astrophysics was focused on the development and application of radiation detector technology. This work included modeling and developing sensor packages, as well as signal processing and communication electronics. Additionally, due to his role in the commissioning and construction of astronomical observatories, Dr. Smith has a background in the mechanical dynamics of large, movable structures as well as coating/degradation processes in mirror surfaces.

Dr. Smith has held research and teaching faculty appointments at NASA's Goddard Space Flight Center, the University of Maryland and Northwestern University. Dr. Smith has been invited to present lectures on a wide variety of topics in physics at conferences and workshops in the United States, Europe, and Asia. He has served as both a primary and contributing author on over 50 peer reviewed articles in the physical sciences.

Academic Credentials & Professional Honors

Ph.D., Physics and Astronomy, University of Leeds, UK, 2008

M.Sc., Particle Physics, Durham University, England, 2002

B.A., Astrophysics, University of California, Berkeley, 2001

Pre-doctoral Research Fellowship, Harvard-Smithsonian Center for Astrophysics, 2005-2008

Licenses and Certifications

Licensed Professional Engineer, California, #39547

OSHA 30 Hour General Industry Training

Prior Experience

Associate Research Professor, Particle Astrophysics, NASA Goddard Space Flight Center/University of Maryland, 2014-2017

Associate Research Professor, Physics and Astronomy, University of Utah, 2011-2014

Visiting Lecturer, Physics, Northwestern University, 2009-2011

Postdoctoral Researcher, Argonne National Laboratory, 2008-2011

Project Experience

Selected Intellectual Property Investigations

Remote controlled wildlife trapping patent in view of prior art; developed opinions regarding infringement, obviousness, written description and enablement, and patentability. Testified at deposition.

Cotton baling and wrapping patent; developed opinions relating to invalidity in support of district court litigation.

Portable fuel storage and dispensing apparatus patent and related prior art; developed opinions relating to both infringement and invalidity in support of district court litigation.

Portable canopy tent patent and related prior art; developed opinions relating to invalidity in support of an IPR petition (instituted).

Automotive door hinge patent and related prior art; developed opinions regarding claim construction, anticipation, and obviousness in support of district court litigation.

Oil and gas drilling technology patents and related prior art; developed opinions regarding anticipation and obviousness in support of several IPR petitions.

Filter for mechanical sifter patent and related prior art; developed opinions regarding invalidity in support of district court matter.

Storage shelf technology patent and related prior art; developed opinions regarding invalidity in support of district court litigation.

Fire truck patent and related prior art vehicles; developed opinions regarding infringement, anticipation, and written description and enablement.

Pneumatic pumps for air mattresses patents and related prior art; developed opinions regarding invalidity in support of an IPR petition.

Exercise treadmill patent and related prior art; collected prior art, developed opinions regarding invalidity and infringement in support of district court litigation.

Selected Industrial Safety Investigations

Lock-out / Tag-out and/or Machine Safeguarding:

- Rotational Molders
- Brake press machinery
- Carousel Baggers
- Industrial Lathes
- Industrial Mixers
- Industrial Wood Chippers
- Drilling Equipment

Standard of Care:

- Natural gas pipeline connection failure
- Pressurized swivel joint detachment
- Dock lift operations
- Hazardous material camlock coupler detachment
- Worker fall from municipal water tower

Selected Consumer Product Investigations

Magnetic field properties of children's toy; provided trial testimony.

Multiple investigations of allegations of injuries sustained while using a pressure cooker.

Designed and implemented custom instrumentation and data readout to measure strain field on ceramic lip of pressure cooker during use.

Built custom automated test fixture to test children's mattresses under cyclic loads.

Performance of ultrasonic pest repeller.

Built custom test fixture to ascertain failure loads of carabiners designed for use in hammocks.

Built custom test fixture to ascertain failure loads of consumer seating.

Multiple investigations of injuries sustained while using casino chairs.

Investigated tipping loads of wooden furniture.

Investigated tipping loads of exercise equipment.

