

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

KOHLER CO.
Petitioner,
v.
DELTA FAUCET CO.,
Patent Owner.

Case No. IPR2024-00700

U.S. Patent No. 10,393,363 B2

PETITION FOR *INTER PARTES* REVIEW

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Mandatory Notices.....	5
	A. Real Party-in-Interest	5
	B. Related Matters.....	5
	C. Counsel, Service, and Fee Information	5
III.	Requirements for IPR	5
	A. Grounds for Standing	5
	B. Identification of Challenge and Statement of Precise Relief Requested	6
IV.	Institution Should Be Granted	7
	A. There Are No Grounds for a § 314 Discretionary Denial in this Case	7
	B. Denial Under § 325(d) Would Be Inappropriate	7
V.	The '363 Patent.....	7
	A. Overview	7
	B. Prosecution History	13
	C. Claims.....	13
VI.	Claim Construction.....	13
VII.	Level of Ordinary Skill in the Art	14
VIII.	Prior Art Overview	14
	A. Tseng	14
	B. Tse	18
	C. Carter	20

D.	Mizuno.....	21
E.	Schneider	22
F.	Spangler.....	22
IX.	Obviousness Over Tseng’s Pull-Out Faucet.....	22
A.	<i>Ground 1</i> : Claims 1-5, 10, and 12-16 Are Obvious Over Tseng	23
1.	Claims 1 and 10.....	23
2.	Claims 2 and 16.....	38
3.	Claims 3, 12, and 13	39
4.	Claims 4 and 14.....	41
5.	Claims 5 and 15.....	42
B.	<i>Ground 2</i> : Claims 9 and 11 are Obvious Over Tseng and Mizuno	43
C.	<i>Ground 3</i> : Claims 17 and 18 are Obvious Over Tseng and Schneider	46
X.	Obviousness over Tse’s Shower Head	52
A.	<i>Ground 4</i> : Claims 1, 6-9, and 19-23 Are Obvious Over Tse	52
1.	Claims 1 and 19.....	52
2.	Claims 6, 7, and 20.....	65
3.	Claims 8, 22, and 23	67
4.	Claims 9 and 21.....	69
B.	<i>Ground 5</i> : Claims 1, 6-9, and 19-23 are Obvious Over Tse and Carter	70
C.	<i>Ground 6</i> : Claim 24 Is Obvious Over Tse (or Tse and Carter) and Spangler	74
XI.	Conclusion	76

LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,393,363 B2 to Weaver et al.
1002	Excerpted File History of 10,393,363 B2 to Weaver et al.
1003	Declaration of J. Chris Cook
1004	U.S. Pub 2015/0354186 A1 to Tseng et al.
1005	WO 2009/000109 A1 to Tse et al.
1006	U.S. Pub. 2010/0046199 A1 to Carter
1007	JP 2003027537A to Mizuno et al.
1008	Translation of JP 2003027537A to Mizuno et al. and associated translator's declaration
1009	U.S. Pub. 2015/0221206 A1 to Schneider, II et al.
1010	U.S. Pub. 2005/0264529 to Morgan et al.
1011	U.S. Pub. 2015/0208897 A1 to Kangas et al.
1012	U.S. Design Patent D540,424 S
1013	U.S. Patent No. 9,199,252 B2 to Schorn et al.
1014	U.S. Pub. 2013/0299608 A1 to Spangler et al.

I. Introduction

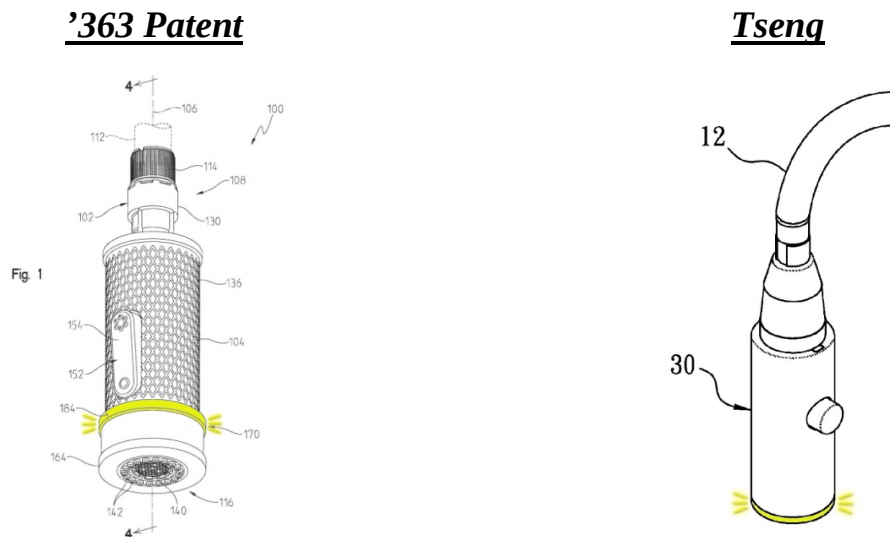
Petitioner respectfully requests IPR of claims 1-24 of U.S. Patent No. 10,393,363 (“the ’363 patent”) assigned to Delta Faucet Co. (“Patent Owner”).

The ’363 patent relates to illuminated kitchen or bath fixtures. Light emanating from emitters (like LEDs) mounted to a substrate within the fixture’s housing is transmitted out of the housing via a “light pipe.” According to the patent, compared to the prior art, its use of the light pipe allows for more uniform light diffusion and avoids light “hot spots.” In other words, the patent is directed to what amounts to a ***better-looking*** lighted fixture.

The ’363 patent includes two primary embodiments. The first is a sink faucet with a pull-out spray head. In this embodiment, the light pipe is located circumferentially around the spray head’s housing allowing light to shine radially outward in a band. The second is a pendant shower head meant to be suspended from a bathroom ceiling. This embodiment’s light pipe is in the shower head’s spray face allowing light to shine downward in same direction as emitted water. Independent claim 10 is directed to the pull-out spray head. Independent claim 19 is directed to the pendant shower head. The patent’s remaining independent claim—claim 1—is more broadly directed to both embodiments.

The prior art is replete with examples of lighted kitchen/bath fixtures, including fixtures employing the same type of light pipe the ’363 patent claims.

As discussed in **Ground 1**, U.S. Pub 2015/0354186 (Ex. 1004, “Tseng”) is one such example. Tseng teaches an illuminated pull-out faucet spray head just like that required by independent claim 10 (and broader claim 1) of the ’363 patent:



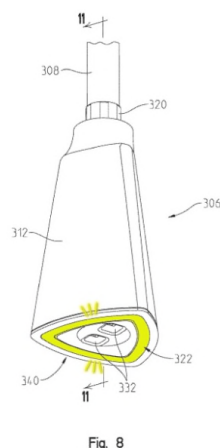
To generate light, Tseng includes LEDs mounted on a substrate (which it calls “circuit board”). A “light conductor” transmits and diffuses light from the LEDs inside the spray head housing to the outside. Due to the shape of the light conductor, light will shine radially out of the spray head in a band. This ground is premised on obviousness—and not anticipation—to account for the differences in language between Tseng and the ’363 patent. While Tseng does not explicitly characterize its light conductor as a “light pipe,” or state that this element “diffuse[s] light” in the specific directions the ’363 patent’s claims require, a POSITA would nonetheless understand that this is exactly what Tseng teaches. Thus, Tseng itself renders claims 1-5, 10, and 12-16 obvious. *See, e.g., Game and Tech. Co. v. Activision Blizzard Inc.*, 926 F.3d 1370, 1381 (Fed. Cir. 2019)

(holding that a single reference can support obviousness); *see also Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1373 (Fed. Cir. 2019) (similarly holding that a single prior art reference can render claims obvious).

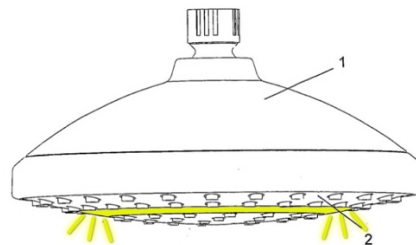
Certain claims depending on claims 1 and 10 add minor, well-known design features not mentioned in Tseng. For instance, as discussed in **Ground 2**, claims 9 and 11 require that the light be powered by a “hydro-generator.” This would have been obvious over combination of Tseng and JP 2003027537A (Exs. 1007, 1008, “Mizuno”). And, as discussed in **Ground 3**, claim 17 and 18 require control of emitted light color based on water temperature. This would have been obvious over Tseng and U.S. Pub. 2015/0221206 A1 (Ex. 1009, “Schneider”)

As discussed in **Ground 4**, WO 2009/000109 (Ex. 1005, “Tse”) provides another example of prior art illuminated fixture. Tse teaches the same type of illuminated pendant shower head required by independent claim 19 (and broader claim 1) of the ’363 patent:

’363 Patent



Tse



Like '363 patent, Tse generates light using LEDs mounted on substrate. It also includes a cover 23 over the LEDs through which emitted light must pass. The light shines downward and out of the cover to color the water emitted by the shower head. While Tse also does not characterize its cover as a “light pipe,” given the structural and functional similarity between this cover and what the '363 patent itself discloses, a POSITA would have understood Tse to teach what the claims require. Thus, Tse renders claims 1, 6-9, and 19-23 obvious.

It is possible that Patent Owner may argue that Tse's cover does not diffuse light sufficiently to qualify as a “light pipe.” While this would be wrong, as discussed in **Ground 5** the claims would still be obvious when the teachings of U.S. Pub. 2010/0046199 A1 (Ex. 1006, “Carter”) are applied to Tse. Carter teaches plumbing fixtures that emit light from an integrated light pipe. The light pipe is molded over LEDs mounted on substrate. According to Carter, use of the light pipe allows for uniform diffusion of light, a cheaper or more watertight fixture, and a wider range of customizable light shapes.

Dependent claim 24 adds yet another minor design feature: multi-dimensional water outlets. As discussed in **Ground 6**, this is obvious over Tse (or Tse and Carter) and U.S. Pub. 2013/0299608 A1 (Ex. 1014, “Spangler”).

II. Mandatory Notices

A. Real Party-in-Interest

Petitioner Kohler is the real party-in-interest.

B. Related Matters

The '363 patent is not at issue any other actions.

C. Counsel, Service, and Fee Information

Petitioner designates the following counsel:

Lead Counsel	Back-Up Counsel
K. Patrick Herman Registration No. 75,018 (P52PTABDocket@orrick.com) Postal & Hand-Delivery Address: Orrick, Herrington & Sutcliffe LLP 51 West 52nd Street New York, NY 10019 T: 212-506-3596	Alyssa Caridis Registration No. 57,545 (A8CPTABDocket@orrick.com) Postal & Hand-Delivery Address: Orrick, Herrington & Sutcliffe LLP 355 South Grand Ave, Suite 2700 Los Angeles, CA 90071 T: 213-629-2020; F: 213-612-2499

Petitioner consents to service by electronic mail at the addresses listed in the table above. Petitioner's Power of Attorney is attached.

The USPTO is authorized to charge the filing fee and any other fees incurred by Petitioner to the deposit account of Orrick, Herrington, & Sutcliffe LLP: 15-0665.

III. Requirements for IPR

A. Grounds for Standing

Petitioner certifies that the '363 patent is available for IPR, and that

Petitioner is not barred or estopped from requesting this IPR.

B. Identification of Challenge and Statement of Precise Relief Requested

Petitioner requests IPR of claims 1-24. This petition discusses claim construction, explains why the claims are unpatentable, provides details regarding where the various claim limitations are found in the prior art, and is supported by the accompanying Declaration of J. Chris Cook (Ex. 1003), a leading expert in the mechanical and product design fields.

The '363 patent was filed April 20, 2018 and makes a facial claim of priority back to an April 25, 2017 provisional. (Ex. 1001, Cover.) For purposes of this petition only, it is assumed that the '363 patent is entitled to the benefit of this April 2017 date.

Petitioner relies on the following references: (1) Tseng (Ex. 1004), (2) Tse (Ex. 1005), (3) Carter (Ex. 1006), (4) Mizuno (Exs. 1007, 1008), (5) Schneider (Ex. 1009), and (6) Spangler (Ex. 1014). These references are all prior art. (See Section VIII.) Mizuno published in Japanese. A translation and associated translator's declaration accompanies this petition. (See Ex. 1008.) All citations refer to this translation.

Petitioner challenges the claims on the following grounds:

Ground 1: Claims 1-5, 10, and 12-16 are obvious over Tseng.

Ground 2: Claims 9 and 11 are obvious over Tseng and Mizuno.

Ground 3: Claims 17 and 18 are obvious over Tseng and Schneider.

Ground 4: Claims 1, 6-9, and 19-23 are obvious over Tse.

Ground 5: Claims 1, 6-9, and 19-23 are obvious over Tse and Carter.

Ground 6: Claim 24 is obvious over Tse (or Tse and Carter) and Spangler.

IV. Institution Should Be Granted

Petitioner has established a reasonable likelihood of success on the merits. And, all other requirements for IPR have been met. The Board should institute IPR.

A. There Are No Grounds for a § 314 Discretionary Denial in this Case

There are no co-pending district court actions involving the '363 patent and no prior post-grant proceedings have occurred.

B. Denial Under § 325(d) Would Be Inappropriate

Neither Tseng nor Tse—the two primary references discussed in this petition—is identified on the face of the '363 patent. (*See* Ex. 1001.) Carter is also not identified. (*See id.*) Moreover, the claims were not subject to any rejections over the prior art during prosecution. (*See generally* Ex. 1002.)

V. The '363 Patent

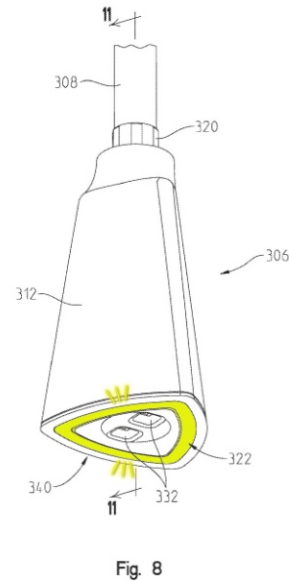
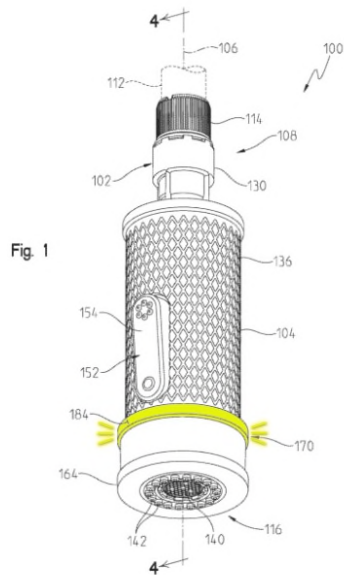
A. Overview

The '363 patent relates to an “illumination device” for the “sprayhead” of a “fluid delivery device[.]” (Ex. 1001, 1:16-18.) The patent notes that

“[i]llumination devices associated with fluid delivery devices are known.” (*Id.*, 1:19-20.) This includes “nightlights” or “indicator lights” providing “a visual indication of” the status or condition of “water flowing from the fluid delivery device.” (*Id.*, 1:20-24.) But, the patent goes on to explain that these existing “illumination devices typically include a single light source” or a “plurality of light sources” that result only in “discrete areas of illumination (i.e. ‘hot spots’).” (*Id.*, 1:24-27.)

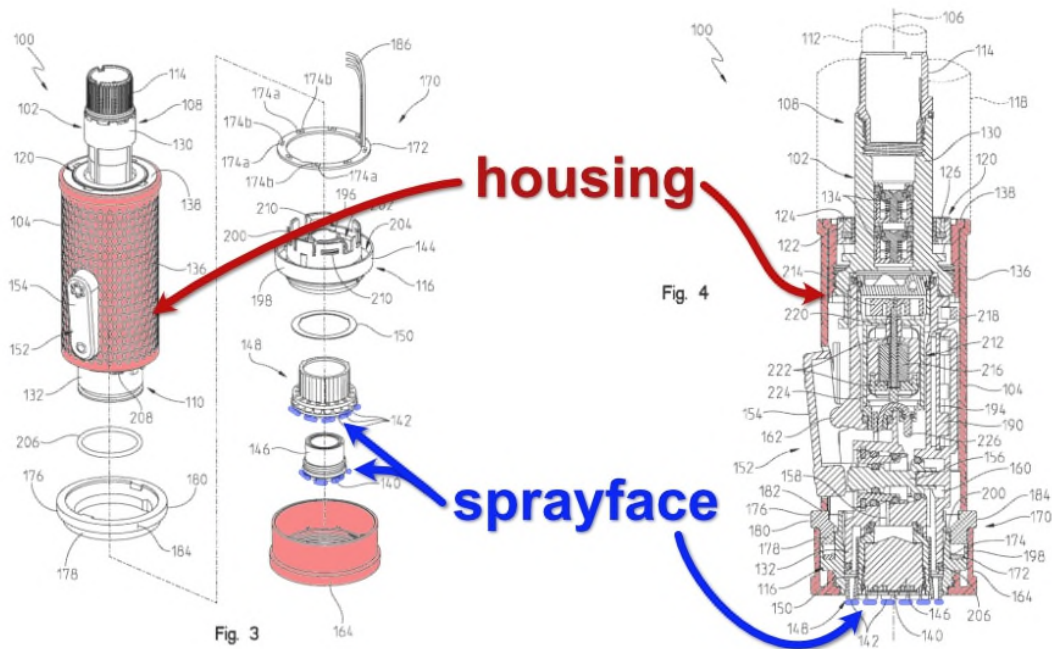
The patent then proposes an “illumination device” that employs “a light pipe illuminated by at least one light emitter.” (*Id.*, 1:27-29.) This may be applied to, for example, the “pull down sprayhead” of a “faucet[,]” or “a pendant showerhead configured to be suspended downwardly from a ceiling.” (*Id.*, 1:29-34.)

