

Examiner's  
use onlyAbbreviations

- Person skilled in the art = PSA
- Common general knowledge = CGK
- Patent drafting conventions = pdc
- Claim = C
- Figure = F
- Page, Line = P, L
- Document A, B, C, D = DA, DB, DC, DD
- Because =  $\nabla$
- As a result =  $\therefore$
- Figure present, absent = Y, N
- Sprinkl-eeze Pro = SP
- " Lite = SL

CONSTRUCTION

C1

1.1) "A sprinkler for automatically expelling a fire extinguishing fluid"

- Independent product claim
- Sets the scene
- for = suitable for ( $\nabla$  pdc)
- fire extinguishing fluid
  - fire retarding, P3, L10 + P6, L1 definite meaning.
  - typically water, P6, L4

0.5

0.5

$\therefore$  1.1 = a sprinkler suitable for automatically expelling a fire extinguishing (retarding) fluid

1.2) "the sprinkler comprising ... member"

- comprising = including but not limited to the following features  $\nabla$  pdc.
- frame
  - known in the art to have an outlet, an orifice, an inlet connectable to fire retarding fluid, P3, L5–7 + a deflector at opposite end from outlet, P3, L11.

0.5

- specific description : has “an outlet..., orifice, ... inlet ... deflector” P5, L35 – P6, L5
- the purpose is to hold parts of sprinkler together and to provide an attachment to a surface (i.e. ceiling, P6, L6-7)
- thermally responsive member
  - Capable of releasing a thermally responsive element when heated to an operating temperature  
→P3, L8-9  
part of prior art but used in same meaning.
  - 2 types, P3, L15
  - Breakable glass bulbs seems to be chosen in this invention, P4, L1-2 “thermally responsive ... bulb”
  - the glass bulbs typically contain a liquid (P3, L24-25)  
(no evidence if the other type (fusible solder links also comprise liquid))
  - The PSA would understand any type of thermally responsive members as C1 language not limited to bulbs.
  - withstands ambient conditions but activates (i.e. breaks) when heated.
  - contains at least two fluids and something breakable (see 1.5)

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∴ 1.2 = the sprinkler includes, at least, a frame capable of holding parts of sprinkler together, and a thermally responsive member capable of releasing a responsive element i.e. activating, when heated to an operating temperature.

### 1.3) “the frame ... the opening,”

- having = like comprising, including but not limited to ∇ pdc.
- opening – shown as “inlet 4” on F1 (P5, L36)
- valve – “cap 5” P6, L2-3 “held in place by thermally responsive element 6”

∴ 1.3 = the frame includes an opening that is connectable to a source of fire extinguishing liquid and a valve closing the opening.

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## 1.4) "the thermally ... the valve"

- "the cap (5) being held in place by a thermally responsive element 6 which is secured in position by bulb assembly screw 7" P6, L3-4.

thus \_\_\_\_\_

1.4 = the screw, or other part of the frame, holds the thermally responsive member in place

&

Thermally responsive member (TRM) holds the valve in closed position.

0.5

## 1.5) "and containing a first ... to flow"

- containing = like comprising, includes the following but may include more ▽ pdc.
- contains "thermally responsive element" only reasonable reading.

0.5

- fluid = comprises gas & liquid

↓  
i.e. water, P6, L4  
CH & DMF, P6, L35-36

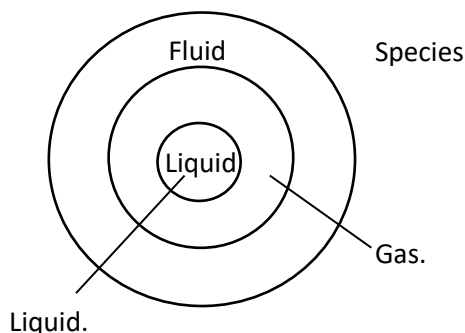
→ gas bubble, P6, L17

0.5

0.5

- must include at least liquids as C2-4 specify liquids (▽ repercussive effect)
- at least one – at least one but not necessarily more
- species
  - specific description shows 2 immiscible liquids and one air bulb as species, air bulb probably not expanding when heated. Thus if C1 was referring to air bulb + liquid then only one of them would be expanding
  - in the description used interchangeably with the 'fluid', P4, L31 P4, L6
  - but no additional example given, thus no limitation to gas/liquid. Seems broader than "fluid"
  - P4, L18-19  
define species to cover both fluid & liquid.

thus



- There seems to be an error in the 1<sup>st</sup> “fluid” wording – it is clear from description (above, P4 L18-19) and C2-C4 that species is meant.

Should be corrected.

∴ 1.5 = TRM includes at least a first and second species at least one of them capable of expanding to break the TRM when heated to actuate the valve & allow fire extinguishing fluid to flow.

0.5

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#### 1.6) “the actuation ... 120°C”

- actuation time
  - “is measured as the time taken for a thermally responsive member to break when exposed to a particular temperature”, P4, L10-11
  - thus is a property of thermally responsive member. (TRM)

0.5

∴ 1.6 = when the TRM is exposed to

- 75°C – it breaks in less than 12s
- 120°C – “ ” “ ” “ ” 7s

C2

#### 2.1) “A sprinkler ... Claim 1”

- Includes all features of C1 + the following  
∇ pdc.