Selected Publication List

Archer, A. Smith, A. et al "VERITAS Observations of The Galactic Center Ridge Above 2 TeV", *The Astrophysical Journal* 821:129, 2016

Archambault, S. Smith, A. et al "Exceptionally bright TeV Flares from the binary LS I +61 303", *The Astrophysical Journal Letters*, 821: 129, 2016

Archer, A. Smith, A. et al “Very-high energy observations of the Galactic center region by VERITAS in 2010-2012”, *The Astrophysical Journal* , 790, 2, 2014

Archer, A. Smith, A. et al “Multiwavelength Observations of the TeV Binary LS I +61 303 During a TeV Outburst with VERITAS, Swift-XRT and Fermi-LAT”, *The Astrophysical Journal*, 779, 88, 2013

Smith, A. for The VERITAS Collaboration, “CF2 White Paper: Status and Prospects of The VERITAS Indirect Dark Matter Detection Program”, White Paper Submitted for the 2013 Snowmass Community Planning Exercise astro-ph/1304.6367

Acciari, V., ...Smith, A. et al “Multiwavelength Observations of The AGN 1ES 0414+009 With VERITAS, Fermi-LAT, Swift-XRT, and MDM”, *The Astrophysical Journal*, 755, 2, 2012

Acciari, V., ...Smith, A. et al “VERITAS Observations of The TeV Binary LS I +61 303 in 2008-2010”, *The Astrophysical Journal*, 2011, 738, 3

Acciari, V., ...Smith, A. et al. “VERITAS Search for VHE Emission From Dwarf Spheroidal Galaxies”, *The Astrophysical Journal*, 720, 1174-1180, 2010

Smith, A. et al. “Long Term X-ray Monitoring Of The TeV Binary LS I +61 303 with RXTE” *The Astrophysical Journal*, 293, 2, 2009

Acciari, V., ...Smith, A. et al “Multiwavelength Observations of LS I +61 303 with VERITAS, Swift and RXTE” *The Astrophysical Journal*, 700, 2, 2009

Cheung, C.C. Smith, A. et al. ”Fermi-LAT Detection of Gravitational Lens Delayed Gamma-ray Flares from Blazar B0218+357”, *The Astrophysical Journal Letters*, 2014, 782, 2

Acciari, V.....Smith, A. et al. “Detection of Pulsed Gamma-Rays Above 100 GeV from the Crab Pulsar”, *Science*, 334: 69, 2011

Acciari, V.....Smith, A. et al. “The Discovery of Gamma-ray Emission From a Starburst Galaxy”, *Nature*, 462, 770, 2009

Acciari, V.....Smith, A. et al. “Radio Imaging of the Very-High-Energy Gamma-Ray Emission Region in the Central Engine of a Radio Galaxy”, *Science*, 325, 448, 2009

APPENDIX B – TESTIMONY HISTORY

Trial Testimony

Meaghin Jordan, Individually; Jonathan Jordan, Individually, And Meaghin And Jonathan Jordan On Behalf Of Their Minor Son, Braylon Jordan Vs. Maxfield & Oberton Holdings, Llc; Craig Zucker, Assemble Llc; Great American E&S Insurance Company; Alterra Excess And Surplus Insurance Company F/K/A Max Specialty Insurance Company; Evanston Insurance Company; Markel Insurance Company, Inc.; Scottsdale Insurance Company; Indian Harbor Insurance Company, And DoeS 5 – 15, Case No. 3:15-cv-00220-CWR-LRA; Testimony given June 2018.

Deposition Testimony

Jager Pro LLC v. Bull Creek Welding and Fabrication Inc., Case No. 4:2019cv00107, U.S. District Court for the Eastern District of Arkansas; Testimony given August 28, 2020

Inventist Inc. v Ninebot (USA), D/B/A Ninebot U.S., Inc.; Ninebot (Tianjin) Technology Co. Ltd./ Ninebot, Inc. (China), Case No. 3:16-cv-05688-RBL, U.S. District Court for the Western District of Washington, at Tacoma, Testimony given July 13, 2022.

Shawn Jefford vs. Dakota, Minnesota & Eastern Railroad Corporation d/b/a Canadian Pacific Railway Company, Case No. 2021-L-8, Circuit Court of the Fourteenth Judicial Circuit, Rock Island County, Illinois; Testimony given May 30, 2023.