Figure 1 (left below) shows the pull-down sprayhead. Light is emitted “radially outwardly” from a “light pipe 176” arranged circumferentially around the sprayhead. (*Id.*, 3:52-58.) Figure 8 (right below) shows the pendant showerhead. Light is emitted downward from a “light pipe” in the showerhead’s “sprayface 322.” (*Id.*, 6:1-15.)



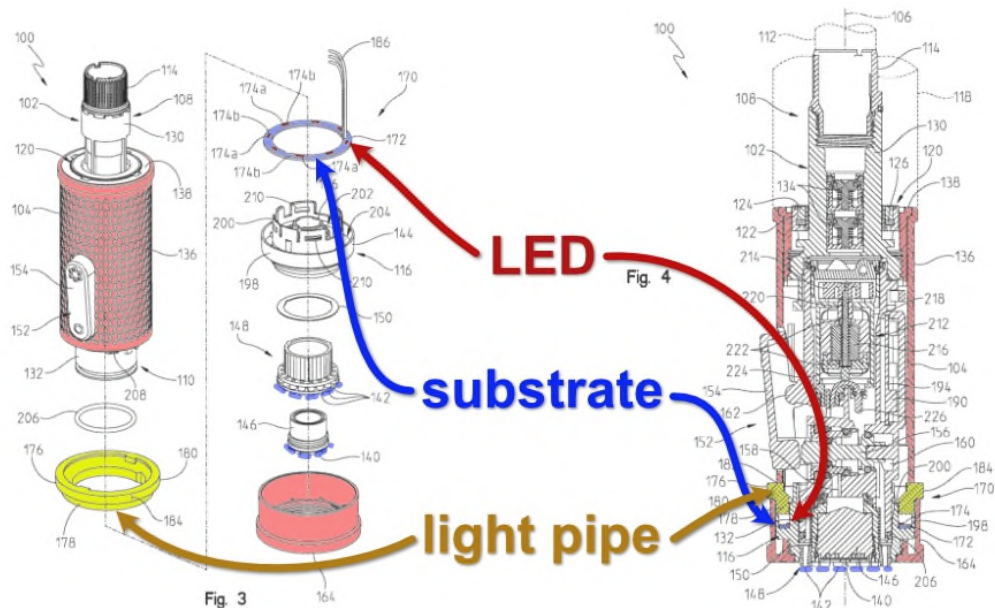
(*Id.*, Figs. 1, 8 (annotated).)

The '363 patent also provides exploded and cross-sectional views of its illumination device. Figures 3 and 4 show the pull-down sprayhead. The sprayhead's body is defined by an "outer shell or housing 104" and "cap 164" (red below). (*Id.*, 2:55-59; 3:45-56.) A "waterway 102" is located within the housing. (*Id.*, 2:55-57.) The waterway delivers water to a "sprayface 116" (blue below) with a "stream outlet 140" and "spray outlet 142." (*Id.*, 3:26-32.) A "rocker arm 154" allows a user to select which of the two outlets emits water. (*Id.*, 3:33-44.)



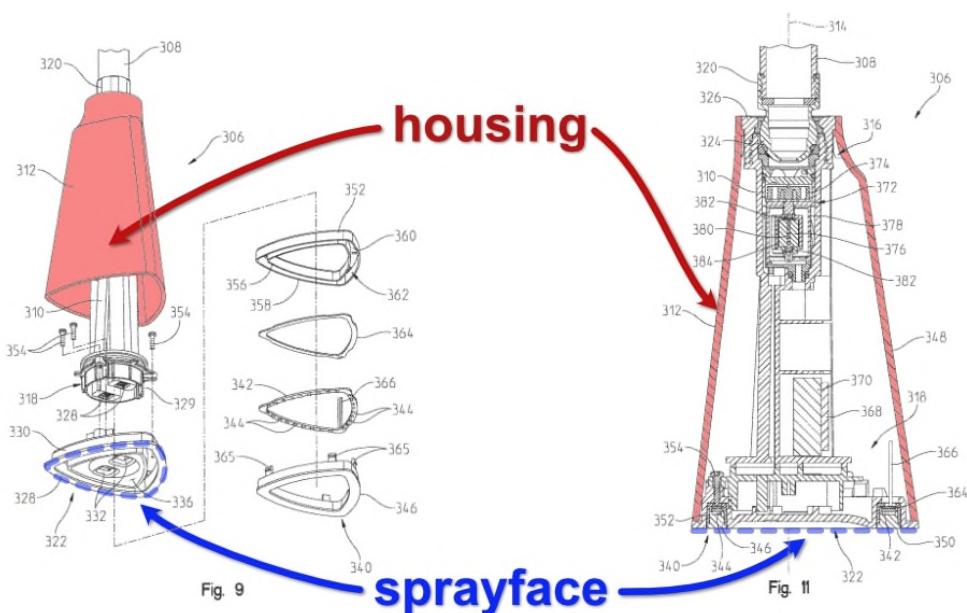
(*Id.*, Figs. 3-4 (annotated).)

The pull-down sprayhead’s “light assembly or illumination device 170” is “supported” within the “housing 104.” (*Id.*, 3:52-54.) The “illumination device 170” includes a “substrate 172” (blue below) that supports “a plurality of light emitters 174” (red below). (*Id.*, 3:54-56.) The “light emitters” can be “light emitting diodes (LEDs)....” (*Id.*, 4:10-12.) “A translucent light pipe or diffuser 176” (yellow below) shaped as a “closed loop” “diffuse[s] light outwardly from the light emitters 174” from within the housing to the outside. (*Id.*, 3:56-58.)



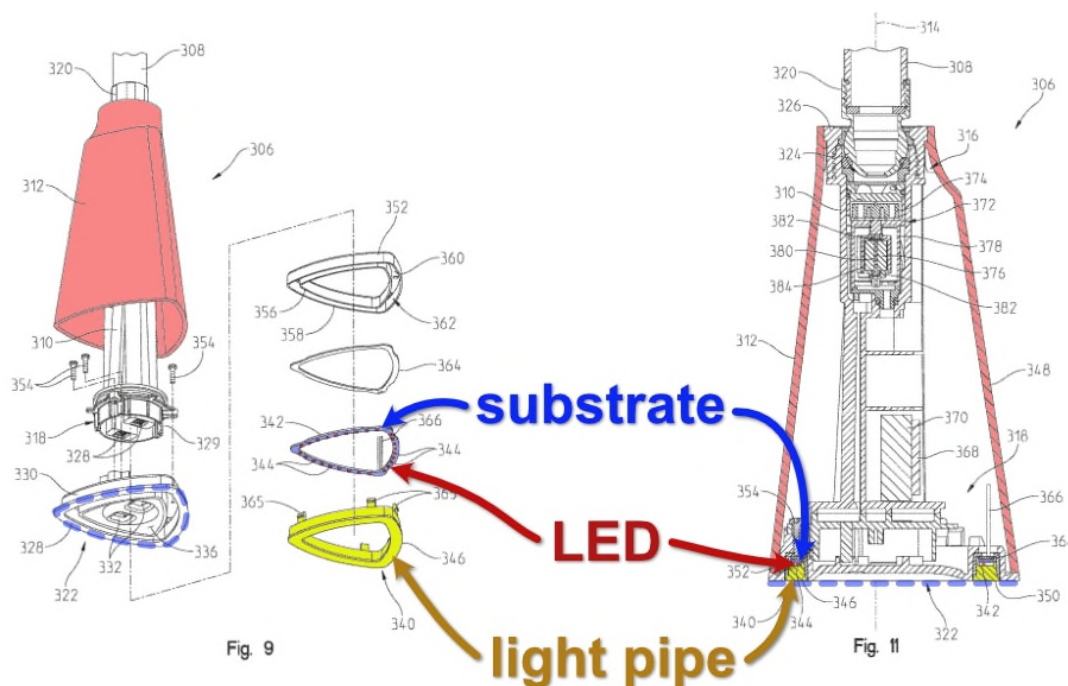
(*Id.*, Figs. 3-4 (annotated).)

Figures 9 and 11 show the pendant showerhead. The showerhead includes an “outer housing or shell 312” (red below) with an inner “waterway 310.” (*Id.*, 5:34-39.) Water is emitted from “water outlet openings 332” in a “sprayface 322” (blue below). (*Id.*, 5:49-52.)



(*Id.*, Figs. 9, 11 (annotated).)

The pendant showerhead's "light assembly or illumination device 340" is "supported by the sprayface 322." (*Id.*, 5:65-67.) The "illumination device" includes a "substrate 342" (blue below) that holds LEDs 344 (red below). (*Id.*, 6:1-2.) "A translucent light pipe or diffuser 346" (yellow below) again formed as a "closed loop" is "supported within the sprayface" and covers the substrate and LEDs. (*Id.*, 6:2-8.) Light from the LEDs is "transmit[ted] ... outwardly" through the light pipe. (*Id.*, 6:10-15.)



(*Id.*, Figs. 9-11 (annotated); *see also* Ex. 1003, ¶¶ 43-66.)

The '363 patent also discusses a series of other, minor design features that can be included in its sprayhead or showerhead. For instance, a "hydro-generator"

can be used to power the illumination device. (*See* Ex. 1001, 1:43-45.) A “temperature sensor” can be used to control the color of emitted light. (*Id.*, 5:5-22.) And, the water outlets can be “multi-dimensional fluid dispensers.” (*Id.*, 5:54-64; *see also* Ex. 1003, ¶¶ 67-70.)

B. Prosecution History

The ’363 patent was not rejected over any prior art references during prosecution. (*See generally* Ex. 1002.) And the Examiner also did not point to or specifically discuss any prior art when allowing the claims. (*See id.*, pp. 92-96; *see also* Ex. 1003, ¶¶ 71-73.)

C. Claims

The ’363 patent includes three independent claims: 1, 10, and 19. Claim 10 is directed to a “pull-down sprayhead” like that shown in Figures 1, 3, and 4. Claim 19 is directed to a “pendant showerhead” like that shown in Figures 8, 9, and 11. Claim 1 is broader and appears to embrace both the “pull-down sprayhead” and the “pendant showerhead.”

VI. Claim Construction

The Board applies the same *Phillips* claim construction standard used by district courts. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*). For purposes of this petition, Petitioner submits that the terms of the ’363 patent’s claims do not require further construction and can be afforded their plain and ordinary meaning. (*See* Ex. 1003, ¶¶ 78-81.)

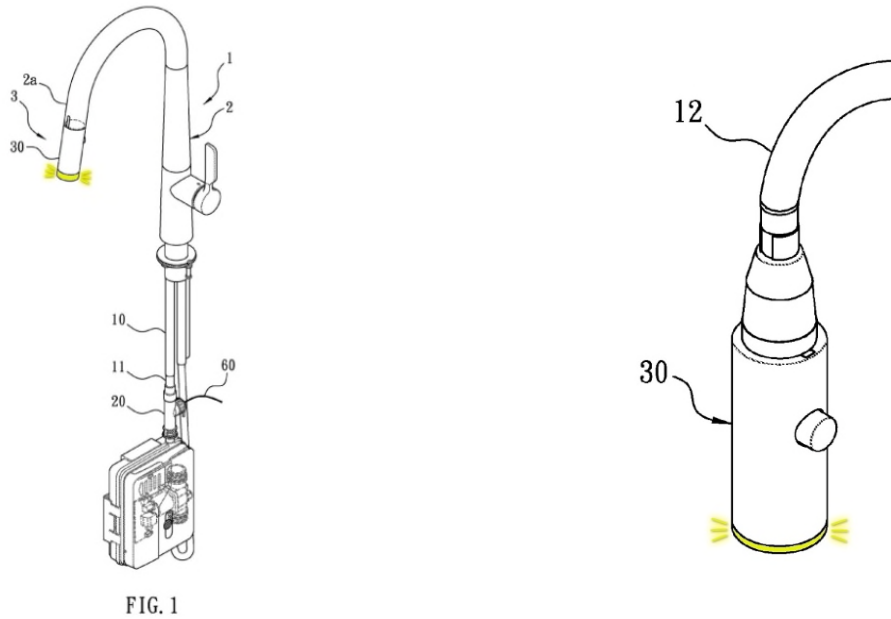
VII. Level of Ordinary Skill in the Art

A POSITA in the field of the '363 patent would have had a degree in industrial design or an equivalent field, along with 2 years of professional experience working with kitchen, bath, or other plumbing fixtures (or similar products), or an equivalent level of skill, knowledge, and experience. (Ex. 1003, ¶ 38.) This POSITA would have been aware of and generally knowledgeable about the standard features and functionality of kitchen, bath, or other plumbing fixtures (or similar products). (*See id.*)

VIII. Prior Art Overview

A. Tseng

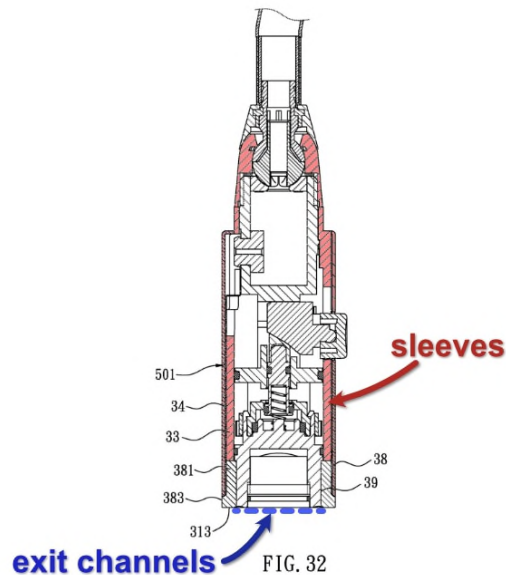
Tseng published December 10, 2015. (Ex. 1004, Cover.) It is prior art under § 102(a)(1). Tseng is directed to a “pull-out faucet” with “illuminat[ing] lights.” (*Id.*, ¶ [0001].) A “spray head 30” can be “pulled outwardly” from the rest of the faucet. (*Id.*, ¶ [0068].) Figure 1 (reproduced below) provides an overview of the entire faucet. Figure 3 (reproduced in cropped form below) shows just the pulled-out spray head. (*Id.*, ¶¶ [0031], [0033].) As shown, the spray head 30 is illuminated by a circumferential band of light:



(*Id.*, Fig. 1 (annotated); Fig. 3 (cropped and annotated).)

Tseng includes three embodiments with slightly different internal structures. Figures 5, 27, and 32 respectively provide cross-sectional views of these embodiments. (*Id.*, ¶¶ [0035], [0057], [0062].) In the first embodiment, a light emitting element is integrated with the spray head's water outlets. In contrast, the second and third embodiments include a light element that is separate from the water outlets. (*See, e.g.*, ¶¶ [0090], [0096]-[0097].) This petition focuses on the second and third embodiments. But because Tseng's three embodiments are overlapping and have numerous common structural features—many of which are discussed only in the context of the first embodiment—this petition also cites to certain first embodiment passages.

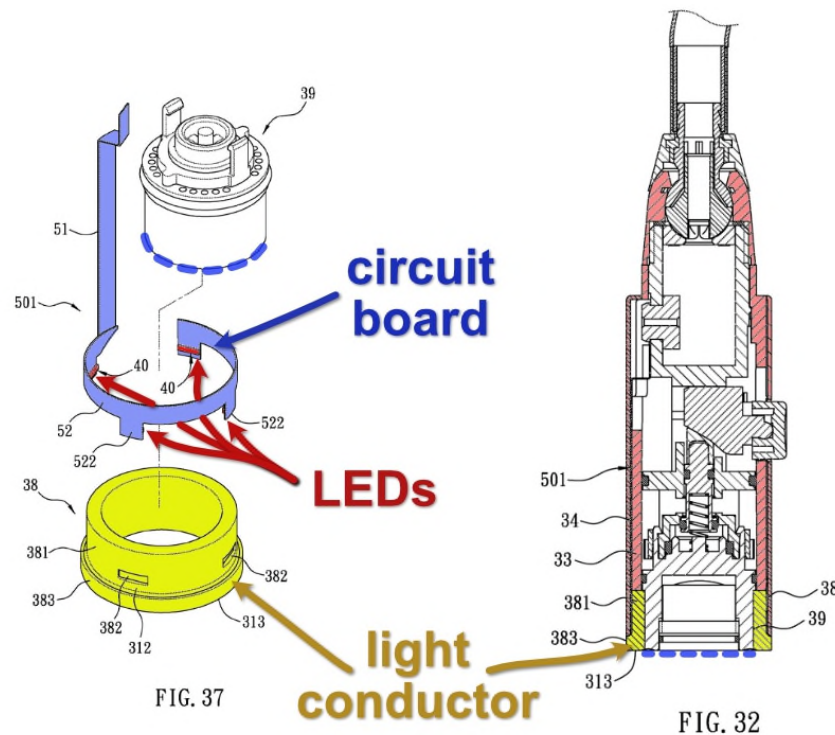
As shown in Figure 32 below, Tseng’s “spray head 30” includes an “internal sleeve 33” and “external sleeve 34” (red below) that house the spray head’s internal components and define its outer shape. (*Id.*, ¶ [0073].) “[W]ater is guided” through a “conduit member 32” within these sleeves, and exits from either a single “central channel 316” or multiple “peripheral channels 317” (blue dashed line below) at the end of the spray head. (*Id.*, ¶ [0076].)



(*Id.*, Fig. 32 (annotated).)

To illuminate the spray head, Tseng employs a “plurality of LED elements 40” (red below) attached to “circuit board 50” (blue below). (*Id.*, ¶ [0068].) A “light conductor” (yellow below) “made of translucent material” is used “to guide light[]” from the LEDs. (*Id.*, ¶ [0070].) Figure 37 provides an example of one such light conductor with a “sleeve” shape. (*Id.*, ¶¶ [0097]-[0099].) Light from LEDs arranged in “indentations 382” is directed to “input face[s] 311.” (*Id.*) The

light is then transmitted through the “light conductor 38” to both an “output face 313” and an “annular protrusion 383” to “enhance light transmission” out of the spray head. (*Id.*, ¶¶ [0097]-[0098].)



(*Id.*, Figs. 32, 37 (annotated).)

Tseng’s second embodiment is similar to the third embodiment, except it uses a light conductor with a slightly different structure. Rather than being formed like “sleeve” like that in the third embodiment, the second embodiment’s light conductor includes a series of “light columns 372” and lower “circular rib 371.” (*Id.*, ¶¶ [0091], [0097]-[0098].)

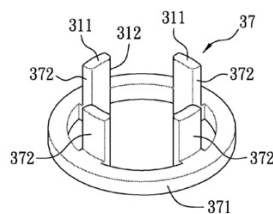


FIG. 30

(*Id.*, Fig. 30; *see also* Ex. 1003, ¶¶ 84-99.)

B. Tse

Tse published December 31, 2008. (*See* Ex. 1005, Cover.) It is prior art under § 102(a)(1). Tse is directed to a “shower head with a light emitting means.” (*Id.*, 1:4-5.) As exemplified by Figure 1, light is emitted from the face of the shower head in the same direction as exiting water:

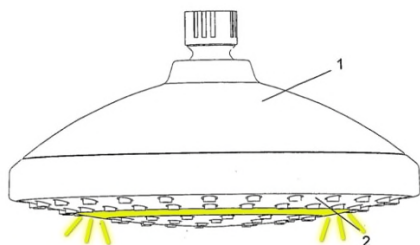
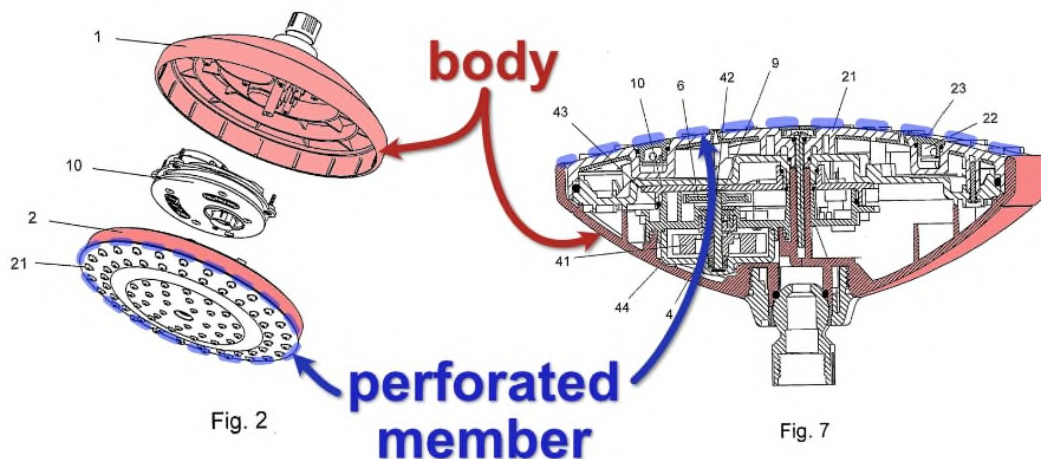


Fig. 1

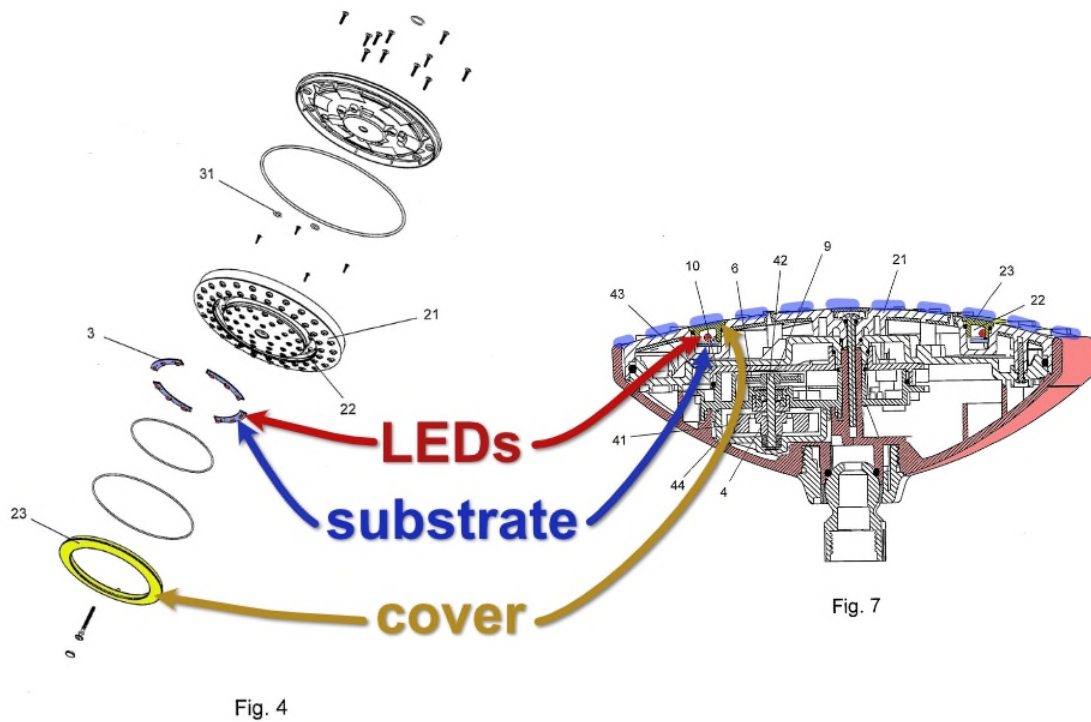
(*Id.*, Fig. 1 (annotated).)

According to Tse, the shower head’s outer shape is defined by a “shower head body” (red below) with a “rear portion 1” and “a front portion 2....” (*Id.*, 5:13-16.) Water “flows through the shower head body” and exits via a “perforated member 21” (blue dashes below) in “the form of a spray....” (*Id.*, 3:28-29, 5:16-18.)



(*Id.*, Figs. 2, 7 (annotated).)

Next, to generate light, Tse includes a “light emitting means 3” with “four sets each of three light emitting diodes” (red below) mounted on a substrate (blue below). (*Id.*, 7:1-2; *see also id.*, 3:6.) The LEDs and substrate are “disposed in the groove 22 of the perforated member 21” “sealed by” a “transparent” “cover 23” (yellow below). (*Id.*, 3:3-5, 6:23-24.) The cover allows the light emitted by the LEDs to be “seen,” and “makes the water coming out of the perforated member 21 hav[e] the same color.” (*Id.*, 3:3-5, 8:20-23.)

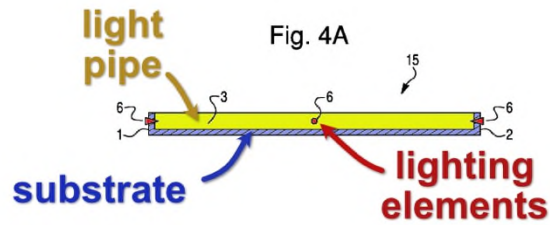


(*Id.*, Fig. 4, 7 (annotated).) Tse also explains that its LEDs can be powered by a “hydroelectric generator.” (*Id.*, 1:17-20; *see also* Ex. 1003, ¶¶ 100-109.)

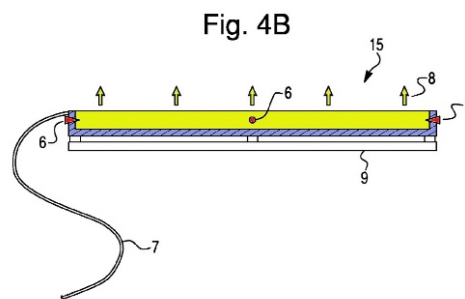
C. Carter

Carter published February 25, 2010. (*See* Ex. 1006, Cover.) It is prior art under § 102(a)(1).

Carter relates to “illuminated plumbing fixtures” with “a molded in place integrated light pipe feature....” (Ex. 1006, ¶ [0003].) As shown in Figure 4A, a series of “lighting elements 6” (red) are mounted on a “substrate ... 1” (blue). (*Id.*, ¶¶ [0018]-[0019].) Then, a “light piping feature 3” (yellow) is applied over the lighting elements/substrate. (*Id.*, ¶ [0019].)



(*Id.*, Fig. 4A (annotated).) This allows light from relatively small number of LEDs to be uniformly “disbursed.” (*Id.*, ¶¶ [0019], [0025].)



(*Id.*, Fig. 4B (annotated); *see also* Ex. 1003, ¶¶ 110-115.)

D. Mizuno

Mizuno published January 29, 2003. (*See* Ex. 1007, Cover.) It is prior art under § 102(a)(1). Mizuno relates to a “faucet with an LED illumination lamp” powered by “a hydroelectric generator.” (*Id.*, ¶ [0001].) The generator is mounted within the “spout head” of the faucet. (*Id.*, ¶¶ [0018], [0022].) Use of the generator eliminates the need for separate wiring or batteries. (*See id.*, ¶¶ [0005]-[0006]; *see also* Ex. 1003, ¶¶ 116-118.)

E. Schneider

Schneider published August 6, 2015. (See Ex. 1009, Cover.) It is prior art under § 102(a)(1). Schneider teaches a “kitchen ... faucet and/or a sprayer” with a “display unit with a variable backlight which changes in response to a change in water temperature.” (Ex. 1009, ¶¶ [0002]-[0003].) The temperature of the water being output by the faucet is measured with a “temperature sensor.” (*Id.*, ¶ [0006].) A “controller” is used to change the color of the display by activating/deactivating different colored LEDs. (*Id.*, ¶¶ [0036], [0040]-[0041]; see also Ex. 1003, ¶¶ 119-122.)

F. Spangler

Spangler published November 14, 2013. (See Ex. 1014, Cover.) It is prior art under § 102(a)(1). Spangler teaches a variety of different “multi-dimensional fluid dispensers” for “showerheads.” (*Id.*, ¶ [0001]; see also Ex. 1003, ¶¶ 123-124.)

IX. Obviousness Over Tseng’s Pull-Out Faucet

Tseng teaches a spray head for a pull-out faucet that includes a band a light around its housing. This renders independent claims 1 and 10—and many of the dependent claims—obvious.

A. Ground 1: Claims 1-5, 10, and 12-16 Are Obvious Over Tseng

Tseng (Ex. 1004), when considered in view of the knowledge of a POSITA, itself renders claims 1-5, 10, and 12-16 obvious.

1. Claims 1 and 10

Due to their similarity—and because they embrace overlapping subject matter—claims 1 and 10 will be analyzed together.

[1-p]/[10-p] “A [pull-down sprayhead for a faucet, the] sprayhead comprising:”¹

To the extent this preamble language is limiting, Tseng teaches a “pull-out faucet....” (Ex. 1004, ¶ [0001].) Tseng’s faucet includes a “spray head 30.” (*Id.*, ¶ [0068].) This “spray head” can be “pulled outwardly[,]” and then “retract[s] back to an outlet 2a” in “the body 2” of the faucet. (*Id.*) Figure 1 provides an example. Spray head 30 is highlighted red, while the direction this head can be pulled—down and away from the outlet—is shown with an arrow:

¹ Underlined: claim 1 only. [Bracketed]: claim 10 only. Other limitations are shared.

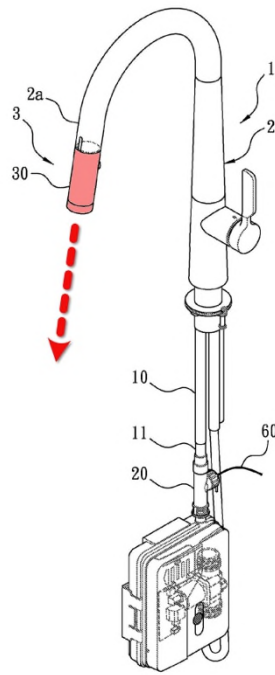


FIG. 1

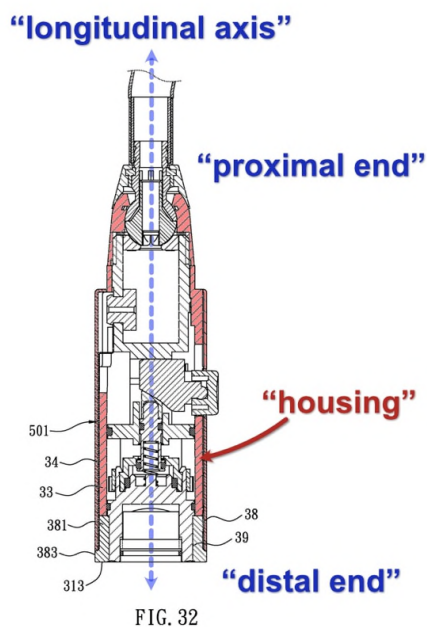
(*Id.*, Fig. 1 (annotated); *see also* Ex. 1003, ¶¶ 130-135.)

[1-1]/[10-1] “a housing defining a longitudinal axis [extending between a proximal end and a distal end];”

Tseng’s spray head includes the claimed **“housing.”** Figures 27 and 32 provide “cross sectional view[s]” of Tseng’s sprayhead. (*E.g.*, Ex. 1004, ¶ [0034]-[0035]; Figs. 27, 32.) In all cases, “spray head 30” includes both an “internal sleeve 33” and “external sleeve 34.” (*Id.*, ¶¶ [0073].) The sleeves together define the external shape of the sprayhead and surround, contain, and house its other components. (*See id.*, Figs. 27, 32.)

Moreover, Tseng’s “spray head” includes a “central axis X” within the sleeves/housing. (*Id.*, ¶¶ [0013], [0017], [0071].) As exemplified by Figure 32,

this axis is **“longitudinal”** (blue arrow) and proceeds along the length the **“housing”** formed by sleeves 33/34 (red highlighting) from a **“proximal”** to a **“distal end”**:



(*Id.*, Fig. 32 (annotated); *see also* Ex. 1003, ¶¶ 136-140.)

[1-2]/[10-2] “a waterway received within the housing;”

According to Tseng, its faucet includes a “flexible pipe 10” with an “outlet segment 12” to “flow water” into spray head 30. (Ex. 1004, ¶ [0068].) The spray head includes an internal “conduit member 32” connected to outlet segment 12. (*Id.*, ¶ [0077].) In operation, “water is guided to flow out” of either the spray head’s “central channel 316” or its “peripheral channels 317 via the conduit member 32.” (*Id.*, ¶ [0076].) Figure 5 provides an example of the internal conduit (shown generally with blue highlighting below) within Tseng’s **“housing”** (red

highlighted sleeves 33, 34). This conduit, which is also present in the embodiments of Figures 27 and 32 (*see id.*, Figs. 27, 32), is the claimed “waterway”:

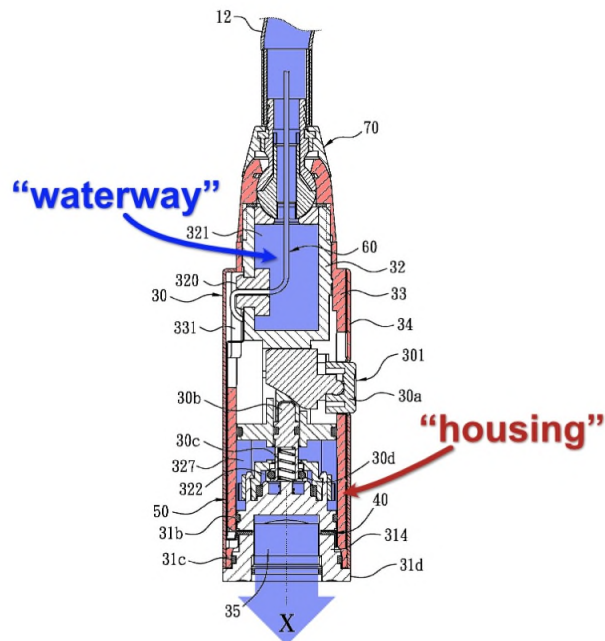


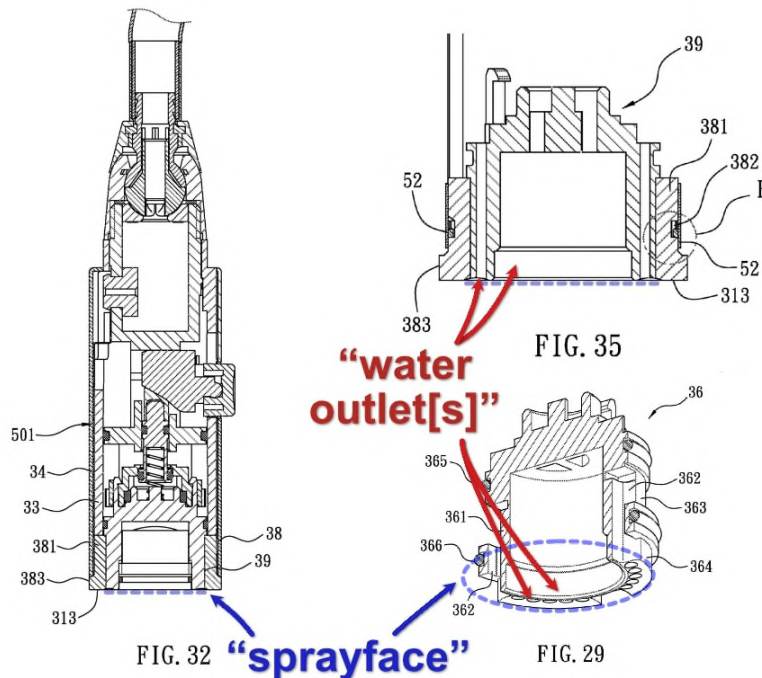
FIG. 5

(*Id.*, Fig. 5 (annotated); *see also* Ex. 1003, ¶¶ 141-146.)