APPENDIX C – MATERIALS REVIEWED AND/OR RELIED UPON

Exhibits

- Exhibit 1001: U.S. Patent No. 10, 555, 629 to Miksovsky
- Exhibit 1003: Prosecution History of U.S. Patent No. 10, 555, 629
- Exhibit 1004: Chinese Utility Model No. CN 2062986U to Feng
- Exhibit 1005: European Design No. 001805383-001 to Kristiansson
- Exhibit 1006: U.S. Patent No. 6,119,351 to Vanderputt
- Exhibit 1007: U.S. Patent Application Pub. No. 2008/0201959 A1 to Kent
- Exhibit 1008: Chinese Patent No. CN 103504965 A to Bo
- Exhibit 1009: U.S. Patent No. 2,318,129 to Torode
- Exhibit 1010: Printed Publication for “The CFL Fork”: Excerpts from “French Silver Cutlery of the XIXth Century” by David Allan, published December 13, 2007.
- Exhibit 1011: U.S. Patent No. 4,535,538 to Nelson

Additional Patents/Trademarks

- U.S. Patent No. 4,984,367 to Albanese
 - U.S. Patent No. 88,370 issued to Cox
 - U.S. Patent No. 2,473,288 to McNeill
 - U.S. Patent Application Publication No. 2003/0110644 by Miller
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- U.S. Patent No. 1,699,248 to Pasal
 - U.S. Patent Design Specification No. 31,575 to Phillips and Stayman
 - U.S. Patent Design Specification No. 60,369 to Quandee
 - U.S. Patent Design Specification No. 93,956 to Wilson
 - U.S. Patent Design Specification No. 32,916 to Richards
 - U.S. Patent Design Specification No. 147,119 to Francis
 - U.S. Patent Design Specification No. 843,953 to Laramy
 - U.S. Patent No. 4,771,541 to Bouchakian
 - U.S. Patent Design Specification No. 192,970 to Loertz
 - U.S. Trademark Application, No. 609,277 by Ballard

Websites

- <https://veritas.sao.arizona.edu>
 - <https://www.hawc-observatory.org>
 - <https://fermi.gsfc.nasa.gov>
 - <https://www.yankeerebelantiques.com/very-rare-richards-patent-combination-eating-utensils-dated-1861-sold/>
 - <https://philamuseum.org/collection/object/305270>
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- <https://emuseum.mfah.org/objects/142889/pair-of-terrapin-forks>
 - https://en.wikipedia.org/wiki/Horatio_Nelson,_1st_Viscount_Nelson
 - <https://www.rmg.co.uk/collections/objects/rmgc-object-63222>
 - <https://www.rmg.co.uk/collections/objects/rmgc-object-63222>
 - [https://collections.vam.ac.uk/item/O78416/melon-fork-the CFL Fork-francis](https://collections.vam.ac.uk/item/O78416/melon-fork-the-CFL-Fork-francis)
 - <https://www.webstaurantstore.com/choice-individually-wrapped-medium-weight-white-plastic-spork-pack/999WSPORKWP.html>
 - <https://australianfoodtimeline.com.au/splayds-invented/>
 - <https://collections.vam.ac.uk/item/O271314/splayd-splayd-combination-knife-mrs-mcarthur/?carousel-image=2017KL7976>
 - <https://www.310bis.com/product/xz-sold-original-vintage-splayds-australia-set-of-6/37>
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 - <https://www.nytimes.com/2006/09/17/business/your-money/17goods.html>
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 - <https://research.calacademy.org/research/anthropology/utensil/forks.htm>
 - <https://dictionary.cambridge.org/us/dictionary/english/chamfer>
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Books

- Dictionary of Mechanical Engineering, Oxford University Press, 2nd Edition, 2019
 - Rosato, Donald; “*Designing with plastics and composites: a handbook*”, Springer Science & Business Media; 2013
 - Mark, Herman, “*Encyclopedia of Polymer Science and Technology, 3rd Edition. Volume 3: Polyamides, Plastics*”, John Wiley & Sons, Inc. 2004
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