[1-3]/[10-3] “a sprayface fluidly coupled to the waterway and supporting [defining] a water outlet; and;”

Tseng’s pull-out faucet—like all such faucets—is designed for “flowing or spraying water” out its lower end. (Ex. 1004, ¶ [0002].) To provide this functionality, Tseng’s spray head 30 includes both a “central channel 316” and “plural peripheral channels 317” that are connected to the “internal conduit 32.” (Ex. 1004, ¶ [0076].) A “switch device” diverts the water flow to either the central or the peripheral channels. (*Id.*, ¶¶ [0015]-[0016], [0076].)

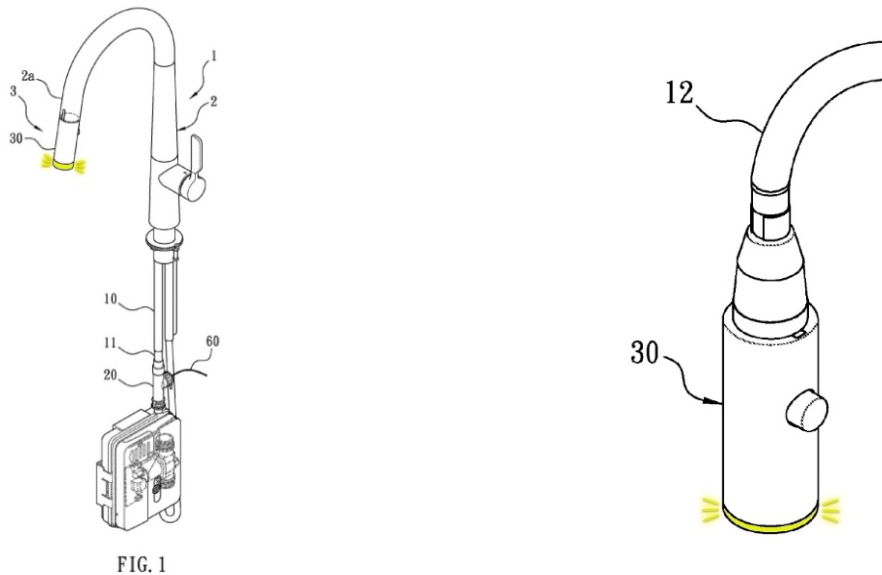
The lower surface of Tseng’s spray head is the claimed **“sprayface”**: it is the portion of the spray head that emits water. (See Ex. 1003, ¶¶ 147-151.) The channels 316/317 in this surface through which water exits—present in all of Tseng’s embodiments—are the claimed **“water outlet[s].”** The **“sprayface”** is shown by, for example, Figures 29, 32, and 35. Figure 32 shows the entire spray head. Figure 35 provides a zoomed cross-sectional view and Figure 29 provides a partial bottom view showing the **“outlet[s]”** 316/317 (red annotations) through the **“sprayface”** (blue-dashed line):



(*Id.*, Figs. 29, 32, 35 (annotated and cropped); see also Ex. 1003, ¶¶ 152-153.)

[1-4]/[10-4] “an illumination device supported by the housing, the illumination device including a substrate, a plurality of light emitters supported by the substrate, and a translucent light pipe [including an outer illumination surface extending perpendicular to the longitudinal axis of the housing, the translucent light pipe] defining a closed loop to diffuse light from the light emitters outwardly away from the housing [to the outer illumination surface].

This is all taught by Tseng. Tseng’s “spray head 30” provides “brilliant illumination.” (Ex. 1004, ¶ [0102]; see also *id.*, ¶ [0001] (explaining that the “pull-out faucet[’s]” “shower assembly” “illuminate[s] lights.”).) An example of this is shown below: the end of Tseng’s pull-out spray head emits a band of light:



(*Id.*, Fig. 1 (annotated); Fig. 3 (cropped and annotated).) Tseng does this using the same elements this limitation requires: an “**illumination device**” with a “**plurality of light emitters**” (multiple LED elements), a “**substrate**” (a circuit board), and a “**translucent light pipe**” (a light conductor). (*Id.*, ¶¶ [0010]-[0011]; see also Ex. 1003, ¶¶ 154-157.)

More particularly, Tseng’s spray head includes a “plurality of LED elements 40” attached to “circuit board 50.” (Ex. 1004, ¶ [0068].) The “circuit board 50” is “a flexible printed circuit (FPC)” and includes, among other elements, “a C-shaped ring 52” with “plural extensions 53” supporting the LEDs. (*Id.*, ¶ [0071].) An example of this is shown in Figure 11, with circuit board 50 highlighted blue, and the LED elements 40 highlighted red:

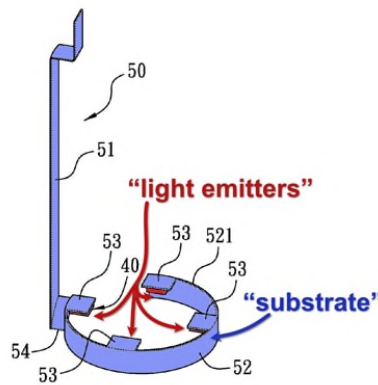


FIG. 11

(*Id.*, Fig. 11 (annotated).) The LED elements 40 are Tseng’s “**plurality of light emitters**”: they generate the light that illuminates Tseng’s spray head. (See Ex. 1003, ¶¶ 158-160.) The circuit board 50 is the claimed “**substrate**”: it supports and holds the LED elements. (*Id.*, ¶¶ 161-162.) All of Tseng’s spray head designs include these elements. (See, *e.g.*, Ex. 1004, Figs. 31, 37.)

Next, Tseng explains that its “light conductor” is “made of translucent material to guide lights....” (*Id.*, ¶ [0070]; see also *id.*, ¶ [0072] (“light conductor”

is a light “guiding member”).) Figures 30 and 37 provide two examples of how this “light conductor” can be structured:

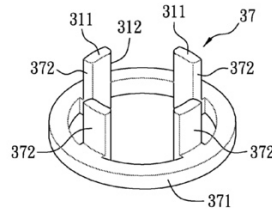


FIG. 30

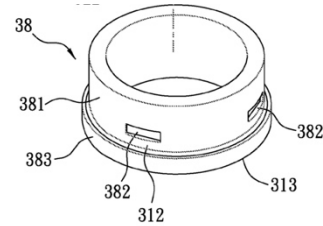
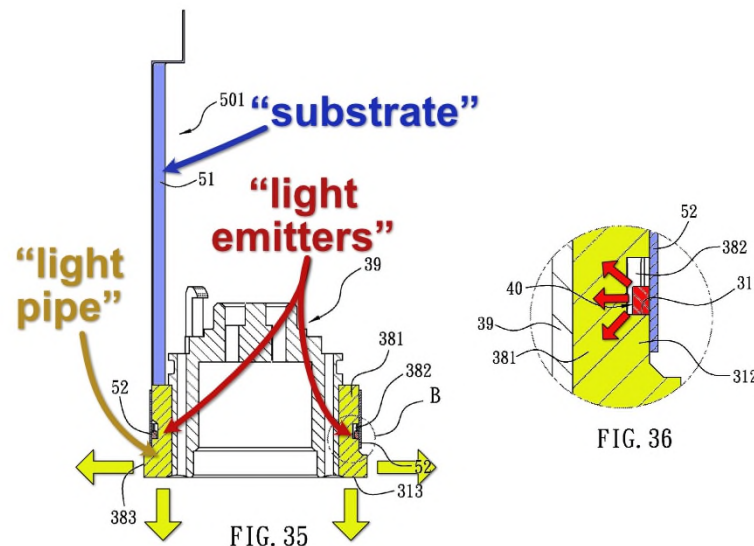


FIG. 37

(*Id.*, Figs. 30, 37 (excerpted).) The conductor of Figure 30 includes a series of “light columns 372” with “input face[s] 311” and a lower “circular rib 371.” (*Id.*, ¶ [0091].) The LED elements are located adjacent to the light input faces. (*Id.*, ¶ [0094].) Light travels through the columns and out the “circular rib” “to enhance light transmission and illumination.” (*Id.*) The conductor of Figure 37 similarly includes “indentations 382” with light “input face[s] 311” that align with the LED elements. (*Id.*, ¶ [0097].) This conductor also includes a lower “light transmission portion 312” a light “output face 313” and an “annular protrusion 383” that—like the rib of Figure 30—“enhance[s] light transmission.” (*Id.*, ¶¶ [0097]-[0098]; *see also* Ex. 1003, ¶¶ 163-166.)

While Tseng does not use the phrase “**light pipe**,” a POSITA would nonetheless understand Tseng’s “light conductor” to correspond to this claim element. The “light conductor” it is made from translucent material. (Ex. 1004, ¶ [0070].) It includes “circular rib” or other pipe-like elements like protrusion 383 in

Figure 37. (See, e.g., ¶¶ [0024], Figs. 30, 37.) And, it operates to transmit and uniformly diffuse light from Tseng’s four internal LED elements to the exterior of spray head 30. (See *id.*, ¶¶ [0011] (“light conductor” “transmit[s]” and “output[s]” light); [0024] (“light conductor” engages in light “transmission”); [0079] (“light conductor” is structured to “enhance [the] illumination effect” “outside” the spray head); [0094] (“light conductor” “enhance[s] light transmission and illumination”); [0098] (similar); Ex. 1003, ¶¶ 167-172.) The relative positioning of LED elements within Tseng’s housing and the light output faces emphasizes this. For example, as shown in Figures 35 and 36, LEDs 40 face inward and emit light towards the center of the spray head (red arrows). Faces 313 and 383, however, emit light outwards (yellow arrows):



(Ex. 1004, Figs. 35, 36 (annotated); see also *id.*, ¶¶ [0097], [0098] (explaining that “face 313” is an “output” face, and that “protrusion 383” “enhance[s] light

transmission”).) Because faces 313 and 383 are oriented in different directions than LEDs 40, a POSITA would have understood that Tseng’s light conductor engages in internal light diffusion and reflection to transmit the light emitted from the LEDs through (and eventually out of) the conductor. (See Ex. 1003, ¶¶ 173-175.) The “light pipe” in the ’363 patent is similarly structured and operates in the same way. (See, e.g., Ex. 1001, 3:59-65 (“light pipe 176” is “formed of a translucent material,” “is positioned longitudinally” within a sprayhead’s “housing,” and “transmit[s] light radially outward”); see also Ex. 1003, ¶ 176.) Moreover, a POSITA would also have generally understood that any structure able to transmit light along its length constitutes a “light pipe.” (See, e.g., Ex. 1010, ¶ [0018] (“A light pipe is a sold transparent plastic rod for transmitting light lengthwise.”); Ex. 1011, ¶ [0075] (noting that a “light pipe can include an optical fiber or a solid transparent plastic rod for transmitting light lengthwise”).) This is what Tseng’s light conductor does: it transmits light from the LEDs from one location to another. (See Ex. 1003, ¶¶ 177-180.)

Next, Tseng’s “light conductor” ***“defin[es] a closed loop.”*** Transmission portion 312 and protrusion 383 in Figure 37 are structured as an unbroken circle. (Ex. 1004, Fig. 37; see also *id.*, ¶¶ [0024], [0026] (explaining that “light conductor” has a “circular” or “sleeve shape”).) So is rib 371 in Figure 30. (See *id.*, Fig. 30; see also Ex. 1003, ¶¶ 181-182.)

Tseng's ***"illumination device"*** (the combination of board 50, LEDs 40, and light conductor 38) is also ***"supported by the housing."*** Figure 37 shows how the LED elements, circuit board, and light conductor integrate. Tseng's ***"substrate"*** (circuit board 50, blue) supports its ***"light emitters"*** (LEDs 40, red). The circuit board wraps around Tseng's ***"light pipe"*** (light conductor 38, yellow) such that the LEDs align with indentations 382. Member 39—which includes channels 316/317 and forms Tseng's ***"sprayface"*** (blue dashed line) —is mounted in the center of light conductor 38. (Ex. 1004, ¶¶ [0096]-[0101].)

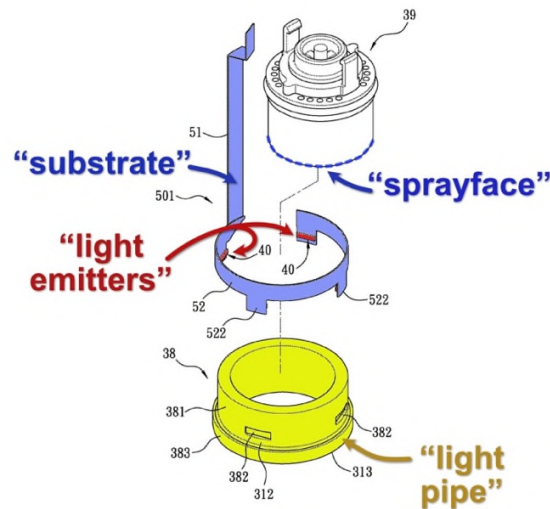
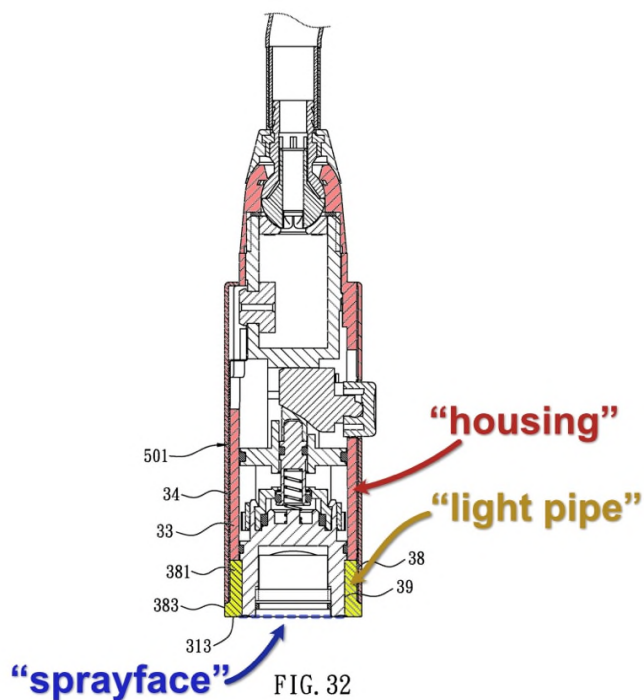


FIG. 37

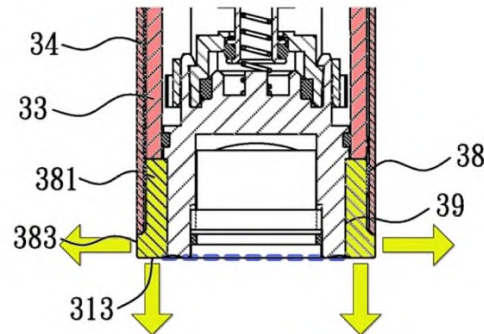
(*Id.*, Fig. 37 (annotated).) Figure 32 depicts these elements within spray head 30:



(*Id.*, Fig. 32 (annotated).) As shown, “light conductor 38 is accommodated among a lower side of the internal sleeve 33, an outer wall of the guiding member 39 and an inner wall of the external sleeve 34.” (*Id.*, ¶ [0099].) In other words, Tseng’s “**light pipe**” (light conductor 38, yellow) is sandwiched between and held in place by the spray head’s internal elements and the outer “**housing**” (sleeves 33/34, red). (*Id.*) The board 50 and LEDs 40 are also contained within the housing. (See *id.*, ¶ [0101]; Figs. 32-37; see also Ex. 1003, ¶¶ 183-189.)

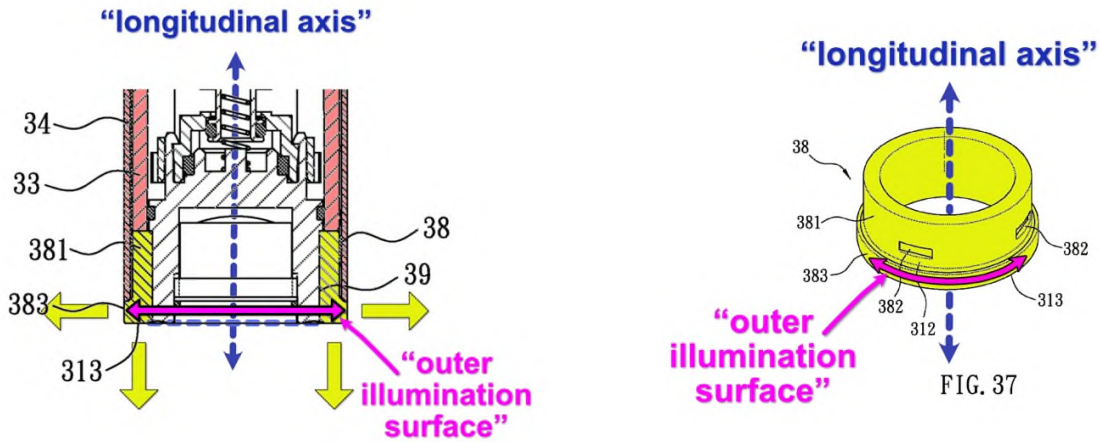
Tseng’s “**light pipe**” (light conductor 38) operates to diffuse light in the way claims 1 and 10 require. Claim 1 requires light diffusion “**outwardly away from the housing.**” According to Tseng, its “light conductor 38” includes both a lower light “output face 313” and an “annular protrusion 383” to “enhance light

transmission.” (Ex. 1004, ¶¶ [0097], [0098].) Again, this results in the emission of light in at least two directions: downward from face 313 and laterally out of the spray head’s sides via protrusion 383. (Ex. 1003, ¶¶ 190-194.) This is shown by the yellow arrows applied to the below excerpted portion of Figure 32:

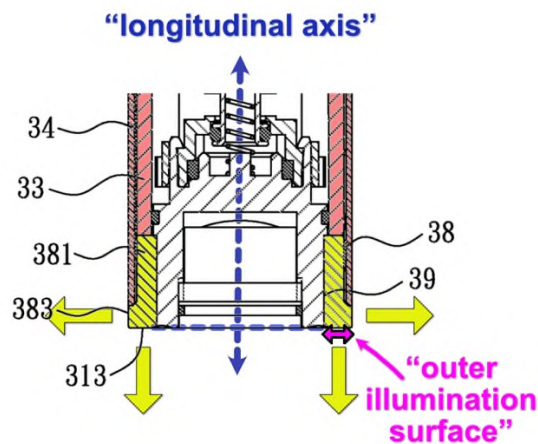


(Ex. 1004, Fig. 32 (excerpted and annotated).)

Claim 10 similarly requires light diffusion towards an ***“outer illumination surface extending perpendicular to the longitudinal axis of the housing.”*** Tseng includes two such surfaces. First, protrusion 383 forms an outer surface that proceeds circumferentially around the spray head like a belt. This surface’s direction of ***“exten[sion]”*** (around the housing) is ***“perpendicular”*** to the housing’s ***“longitudinal axis”***:



(*Id.*, Figs. 32, 37 (excerpted, annotated).) Second, light conductor 38 also has a lower surface 313 with a direction of “*exten[sion]*” (a width) that is similarly “*perpendicular*” to the housing’s “*longitudinal axis*”:

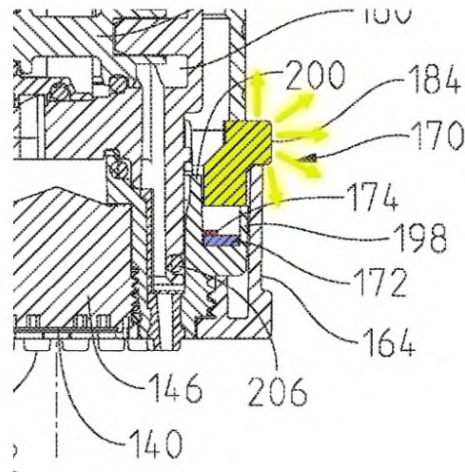


(*Id.*, Fig. 32 (annotated).) Both of these faces receive and emit light from the LEDs 40. (See *id.*, ¶¶ [0097]-[0098]; see also Ex. 1003, ¶¶ 195-198.)

A POSITA would also understand that the light emitted from Tseng’s light conductor would be substantially uniform without the type of “hot spots” referenced in the ’363 patent’s background section (*e.g.*, Ex. 1001, 1:24-30). Again, Tseng explains that its light conductor is designed to “enhance light

transmission” and provide “brilliant illumination.” (Ex. 1004, ¶¶ [0098], [0102].) A POSITA would have understood that uniform light emission (as opposed to spotty emission) furthers these expressed goals. (See Ex. 1003, ¶¶ 199-201.) Moreover, a POSITA would understand that—given the path it must travel—light entering Tseng’s light conductor will be substantially diffused as it is transmitted towards protrusion 383 and face 313. (See *id.*, ¶ 202.) This in turn will lead to near uniform emission of light out of the light conductor upon arrival at these surfaces. (See *id.*)

Finally, the fact that Tseng’s light conductor emits light from both protrusion 383 and face 313 does not distinguish it from the claims. A POSITA would not interpret the claims as requiring **all** the light emitted by the LEDs to be “diffuse[ed] ... outwardly” in the same direction from the housing. Instead, the claims require only that **some** “light from the light emitters” be diffused in this manner. (See Ex. 1001, claims 1, 10; see also Ex. 1003, ¶¶ 203-204.) Consistent with this, a POSITA would have recognized that even in the ’363 patent, some fraction of the light emitted by the LEDs will remain within the showerhead housing, while light making its way to the light pipe will be emitted in pattern covering almost a full 180°:



(Ex. 1001, Fig. 4 (cropped and annotated); *see also* Ex. 1003, ¶¶ 205-206.)

2. Claims 2 and 16

Claims 2 and 16 respectively depend on claims 1 and 10 and further require:

“a pull-down sprayhead configured to be releasably coupled to a delivery spout of a faucet” [Claim 2]

“a coupler configured to releasably couple the housing to a delivery spout of a faucet” [Claim 16]

Again, Tseng teaches a “pull-out faucet....” (Ex. 1004, ¶ [0001].) In this regard, Tseng’s “spray head 30” can be “pulled outwardly” from and “retracts” back to an “outlet 2a” in the faucet’s “body 2.” (*Id.*, ¶ [0068]; *see also id.*, Fig. 2.) A “flexible pipe 10” with an “outlet 12” passes through this outlet to deliver water to the spray head. (*Id.*) The upper end of the spray head, which includes a “coupling member 70,” contacts and is held in the outlet when the spray head is retracted. (*Id.*, ¶¶ [0082]; Figs. 2, 4, 5.) This is shown in Figures 2 and 4 below:

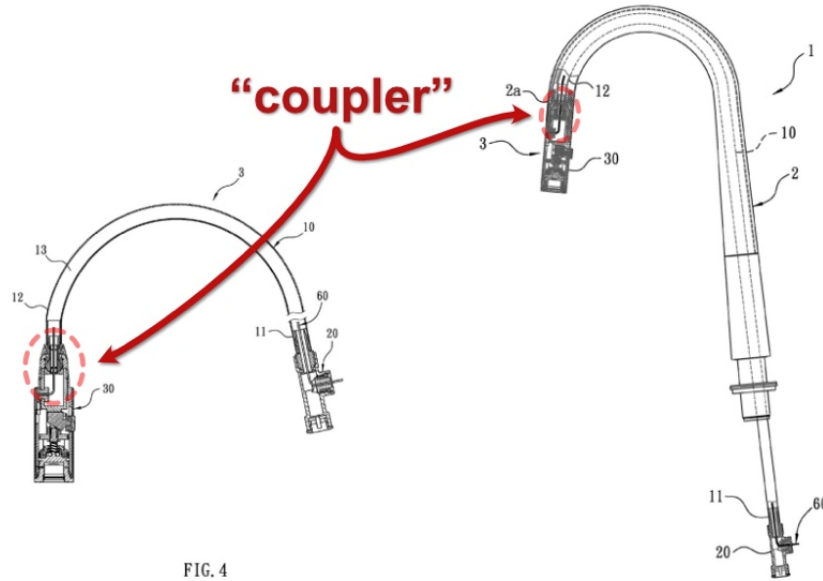


FIG. 4

FIG. 2

(*Id.*, Figs. 2, 4 (annotated).) This is what this claim requires: Tseng includes a **“pull-down sprayhead”** (spray head 30) that is **“releasably coupled”** to a **“delivery spout”** via a **“coupler”** (the upper portion of the spray head that retracts into and can be pulled out of the outlet 2a of the faucet’s body). (Ex. 1003, ¶¶ 207-214.)

3. Claims 3, 12, and 13

Claims 3 and 12 respectively depend on claims 2 and 10 and further require:

“wherein the light pipe includes an annular ring configured to transmit light radially outwardly [from the longitudinal axis]”

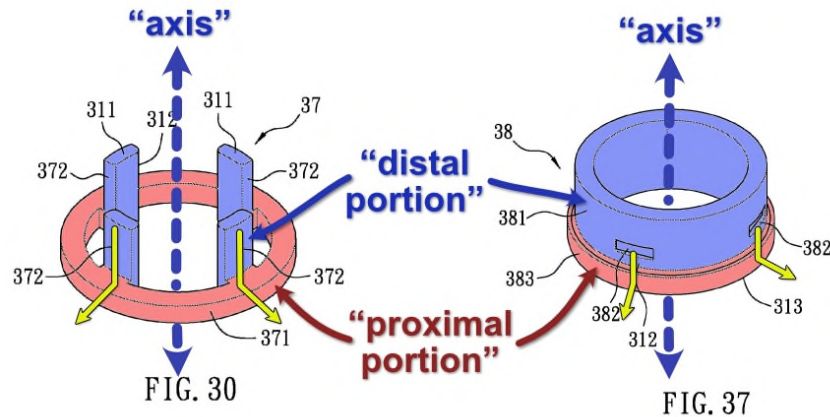
Tseng’s **“light pipe”** includes an **“annular ring configured to transmit light radially outwardly.”** In particular, the “light conductor” of Figure 30 includes a “circular rib 371” that “exposes outside” the spray head’s housing “to enhance light transmission and illumination.” (Ex. 1004, ¶ [0094].) Similarly, the “light conductor” of Figure 37 has a “sleeve shape” with a “light transmission portion”

and an “annular protrusion 383” that “enhance[s] light transmission.” (Ex. 1004, ¶¶ [0097]-[0098]; *see also* Ex. 1003, ¶¶ 215-219.)

Claim 13 depends on claim 12 and further requires:

“wherein the annular ring includes a distal portion extending parallel to the longitudinal axis and configured to transmit light from the light emitters in an axial direction, and a proximal portion extending radially outwardly from the distal portion and configured to transmit light toward the outer illumination surface”

This is also taught by Tseng. The light conductor of Figure 30 includes both “plural light columns 372” that extend along the spray head’s length, and a “circular rib 371.” (Ex. 1004, ¶ [0091].) Light from the LEDs 40 is input into the tops of columns via input faces 311 and is output from the rib. (*See id.*) Similarly, the light conductor of Figure 37 includes both an “outer cliff 381” extending along the length of the spray head, and an “annular protrusion 383 extending outwardly” from the bottom of the cliff. (*Id.*, ¶¶ [0097]-[0098].) Light from the LEDs 40 is inputted into the cliff via indentions 382 and is output from the protrusion. (*Id.*) The columns of Figure 30 and cliff of Figure 37 (blue below) both constitute a **“distal portion extending parallel to the longitudinal axis”** that **“transmits light ... in an axial direction”** (first part of yellow arrow). The rib of Figure 30 and annular protrusion of Figure 37 (red below) are the claimed **“proximal portion extending radially outward”** that transmits light to **“the outer illumination surface”** (second part of yellow arrow):



(*Id.*, Figs. 30, 37 (annotated); *see also* Ex. 1003, ¶¶ 220-225.)

4. Claims 4 and 14

Claims 4 and 14 respectively depend on claims 3 and 12 and further require:

“wherein the light emitters comprise a plurality of circumferentially spaced light emitting diodes”

Tseng employs **“light emitting diodes”**: it uses “a plurality of LED elements 40” to generate light. (Ex. 1004, ¶ [0101].) Further, as shown in Figure 37, four “LED Elements 40” are mounted on “tabs 522” equally spaced around a “C-shaped ring 52” of a circuit board. (*Id.*) The mounting of the LEDs 40 on a ring—with equal spacing—causes them to be **“circumferentially spaced”** around the periphery of Tseng’s sleeve-like light conductor 38:

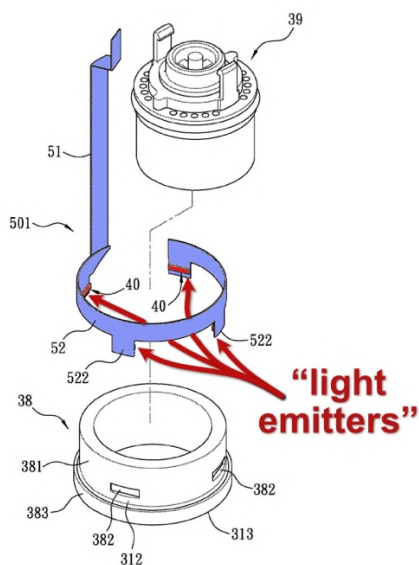


FIG. 37

(*Id.*, Fig. 37 (annotated); *see also* Ex. 1003, ¶¶ 226-231.)

5. Claims 5 and 15

Claims 5 and 15 respectively depend on claims 1 and 10 and further require:

“a diverter valve assembly fluidly coupled to the waterway, wherein the sprayface includes a stream outlet and a spray outlet, the diverter valve assembly configured to divert water between the stream outlet and the spray outlet”

Tseng’s spray head “includes a switch device 301” that can be “manually operated by a user to control the water flow out of the central channel 316 or the plural peripheral channels 317.” (Ex. 1004, ¶ [0075].) The switch controls a “valve core 30b mounted” within Tseng’s “conduit member 32” that selectively “guide[s] the flow” of water to produce the desired output. (*Id.*) This valve core is the claimed **“diverter valve assembly fluidly coupled to the waterway”**: it diverts

water flowing through the spray head's conduit to either channel 316 or channels 317. (See Ex. 1003, ¶¶ 232-236.) Further, the single central channel 316 produces a “*stream*,” while the many peripheral channels 317 produce a “*spray*” as required. (See *id.*, ¶¶ 237-238.)

B. Ground 2: Claims 9 and 11 are Obvious Over Tseng and Mizuno

As explained above, Tseng renders independent claims 1 and 10 obvious. Dependent claims 9 and 11 narrow claims 1 and 10 by further requiring that the claimed illumination device include “*a hydro-generator fluidly coupled to the waterway and in electrical communication with the illumination device.*” While Tseng does not itself reference a “hydro-generator,” Mizuno (Ex. 1008) does, rendering these claims obvious when its teachings are applied to Tseng’s pull-out faucet.

Mizuno relates to a “faucet with an LED illumination lamp” powered by “a hydroelectric generator.” (*Id.*, ¶ [0001].) More specifically, in Mizuno a “spout head in a faucet” incorporates “a plurality ... of LED illuminating lamps 12.” (*Id.*, ¶ [0018].) To provide the electrical power required by the LEDs, a “generator unit 32” is mounted within the spout head’s “body 14.” (*Id.*, ¶ [0022].) Water flowing through the “inner water passage” of the spout head and generator causes the generator to produce electrical “power.” (*Id.*, ¶ [0023].) The electrical power is then supplied to the “LED illumination lamps 12.” (*Id.*) This is exactly what these

claims require: a “**hydro-generator**” (Mizuno’s generator unit 32) is “***coupled to the waterway***” (the water passage through Mizuno’s spout head) and is in “***electrical communication with the illumination device***” (Mizuno’s LEDs). (See Ex. 1003, ¶¶ 239-245.)

A POSITA would have been motivated to apply Mizuno’s hydro-generator to Tseng. Mizuno explains that in many prior art faucets, an “external power source” often used to power light in faucet. (Ex. 1008, ¶ [0004].) But this requires either “electrical wiring” or “mount[ing] a battery in the faucet.” (*Id.*) The need to include wiring from an external power supply, however, “tak[es] time and effort in ... construction.” (*Id.*, ¶¶ [0005]-[0006].) Use of a battery gives rise to different problems: the faucet must be made undesirably “large,” and the battery must be routinely changed for the device to remain functional. (*Id.*; see also Ex. 1003, ¶¶ 246-250.)

A POSITA would have recognized that Tseng is subject to these problems. An “electric wire 60” is routed through Tseng’s “pull-out faucet” to supply the power needed by the LEDs. (Ex. 1004, ¶ [0068]; Figs. 1-5.) This wire must be interconnected with an external power supply (like an outlet, junction box, or the like). (See Ex. 1003, ¶¶ 251-253.) This complicates installation and adds expense. Moreover, because Tseng’s shower head is designed to be pulled-out, the wire will be subject to stress and strain which could lead to its failure over time. (See *id.*)

Mizuno’s system avoids these issues. By using a “hydraulic generator” that “generat[es] power” from “water current in an inner water passage,” the need for an external power supply or battery is eliminated. (Ex. 1008, ¶ [0006].) This in turn reduces installation costs, avoids the need for periodic battery replacement, and eliminates the potential of a wiring failure. (*Id.*; *see also* Ex. 1003, ¶¶ 254-256.) This would have provided a strong motivation to apply Mizuno’s teachings to Tseng: because a hydro-generator would be located within Tseng’s faucet, wire 60 could be eliminated. This would make Tseng’s faucet easier to install. (*See id.*, ¶¶ 257-258, 260.) It would also make it less expensive to operate (as it would generate its own power) and eliminate the possibility of a wiring failure. (*See id.*, ¶ 259.)

A POSITA would have recognized that application of Mizuno would also produce other benefits. In particular, Mizuno’s hydro-generator—unlike other prior art generators—includes various features to avoid damage to both the generator itself and the LED lights. In particular, it includes a voltage stabilizer to ensure proper electrical supply to LEDs. (Ex. 1008, ¶ [0009].) It also includes a cooling component to “promote heat dissipation” and a “relief valve” to stabilize the water flow and avoid damage to electrical components. (*Id.*, ¶¶ [0009]-[0013].) This would also have motivated application of Mizuno to Tseng. A POSITA would have recognized that Mizuno’s hydro-generator is specifically designed to

provide a consistent and reliable source of power that is unlikely to fail over time. (See Ex. 1003, ¶¶ 261-264.)

A POSITA would also have had a reasonable expectation of success. Mizuno’s hydro-generator is specifically meant for use with plumbing fixtures like “faucet[s]” for “kitchens and washrooms.” (Ex. 1008, ¶ [0002].) Moreover, it is intended to be integrated into the faucet’s shower head, and is designed to reliably power multiple LED lights contained within the head. (*Id.*, ¶ [0001].) A POSITA would have recognized that this makes Mizuno’s hydro-generator particularly suitable for use with Tseng: Tseng similarly teaches a faucet that includes LED lights within the faucet’s shower head that require electrical power. (See *generally* Ex. 1004, ¶ [0001]; see *also* Ex. 1003, ¶¶ 265-269.) Moreover, a POSITA would have recognized that the large internal “chamber 321” within Tseng’s shower head could be readily adapted to accommodate Mizuno’s hydro-generator. (See *id.*, ¶ 270.)

C. Ground 3: Claims 17 and 18 are Obvious Over Tseng and Schneider

As explained above, Tseng renders independent claim 10 obvious. As discussed in greater detail below, dependent claims 17 and 18 narrow this claim by further requiring (1) a “temperature sensor,” (2) a “controller” that changes the light color depending on water temperature, and (3) the use of “first” and “second” color light emitters to emit three “colors” of light corresponding to different water

temperatures. This all would have been obvious in view of Schneider (Ex. 1009). Schneider teaches a faucet that is able to change emitted light color based on sensed water temperature. Applying this to Tseng's illuminated pull-out faucet results in what the claims require.

Again, claim 17 further requires:

“a temperature sensor configured to detect the temperature of water within the waterway; and”

“a controller in electrical communication with the temperature sensor, the controller configured to change the color of light emitted by the light emitters in response to the temperature detected by the temperature sensor”

While Tseng does not itself include the claimed *“temperature sensor”* and *“controller”* for changing light color of its *“light emitters”* *“in response to”* the *“detected” “temperature,”* Schneider does.

Schneider relates to a “fluid delivery device”—like a “kitchen ... faucet and/or a sprayer”—with a “display unit with a variable backlight which changes in response to a change in water temperature.” (Ex. 1009, ¶¶ [0002]-[0003].) Figure 4 provides an example of one such lighted display 20 arranged on a kitchen faucet:

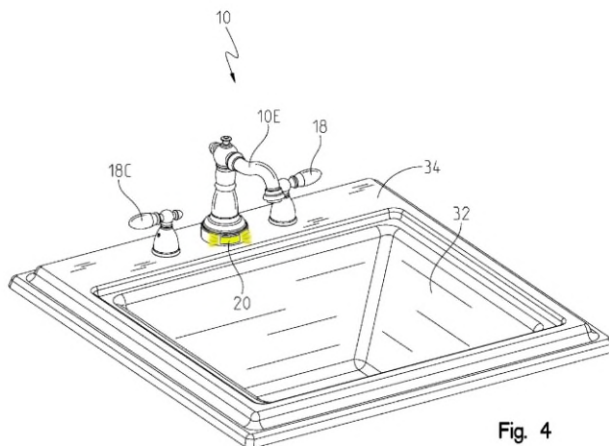


Fig. 4

(*Id.*, Fig. 4 (annotated).) A “temperature sensor” is used to “detect[]” the “temperature of the” faucet’s “output water.” (*Id.*, ¶ [0006]; *see also id.*, ¶ [0026] (discussing a “temperature sensor 22” that can be a “thermistor”).) Schneider’s device also includes a “controller 24” that is “electrically coupled with the temperature sensor 22...” (*Id.*, ¶ [0026].)

During operation, Schneider’s “temperature sensor 22 will measure the temperature of the water” passing through the faucet “and send a signal to controller 24.” (*Id.*, ¶¶ [0040]-[0041].) The “controller 24” then uses the temperature signal “to adjust the color” of the faucet’s display. (*Id.*) This can be accomplished by, for instance, selectively activating one or more “light emitting diode[s]” like a “blue LED” or a “red LED.” (*Id.*, ¶ [0036]; *see also* Ex. 1003, ¶¶ 276-284.)

Again, applying these teachings to Tseng results in a faucet with a sprayhead satisfying the claims. Tseng’s sprayhead would include a “**temperature sensor**”

(Schneider's sensor 22) that measures the temperature of water passing through the sprayhead's internal **"waterway."** It would also include a **"controller"** (Schneider's controller 24) that receives a signal from the temperature sensor and uses it to control the color of Tseng's LEDs. (*See id.*, ¶¶ 285-287.)

Claim 18 depends on claim 17 and further requires:

"wherein the plurality of light emitters include a first light emitter configured to generate light of a first color when the signal from the temperature sensor detects a first water temperature, a second light emitter configured to generate light of a second color when the signal from the temperature sensor detects a second water temperature greater than the first water temperature, and the first and second light emitters blend the light of the first color and the light of the second color and generate light of a third color when the signal from the temperature sensor detects a third water temperature between the first water temperature and the second water temperature"

Schneider explains that its temperature sensor and controller can be used to control the color emitted by a "blue LED" and a "red LED." (Ex. 1009, ¶ [0036].) In one example, when the sensed "water temperature" is "less than approximately 80° F." only a "first light" (the blue LED) may be activated resulting in "blue" light. (*Id.*, ¶ [0040].) When the "temperature of the water" increases to "greater than 80° F. and less than 110° F. ..." both the "first" and "second lights" (the blue and red LEDs) are activated to produce a "combination of blue and red colors" like "purple" or "magenta[.]" (*Id.*, ¶ [0041].) If the water temperature exceeds "approximately 110° F." only the "second light" (the red LED) is activated resulting in "red" light. (*Id.*, ¶ [0042].) This process of producing **"first,"**

“*second*,” and “*third*” “*color[s]*” (red, blue, and purple) at different temperatures using a “*first*” and “*second*” “*light emitter*” (red and blue LEDs) is shown in Figure 14:

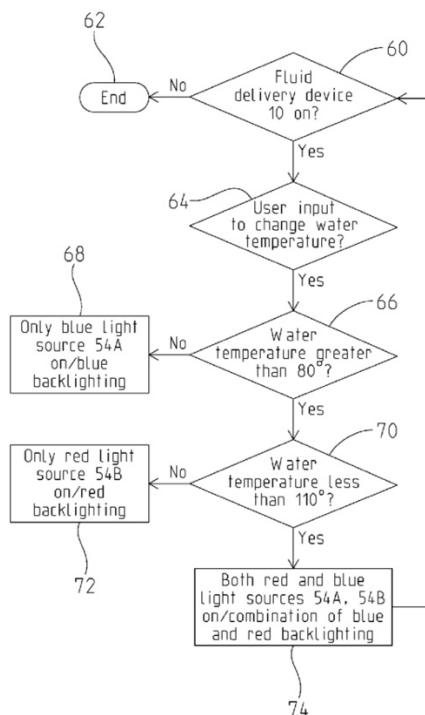


Fig. 14

(*Id.*, Fig. 14; *see also* Ex. 1003, ¶¶ 288-294.)

A POSITA would have understood that Tseng could be readily adapted to include the same functionality. Its spray head already includes a “plurality of LED elements 40.” (Ex. 1004, ¶ [0068].) Half of these would be configured to emit red light, and half would be configured to emit blue light, allowing for the production of at least three colors (red, blue, and purple) at different sensed temperatures. (See Ex. 1003, ¶¶ 295-297.)

A POSITA would have been motivated to apply Schneider's teachings to Tseng. Doing so would have improved Tseng. (*See id.*, ¶¶ 298-299.) Tseng's pull-out faucet would not only illuminate, but would also convey information to the faucet user regarding water temperature. (*See id.*, ¶ 300.) For instance, the faucet could emit color alerting the user to the fact that the water is hot such that care should be exercised. (*See id.*, ¶ 301.) The faucet could also notify a user when water reaches a desired temperature range. (*See id.*, ¶ 302.) A POSITA would have recognized that this functionality would have allowed for safer and more convenient operation of Tseng's faucet. (*See id.*, ¶ 303.)

Next, "when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious." *KSR Int'l Co. v. Teleflex Inc.*, 550 US 398, 406 (2007). This is all claims 17 and 18 do here. (*See Ex. 1003*, ¶¶ 304-305.) Tseng teaches a faucet with LEDs that emit light. Schneider teaches a faucet that uses a temperature sensor and controller to change LED light color. The combined faucet of Tseng and Schneider would continue to provide all this very same functionality. (*Ex. 1003*, ¶¶ 306-308.)

A POSITA would also have had a reasonable expectation of success. Again, Schneider's temperature sensor and controller is specifically designed for use with a faucet. (*See, e.g.*, 1009, ¶¶ [0002]-[0003]; Fig. 4.) It also allows for the control

of LEDs within that faucet. (*See id.*, ¶ [0036].) Tseng teaches a faucet that employs LEDs for illumination. (*See* Ex. 1004, ¶ [0068].) Given this similarity of subject matter and application, a POSITA would have every reason to believe that Schneider could (and would) be successfully integrated into Tseng. (Ex. 1003, ¶¶ 309-313.)

X. Obviousness over Tse’s Shower Head

Tse teaches a shower head (that may be configured as a pendant) that emits light from its spray face. This renders independent claims 1 and 19—and many of the dependent claims—obvious.

A. *Ground 4: Claims 1, 6-9, and 19-23 Are Obvious Over Tse*

Tse (Ex. 1005), when considered in view of the knowledge of a POSITA, itself renders claims 1, 6-9, and 19-23 obvious.

1. Claims 1 and 19

Due to their similarity—and because they embrace overlapping subject matter—claims 1 and 19 will be analyzed together.

[1-p]/[19-p] “A sprayhead [pendant showerhead] comprising:”²

To the extent limiting, Tse teaches a “**sprayhead.**” It is directed to a “shower head with a light emitting means.” (Ex. 1005, 1:4-5.) The shower head “discharge[s] water in the form of a spray.” (*Id.*, 1:24-27.)

A POSITA would also have understood that Tse’s shower head could obviously be a “**pendant showerhead.**” Tse explains that its shower head can be configured in various ways. For instance, it can be “fixed on the wall” or formed as a “hand-held” unit connected to a “shower hose.” (*Id.*, 3:20-22; *see also id.*, 7:16-19.) Further, Figure 1 depicts the shower head orientated such that water enters from its top and then is sprayed directly down:

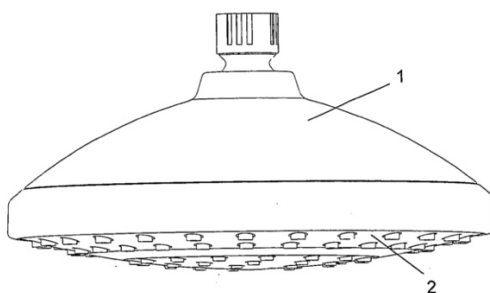


Fig. 1

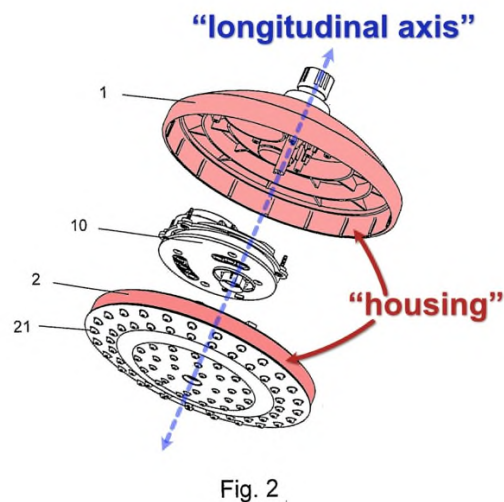
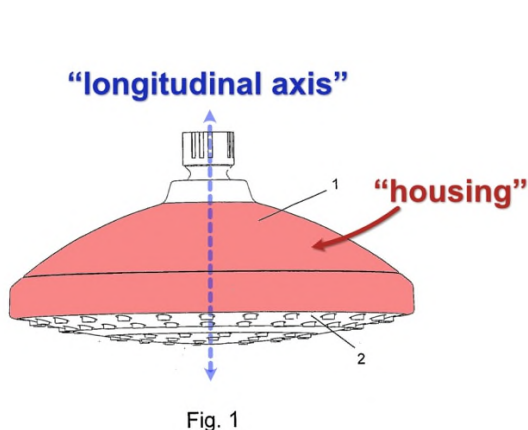
(*Id.*, Fig. 1.) This is the same way a pendant shower head mounted to a ceiling is oriented and operates. (See Ex. 1003, ¶¶ 319-325.)

² Underlined: claim 1 only. [Bracketed]: claim 19 only. Other limitations are shared.

Moreover, a POSITA would have considered configuring Tse’s shower head as a pendant to amount to nothing more than a routine design choice. (See *id.*, ¶¶ 326-330.) When the ’363 patent was filed, it was well-known that shower heads could be readily configured as handheld units, attached to a wall, or suspended from a ceiling. (See, *e.g.*, Ex. 1012, Figs. 1, 6 (showing the same “showerhead” configured as a pendant and wall-mounted shower head); Ex. 1013, 1:59-62 (similarly explaining that a “shower device” can be configured as a “hand-held shower device, an overhead shower device or also a side shower device”).

[1-1]/[19-1] “a housing defining a longitudinal axis;”

Tse’s shower head includes a **“housing.”** In particular, the shower head is formed from a “shower head body having a rear portion 1” and “a front portion 2....” (Ex. 1005, 5:13-16; see also *id.*, 3:24-25 (similarly referencing the “shower head body”).) As shown in Figures 1 and 2, the “shower head body” (red) has a circular shape, resulting in a central **“longitudinal axis”** (blue dashed line):



(*Id.*, Figs. 1, 2; *see also* Ex. 1003, ¶¶ 331-334.)

[1-2]/[19-2] “a waterway received within the housing;”

According to Tse, water is “supp[lied]” to one side of its “shower head body” and “discharge[d] ... in the form of a spray” from the body’s other side. (Ex. 1005, 1:24-27; *see also id.*, 3:25-28, 5:13-17.) The “incoming water flows through the shower head body” before exiting. (*Id.*, 3:28-29; *see also id.*, 7:28-8:2 (“water from the water supply flows from the top inlet of the rear portion 1 ... into the shower head body and then comes out from ... the front portion 2”).) The internal pathway through Tse’s shower head body through which water flows before exiting the front portion is the claimed **“waterway.”** This is shown generally in Figure 7 below:

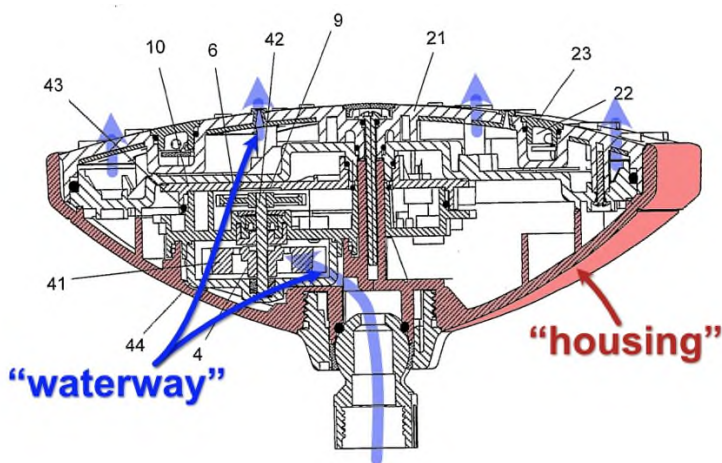
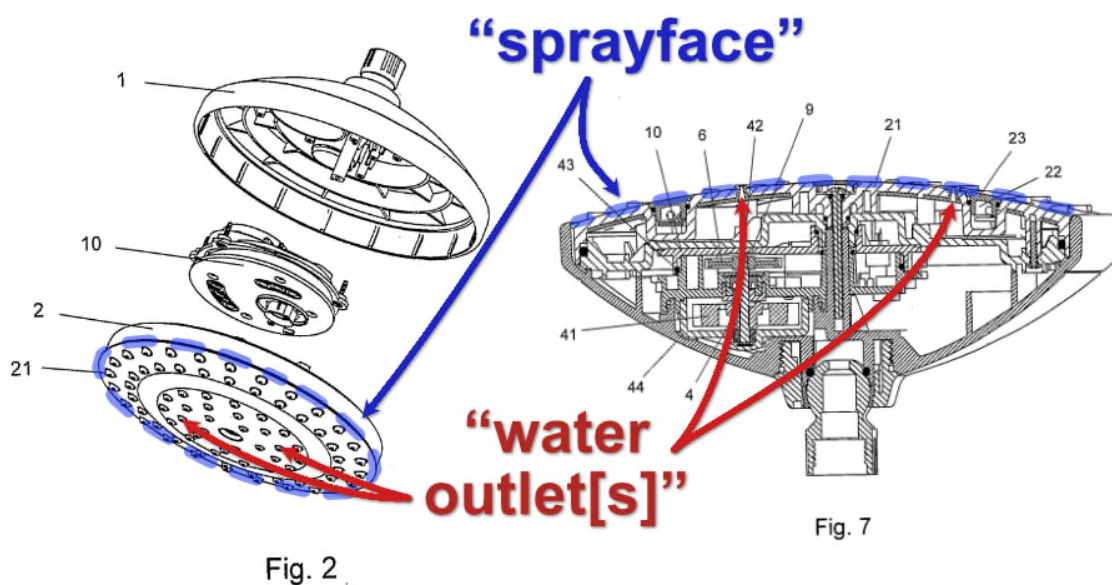


Fig. 7

(*Id.*, Fig. 7 (annotated); *see also* Ex. 1003, ¶¶ 335-339.)

[1-3]/[19-3] “a sprayface fluidly coupled to the waterway and supporting [including] a water outlet; and;”

Tse includes a “*sprayface*” with “*water outlet[s]*” “*coupled*” to its “*waterway*.” Tse’s shower head includes a “perforated member 21 adapted to discharge water in the form of a spray....” (Ex. 1005, 5:16-18.) Water supplied to the shower head flows through the “shower head body and then comes out from the perforated member 21....” (*Id.*, 8:1-3.) The perforated member is the claimed “*sprayface*” (blue dashed outline), while the water spraying perforations or holes through the central portion of this member are the claimed “*water outlet*” (red annotations):



(*Id.*, Figs. 2, 7 (annotated); see also Fig. 3 (providing a plan view of perforated member 21); Ex. 1003, ¶¶ 340-343.)

[1-4]/[19-4] “an illumination device supported by the housing [sprayface], the illumination device including a substrate, a plurality of light emitters supported by the substrate, and a translucent light pipe defining a closed loop [surrounding the water outlet] to diffuse light from the light emitters outwardly away from the housing [in a direction parallel to the longitudinal axis].

Tse teaches an “*illumination device*” with the components this limitation requires. Tse’s “invention generally comprises a shower head body having ... a power source and a light emitting means....” (Ex. 1005, 1:24-27.) As shown below, light is emitted from the face of Tse’s show head:

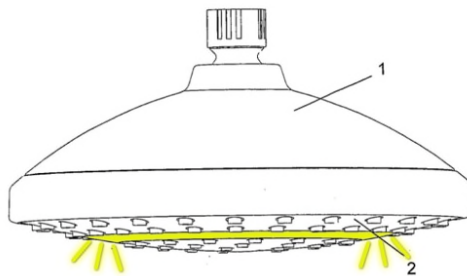
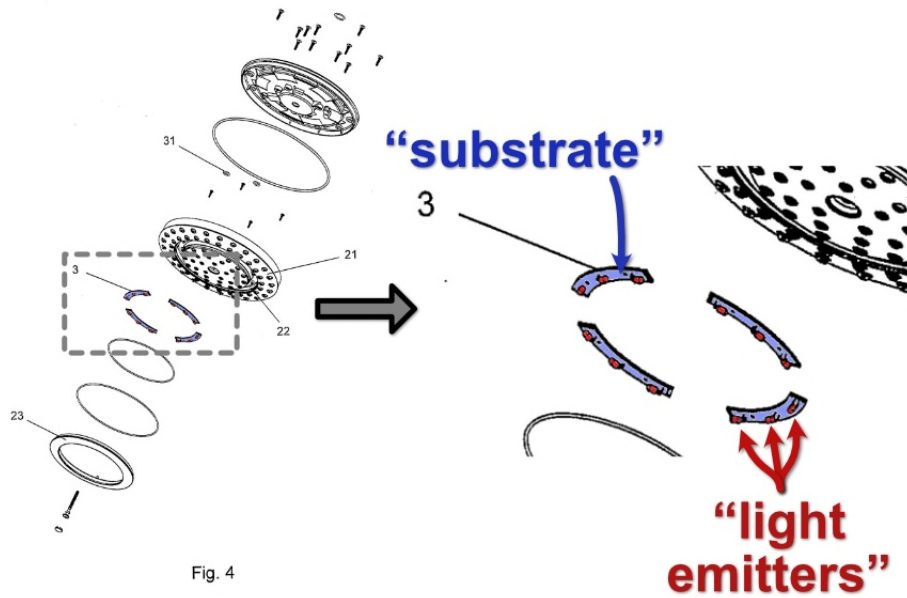


Fig. 1

(*Id.*, Fig. 1 (annotated).) Tse’s “light emitting means 3 comprises four sets each of three light emitting diodes.” (*Id.*, 7:1-2; *see also id.*, 3:6.) As shown in Figure 4, Tse’s “*light emitters*” (the light emitting diodes, red below) are mounted on and supported by a semicircular piece of material (blue below). This is the claimed “*substrate*”:



(*Id.*, Fig. 4 (annotated, and expanded to right); *see also* Ex. 1003, ¶¶ 344-348.)

While Tse does not indicate what the material supporting its light emitting diodes is made from, elsewhere it discusses use of a “printed circuit board ... laminated with molten plastics to make it watertight.” (Ex. 1005, 2:24-25.) POSITA would understand that Tse’s LEDs are (or could obviously be) mounted on a similar structure. (See Ex. 1003, ¶¶ 349-350.) According to Tse, the LEDs are “arranged in serial.” (Ex. 1005, 7:25-26.) Mounting the LEDs to a printed circuit board would facilitate the serial interconnection of the LEDs without the need for separate wiring. (See Ex. 1003, ¶¶ 350-353.)

Tse also explains that its “light emitting means 3 is disposed in the groove 22 of the perforated member 21 and sealed by the cover 23 of the groove 22.” (Ex. 1005, 6:23-24; *see also* 2:16-17 (explaining that the “light emitting means” includes a “cover”); 5:21-22 (“[c]over 23” is in “sealed engagement with” a

“groove 22” in “perforated member 21”).) “The cover” over the LEDs “is made of transparent or semi-transparent material so that the light emitted by the light emitting means can be seen.” (*Id.*, 3:3-5; *see also id.*, 6:27-29.) This is the claimed **“translucent light pipe.”**

Tse’s **“light emitters”** (the LEDs, red), **“substrate”** (blue), and **“light pipe”** (translucent cover 23, yellow) are all shown below. The cover 23 has a circular shape and thus **“defin[es] a closed loop”**:

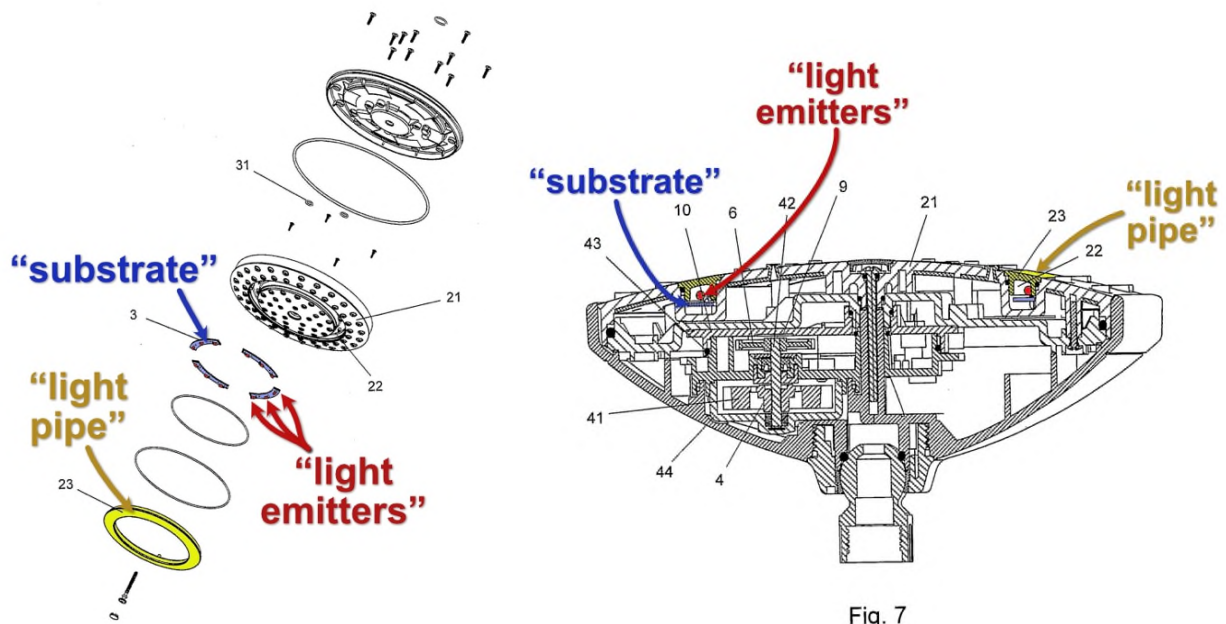
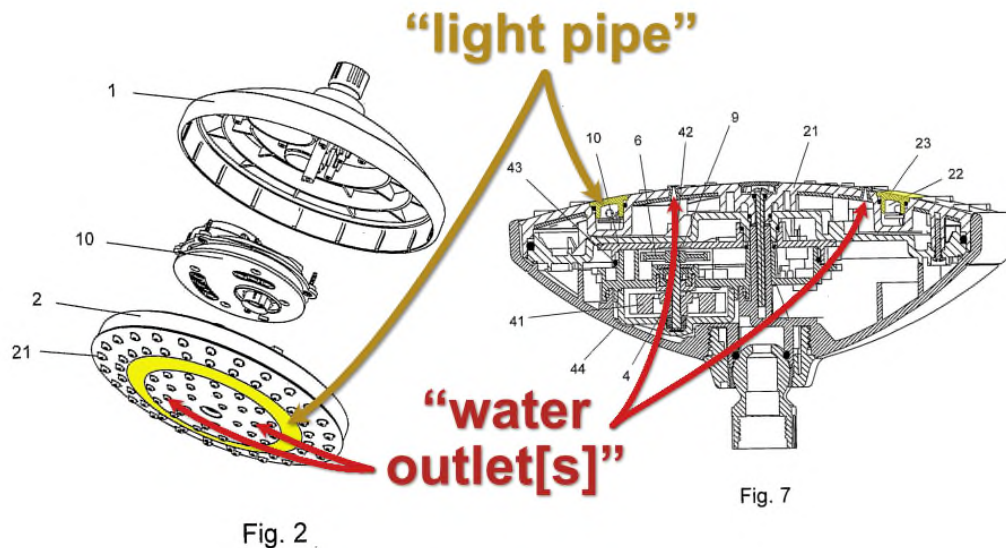


Fig. 4

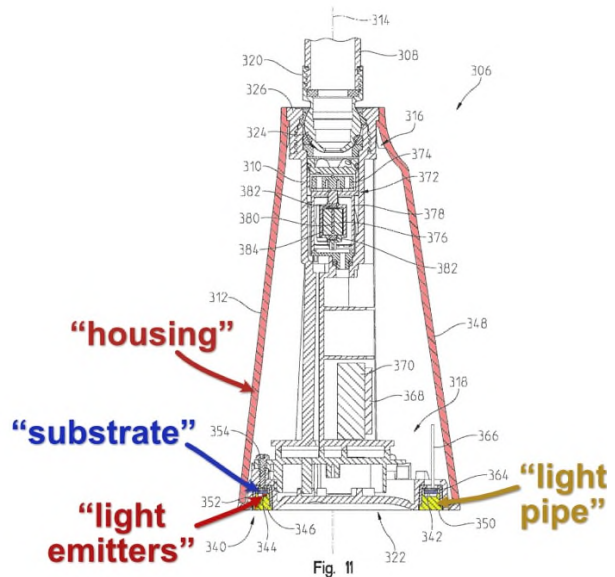
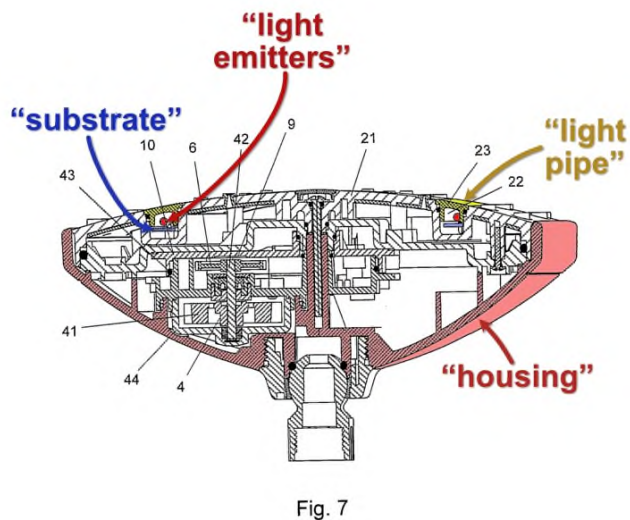
Fig. 7

(*Id.*, Figs. 4, 7 (annotated).) Further, Tse’s **“light pipe”** (translucent cover 23, yellow) encircles and thus **“surround[s]”** its **“water outlet”** (the holes through the central portion of its perforated member):



(*Id.*, Figs. 2, 7 (annotated); see also Ex. 1003, ¶¶ 354-358.)

While Tse does not use the term **“light pipe,”** a POSITA would nonetheless understand Tse’s cover 23 to be such an element. Cover 23 is indistinguishable from “light pipe 346” shown in Figure 11 of the ’363 patent. Just like Tse’s cover 23, “light pipe 346” is disposed in a “cavity or recess 362” in an “upper housing 352” of a showerhead’s “sprayface 322.” (Ex. 1001, 6:16-24.) The “light pipe 346” seals the “substrate 342” and “light emitters 344” within this cavity/recess. (*Id.*, 6:24-26.)



(Compare Ex. 1005 (Tse), Fig. 7; Ex. 1001 ('363 patent), Fig. 11 (both annotated).)

Again, a POSITA would also have understood that any structure that transmits light along its length to be a “light pipe.” (See, e.g., Ex. 1010, ¶ [0018]; Ex. 1011, ¶ [0075].) Tse’s cover 23 obviously operates in this manner: at least some light emitted by the LEDs will be internally reflected and transmitted along the cover’s length before it diffuses out of Tse’s shower head. (See Ex. 1003, ¶¶ 359-364.)

Next, Tse’s “*illumination device*” is “*supported*” by both the shower head’s “*sprayface*” as claim 19 requires, and the “*housing*” as required by claim 1. According to Tse, “the light emitting means is disposed in” a “groove” formed in its shower head’s “perforated member.” (Ex. 1005, 2:16-17.) Cover 23 also attaches to this groove. (See *id.*, Fig. 7.) Again, Tse’s “*sprayface*” is formed by

this perforated member. (See *id.*, 5:13-18 (“perforated member 21” is “adapted to discharge water in the form of a spray”).) Thus, in Tse, the **“illumination device”** (the light emitting means 3 and cover 23) is directly housed in and **“supported”** by the **“sprayface.”** Further, as shown below, Tse’s **“sprayface”** and the **“illumination device”** it contains are secured to Tse’s **“housing”** with a fastener (red dashed circle):

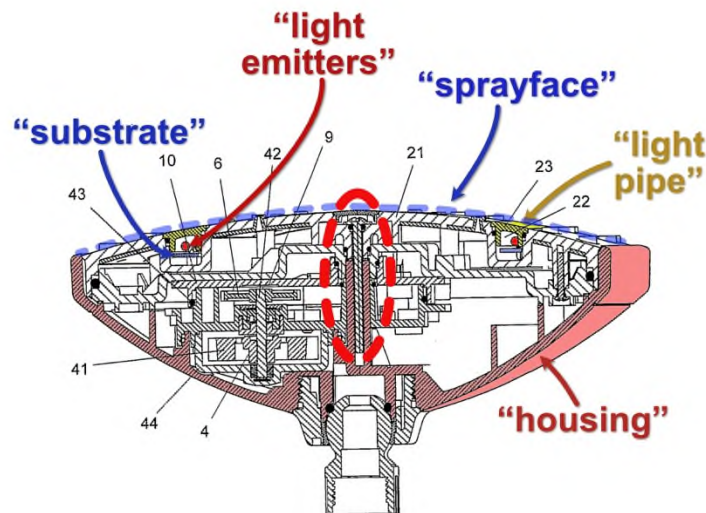
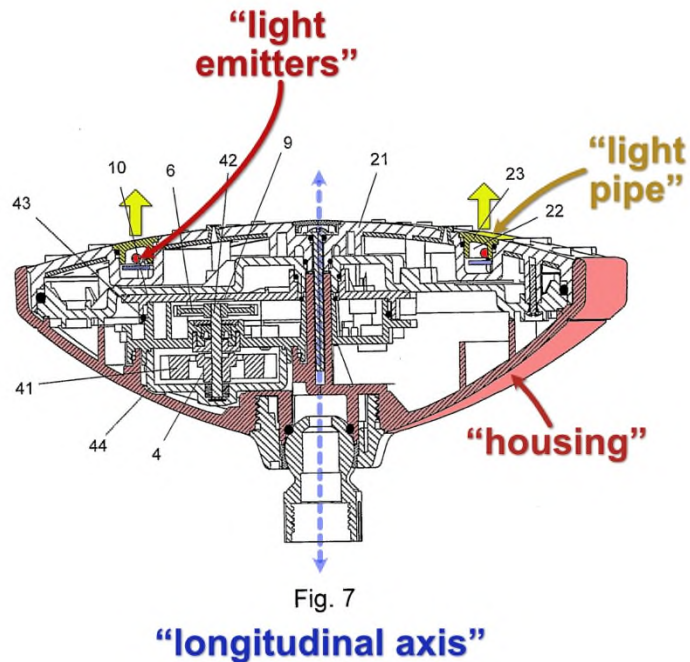


Fig. 7

(Ex. 1005, Fig. 5 (annotated); see also Ex. 1003, ¶¶ 365-368.) Thus, the housing also indirectly **“support[s]”** the **“illumination device.”** (See *id.*, ¶ 369.) Nothing about the claim or the ’363 patent requires that housing directly support the illumination device. In fact, dependent claims confirm that indirect support is sufficient. In particular, while independent claim 1 provides that “illumination device” be “supported by the housing,” dependent claim 6 further specifies that this can entail the “illumination device[’s]” “light pipe” being “supported within

the spray face.” (See Ex. 1001, claims 1, 6.) This is exactly what Tse teaches: its **“light pipe”** (cover 23) is integrated into its **“sprayface”** (perforated member 21). (See Ex. 1003, ¶¶ 370-372.)

A POSITA would have considered it obvious that Tse’s cover 23 operates to **“diffuse light from the light emitters outwardly”** both **“away from the housing”** and **“in a direction parallel to the longitudinal axis.”** In operation, “[t]he light emitting means 3 emits color light” that diffuses through the cover so as to “make[] the water coming out of the perforated member 21 hav[e] the same color. Therefore, a user can have visual enjoyment of the color light while showering.” (Ex. 1005, 8:20-23; see also *id.*, 4:16-18.) In other words, light is emitted in the same direction as the water spraying out of Tse’s shower head. (See *id.*) Moreover, because the light emitting means are located in a groove, light will diffuse, out of the groove, through the cover 23, and out of the perforated member 21 in a direction parallel to both the direction of water flow and the showerhead’s longitudinal axis. (See *id.*) This is shown below with yellow arrows:



(*Id.*, Fig. 7 (annotated); *see also* Ex. 1003, ¶¶ 373-377.)

A POSITA would also have understood that Tse’s cover would obviously have been designed to diffuse the light emitted by its LEDs in a manner that avoids hot spots. (*See id.*, ¶¶ 378-380.) Again, Tse’s goal is to give the all the water coming out of its shower head the “same color” for purposes of enhancing user “visual enjoyment.” (Ex. 1005, 8:20-23; *see also id.*, 4:16-18.) Uniform light emission furthers this goal to a greater extent than non-uniform emission. (*See* Ex. 1003, ¶ 380.) Moreover, a POSITA would have understood that the uniformity of the light emitted from Tse’s cover is a function of the cover’s thickness and shape. (*See id.*, ¶ 381.) A thicker cover with curved surfaces will produce more light diffusion than a thin, flat cover. (*See id.*, ¶ 382.) A POSITA would have considered the use of a thicker, curved cover to be nothing more than a routine

design choice. (*See id.*, ¶ 383.) Forming the shower head with such a cover would increase its aesthetic appeal by allowing for more uniform light emission. (*See id.*, ¶ 384.) A thicker cover would also have been considered more durable. (*See id.*, ¶ 385.)

2. Claims 6, 7, and 20

Claim 6 depends on claim 1 and further requires:

“wherein the sprayhead comprises a pendant showerhead configured to be suspended downwardly from a ceiling”

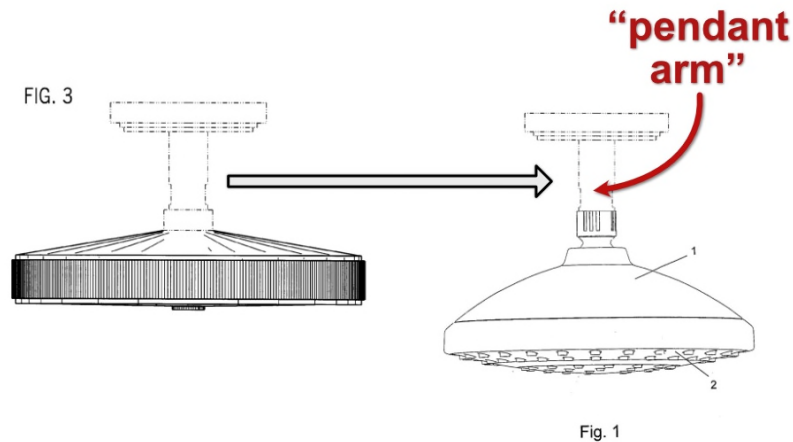
This is rendered obvious by Tse for the same reasons discussed for the preambles of claims 1 and 19: Tse teaches a shower head that can be configured in various ways, including as a ceiling pendant. (*See supra* elements [1-p], [19-p]; Ex. 1003, ¶¶ 386-388.)

Claims 7 and 19 respectively depend on claims 6 and 19 and include further limitations relating to the structure of the claimed “pendant showerhead.” In particular, both require:

“a pendant arm and a coupler fluidly coupling the waterway to the pendant arm, the coupler including a ball joint such that the housing is supported for rotation about at least two orthogonal axes”

Tse explains that its shower head’s “rear portion [is] adapted to be connected to a water supply.” (Ex. 1005, 1:25; *see also id.*, 5:15.) While not shown in Tse’s figures, a POSITA would have understood that water is supplied (or at the very least could obviously have been supplied) to the shower head by a pipe. (*See* Ex.

1003, ¶¶ 390-392.) And, when Tse’s shower head is configured as a pendant, this supply pipe will serve as a **“pendant arm”** connecting the shower head to the ceiling. The below demonstrative (using the well-known pendant shower head design shown in Ex. 1013) exemplifies this:



(Ex. 1013, Fig. 3; Ex. 1005, Fig. 1 (modified and annotated); *see also* Ex. 1003, ¶¶ 393-394.)

Tse also includes the claimed **“coupler fluidly coupling the waterway to the pendant”** and **“ball joint.”** As shown in figure 7, the rear end of Tse’s shower head includes a screw element allowing attachment to water supply pipe. And, this screw element is attached to the rest of the shower head with a ball:

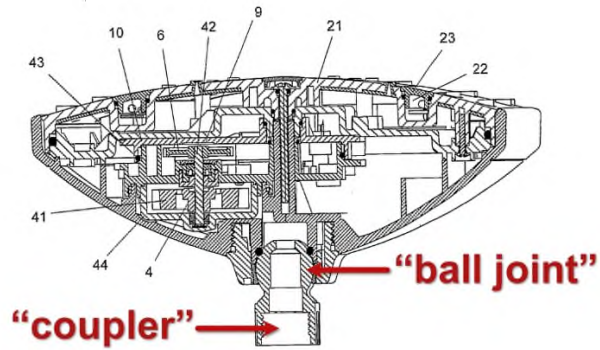


Fig. 7

(Ex. 1005, Fig. 7 (annotated); *see also* Fig. 3.) POSITA would have understood that this ball joint is present to allow movement of the shower head back-and-forth and up-and-down for purposes of redirecting its water spray. (See Ex. 1003, ¶¶ 395-396.) Thus, it permits ***“rotation about at least two orthogonal axes.”*** (See *id.*, ¶¶ 397-398.)

3. Claims 8, 22, and 23

Claims 8 and 22 respectively depend on claims 6 and 19 and further require:

“the housing includes an outer housing wall, and the light pipe is supported within the spray face laterally intermediate the water outlet and the housing wall”

As explained above, Tse’s shower head includes a ***“housing”*** (the shower body) and ***“spray face”*** (perforated member 21). (See *supra* limitations [1-1] and [1-3].) Moreover, Tse’s ***“light pipe”*** (cover 23) is located ***“laterally intermediate”*** the housing and the spray face’s ***“water outlet”*** (the holes through the central portion of the perforated member):

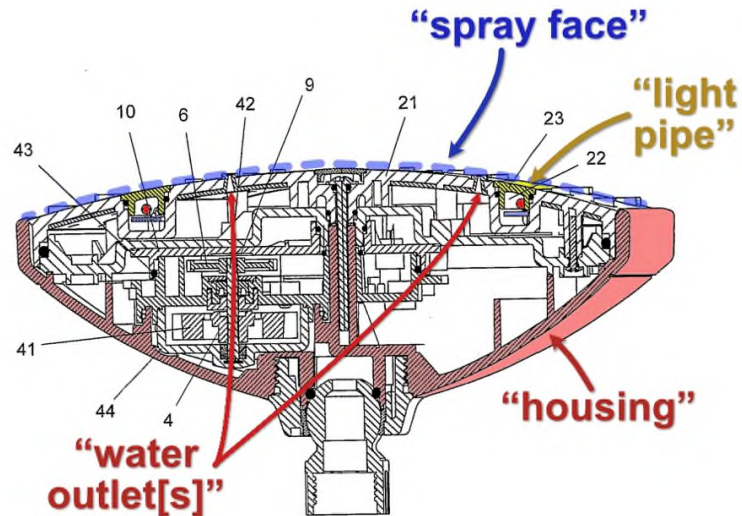


Fig. 7

(Ex. 1005, Fig. 7 (annotated); *see also* Ex. 1003, ¶¶ 399-402.)

Claim 23 depends on claim 22 and requires that:

“the translucent light pipe includes an outer illumination surface extending parallel to an outer surface of the sprayface”

The top surface of Tse’s **“light pipe”** (cover 23) sits flush with the surface of its **“sprayface”** (perforated member 21). (See Ex. 1005, Figs. 1, 2, 7.) Because of this, it includes an **“outer illumination surface”** that **“extend[s] parallel”** to an **“outer surface of the sprayface”**:

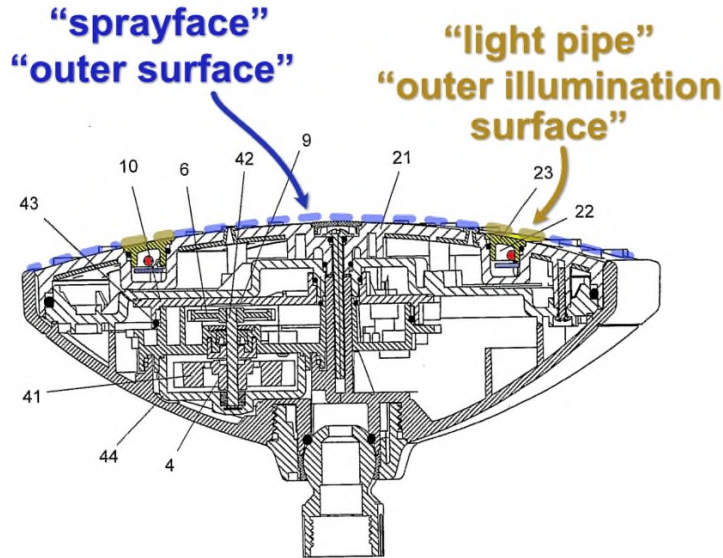


Fig. 7

(*Id.*, Fig. 7; *see also* Ex. 1003, ¶¶ 403-406.)

4. Claims 9 and 21

Claims 9 and 21 depend respectively on claims 1 and 19 and further require:

“a hydro-generator fluidly coupled to the waterway and in electrical communication with the illumination device”

Tse teaches a “*hydro-generator*” that is in “*electrical communication*” with its “*illumination device.*” Tse’s “shower head” employs a “hydroelectric generator disposed in” its “shower head” to power its “light emitting means” and “avoid [the] extra requirement of electricity.” (Ex. 1005, 1:17-20; *see also id.*, 8:2-13 (explaining that Tse employs an “hydroelectric generator”).) This generator includes “a water turbine” that is “driven by [the] force of water passing through” for purposes driving an “electrical generator for converting mechanical energy into electrical energy.” (*Id.*, 2:1-16; *see also id.*, 5:23-6:27; Fig. 5.) The electrical

generator is connected to the “light emitting means” “by an insulated conductive wire.” (*Id.*, 2:10-11, 2:18-20; *see also id.*, 8:15-20; *see also* Ex. 1003, ¶¶ 407-412.)

B. Ground 5: Claims 1, 6-9, and 19-23 are Obvious Over Tse and Carter

As explained above, Tse (Ex. 1005) itself renders claims 1, 6-9, and 19-23 obvious. Patent Owner may argue (incorrectly) that Tse’s cover 23 is not a “light pipe” as all these claims require. Even if this were the case, however, a POSITA would still have considered the claimed subject matter obvious when Carter’s (Ex. 1006) teachings are applied to Tse.

Carter relates to “illuminated plumbing fixtures” that include “a molded in place integrated light pipe feature....” (Ex. 1006, ¶ [0003].) Specifically, in Carter an “[i]ntegrated light pipe” is “molded over (or encapsulates) a “substrate” and “lighting element” (like a “L.E.D.”). (*Id.*, ¶¶ [0008]-[0009].) “[V]arious forms for injection molding” such as “multi-shot molding or pre-mold/over-mold molding” can be employed. (*Id.*, ¶ [0008].) The light pipe is “transparent.” (*Id.*, Abstract, ¶ [0026].) Figure 4A provides an example of a “unidirectional lighting element array 15.” (*Id.*, ¶ [0019].) A series of “lighting elements 6” (red) are mounted on a “substrate ... 1” (blue). (*Id.*, ¶¶ [0018]-[0019].) Then, a “light piping feature 3” (yellow) is applied over the lighting elements/substrate. (*Id.*, ¶ [0019].)

cost and complication” while still giving rise to risk of “serious complications” like “inadvertent electrocution.” (*Id.*) In contrast, Carter’s integrated light pipe is “simpl[e],” “rugged[,]” reliable, and cost-effective. (*Id.*, ¶ [0007].)

A POSITA would have recognized that Tse is subject to the cost and durability issues identified by Carter. (*See* Ex. 1003, ¶¶ 427-432.) Tse employs multiple O-rings to create a “sealed engagement” between “groove 22 and “cover 23 ... to prevent water from entering the groove 22.” (Ex. 1005, 5:19-22; *see also id.*, Figs. 4, 7.) This not only increases cost—by requiring multiple distinct parts—but it also gives rise to a risk of failure. (*See* Ex. 1003, ¶ 432.) Manufacturing defects or deterioration of the O-rings could eventually allow water to enter the groove damaging the light emitting means 3. (*See id.*) In contrast, applying Carter’s teachings, a light pipe would be integrated with and molded directly into Tse’s groove. (*See id.*, ¶ 433.) This would be accomplished by first molding the perforated member with the groove, inserting the light emitting means 3 into the groove, and then applying the light pipe via a second molding step. (*See id.*, ¶ 434.) The light emitting means 3 would then be fully covered by and encapsulated within the light pipe—and completely watertight—without the need for separate O-rings. (*See id.*, ¶ 435.) A POSITA would have recognized that this integrated structure would have substantially improved the durability of Tse’s shower head. (*See id.*, ¶ 436.)

A POSITA would have recognized that applying Carter’s teachings would also have improved Tse in other ways. Carter explains that use of its molded, integrated light pipe allows for greater control over light direction to “create unique and/or different lighting effects.” (Ex. 1006, ¶ [0026].) Moreover, “design features” can be “molded directly into the integrated light pipe” to further increase its functionality and appeal. (*Id.*) A POSITA would have recognized that these benefits would have translated to Tse. (See Ex. 1003, ¶¶ 437-440.) Replacing its simple cover with a customized, molded light pipe would have resulted in a better, more customizable dispersion of light. (See *id.*, ¶ 441.)

A POSITA would have had a more than reasonable expectation of success. While Carter does state that its “plumbing fixture” is “primarily intended for the spa or pool industry,” it also explains that it is “adapt[able] to all forms of recreational and/or non-recreational water applications.” (Ex. 1006, ¶ [0027]; see also *id.*, ¶ [0003] (“[t]he present invention relates generally to the field of illuminated plumbing fixtures”); ¶ [0007] (Carter’s teachings can be “adapt[ed] to a variety of plumbing features.”).) A POSITA would have understood that a showerhead is one such application. (See Ex. 1003, ¶¶ 423-424, 442-444.) A lighting element in a showerhead is subject to the very same types of environmental conditions—including water exposure—Carter’s invention is designed to protect against. (See *id.*, ¶ 445.) Relatedly, a POSITA would have

understood that an illuminated plumbing fixture that is sufficiently watertight and “rugged[]” to be employed below the waterline in a chlorinated and heated pool or spa as Carter’s is (*see, e.g.*, Ex. 1006, ¶¶ [0006]-[0007]) would have been more than capable of dealing with the less demanding environment of a shower. (*See* Ex. 1003, ¶ 446.) Next, Carter also allows for the formation of a “light piping element” with “any shape complementary to ... a fixture.” (Ex. 1006, ¶ [0020].) And, it employs existing, well-known molding techniques, and allows for the use of various “commodity and/or engineered plastic resins.” (*Id.*, ¶ [0026].) Given this expressed flexibility, a POSITA would have every reason to believe—and no reason to doubt—that a light pipe could be successfully applied to Tse’s shower head following Carter’s teachings. (*See* Ex. 1003, ¶¶ 447-448.)

C. Ground 6: Claim 24 Is Obvious Over Tse (or Tse and Carter) and Spangler

As explained above, claim 19 is either obvious of Tse itself (Ground 4), or obvious over the combination of Tse and Carter (Ground 5). Claim 24 depends on claim 19 and further requires: **“a multi-dimensional fluidic device received within the water outlet.”** It would have been obvious to employ this type of device with Tse in view of Spangler (Ex. 1014).

Spangler relates to “showerheads including multi-dimensional fluid dispensers.” (*Id.*, ¶ [0001].) One example of such a dispenser is a “two-dimensional (2D) fluidic device” that is able to produce “a fan of water within a

plane by oscillating a water stream about a center axis.” (*Id.*, ¶ [0003]; *see also id.*, Fig. 12.) Another example is a “three-dimensional (3D) fluidic device[]” that “produce[s] a plurality of fans of water within diverging planes.” (*Id.*, ¶ [0003]; *see also id.*, Fig. 13.) To produce these types of water streams, the “fluidic devices” are fitted into the outlets of a “spray face ... in fluid communication” with a “waterway.” (*Id.*, ¶ [0005].) The multi-dimensional fluidic devices can be used by a “showerhead” attached to a “wall,” or a “handheld wand or handshower.” (*Id.*, ¶ [0043]; *see also* Ex. 1003, ¶¶ 450-456.)

A POSITA would have been motivated to use Spangler’s multi-dimensional fluidic devices with Tse. (*See id.*, ¶ 457-458.) A POSITA would have considered this nothing more than a simple, straightforward design choice. (*Id.*, ¶¶ 459-460.) Spangler’s fluidic devices were a known, existing option available for use with shower heads if spray pattern variation was desired. (*See id.*, ¶ 460.) Further, a POSITA would have understood that using Spangler’s devices with Tse would have improved Tse by increasing the coverage and uniformity of water emitted by the shower head. (*See id.*, ¶¶ 461-462.) Rather than emitting simple streams, Tse’s shower head would emit fans of water in multiple dimensions enhancing the shower experience. (*See id.*, ¶ 462.)

Next, as explained, art combinations that “simply arrange[] old elements with each performing the same function it had been known to perform and yields

no more than one would expect from such an arrangement” are obvious. *KSR Int’l*, 550 US at 406. This is the case here: Tse teaches a shower head that emits water and can be illuminated. Spangler teaches a fluidic device that allows for an improved shower spray pattern. (See Ex. 1003, ¶¶ 463-464.) The combined shower head of Tse and Spangler would continue to provide this same functionality. (See *id.*)

A POSITA would also have had a reasonable expectation of success. Spangler explains that its multi-dimensional fluidic devices are specifically designed and meant for use with shower heads like that taught by Tse. (See, *e.g.*, Ex. 1014, ¶ [0043].) Further, Spangler teaches that the devices can be readily applied to a shower head’s sprayface via press fitting or other well-known processes. (See *id.*, ¶ [0050].) This would have given a POSITA every reason to believe—and no reason to doubt—that the multi-dimensional fluidic devices could have been successfully used with Tse. (See Ex. 1003, ¶ 465-468.)

XI. Conclusion

For the foregoing reasons, Petitioner respectfully requests institution of IPR and cancellation of claims 1-24.

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

The undersigned certifies that the foregoing PETITION FOR *INTER PARTES* REVIEW complies with the type volume limitation in 37 C.F.R. § 42.24(a). According to the utilized word-processing system's word count, the petition—excluding the caption, table of contents, table of exhibits, mandatory notices, certificate of word count, and certificate of service—contains 12,313 words.

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CERTIFICATE OF SERVICE

The undersigned hereby confirms that the foregoing PETITION FOR IPR and associated exhibits were caused to be served on March 25, 2024 via overnight courier upon the following counsel of record for Patent Owner:

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