#### 2.2) “wherein the first ... liquid.”

- 1<sup>st</sup> species is limited to be a fluid
- 2<sup>nd</sup> species “ ” “ ” “ ” liquid.

0.5

0.5

- liquid
    - must include but be broader than the immiscible liquids in C3, dependent to C2  
 $\nabla$  repercussive effect
    - also has no limitation on density/boiling point, as described in C4.  
 Can be any liquid.
  - see fluid/liquid definitions in 1.5
- $\therefore$  2.2 = 1<sup>st</sup> species is a fluid, 2<sup>nd</sup> species is a liquid.

C3

## 3.1) "A sprinkler ... Claim 2"

- Includes all features of C1 + C2 + the following.

## 3.2) "wherein ... liquids"

- third species
  - antecedent basis locking, not introduced before C1/C2.
  - clear that TRM can include something else ('containing' in 1.5)
- immiscible liquid
  - definite meaning 'do not mix' P4, L21 thus are incompressible, act as 2 separate systems.
  - has clear boundary in between, P6, L23.

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I believe there is an error in C3.

If there were 3 species, as in C2 & C3, all of them liquid then this would not be in-line with description, P6, L28-29 and L17.

Description and F2 requires that there are two immiscible liquids, first liquid 10A & second liquid 10B and the gas bubble is a third fluid – 12.

C3, (3.2) seems to only specify 1<sup>st</sup> & 2<sup>nd</sup> species as immiscible liquids.

Check this with client, but until then I will construe as third species = 2nd species because claims need to cover specific description & examples & figures.

$\therefore$  3.2 = The first & second species are immiscible liquids.

C4

4.1) "A sprinkler according to C3"

- includes features of C1 + C2 + C3 + the following  
( $\nabla$  pdc)

## 4.2) "wherein the first liquid ... second liquid"

•

4.2 = "The boiling point & density of 1<sup>st</sup> liquid is less than the 2<sup>nd</sup> liquid"

C5

## 5.1) "A sprinkler according to C1"

- Includes features of C1 + the following.  
( $\nabla$  pdc)

## 5.2) "wherein ... bubble."

- upper pointed end is for accommodating an air bubble, P4, L36
- gives an installation direction (pointed end up)

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$\therefore$  5.2 = the TRM is a glass bulb with an upper pointed end suitable for accommodating air bubble and giving an installation direction being on top, and a lower rounded end.

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C6

## 6.1) "A sprinkler ... Claim 5"

- Includes all features of C1 + C5 + the following.

## 6.2) "wherein ... rounded end"

- the wall between two ends of the glass bulb is thinner than the lower rounded end.

Depend  
1**MARKS AWARDED 11.5**

# INFRINGEMENT

			Examiner's use only
	SP	SL	
<b>C1</b>			
1.1)	Y P12, L5, L9-10  Supply a <u>separate</u> sprinkler from which fire extinguishment flows out, when the glass bulb breaks (automatically)	Y as in SP	1
1.2)	Y P12,L5-8  Frame = fitting on L5, as it is for attachment to a surface, and contains all parts of sprinkler including the glass bulb, i.e. TRM	Y as in SP	1
1.3)	Y P12, L6-8 supplies fire extinguishment thus must have an opening for it. the valve closes opening	Y as in SP	1
1.4)	Y P12, L8,9 the bulb retains the valve in closed position. the fitting holds the glass bulb.	Y as in SP	1
1.5)	Y P10, Figures +P11, L11 the glass bulb has 3 species – PC, air pocket, water. PC expands when heated	Y Figures on P11, + P11, L11 • PC is something that expands when heated. • SL has air pocket & PC as 2 species.	2.5
1.6)	Y P11, L15-17 As reaction time is only 1s at 80°C, assume would be less than <u>12s</u> at 75°C  ∴ C1 infringed (contributory)	Y P11, L33-35 • 12s actuation period at 70°C – must be less than 12s at 75°C. 7s to activate at 80°C so must take less than 7s at 120°C.  ∴ C1 infringed (contributory)	1  0.5

			Examiner's use only
	SP	SL	
<b>C2</b>			
2.1) Y	see above	Y see above.	
2.2) Y	air bulb is fluid as gas. PC is not liquid when sold but liquid in <u>use</u> as it melts P11, L6 (water is liquid but water + air bulb = nothing expandable – to be checked)  + see F on P10  ∴ <u>C2 infringed by users</u>	Y same as SP + F on P11      ∴ <u>C2 infringed by users</u>	1
<b>C3</b>			
3.1) Y	see above	Y as in SP	
3.2) Y	F on P10 water and melted PC immiscible, do not mix in use, there is a clear separation.  ∴ C3 infringed by users	N F on P11 air is not liquid. no 2 liquids.  ∴ C3 not infringed	1
<b>C4</b>			
4.1) Y	see above	N see above	
4.2) Y/N ?	(F on P10) water density is less as it stands at top when PC melted.  boiling points? need to check with client  ∴ may be infringed by users if water boiling point less than PC boiling point	N no two liquids.	1



			Examiner's use only
	SP	SL	
<b>C5</b>			
5.1)	Y see above	Y see above	
5.2)	N F on P10 no pointed end on the bulb	Y F on P11 pointed end is on the upper side, accommodates air bubble.	1 0.5
	∴ <u>C5 not infringed</u>	∴ <u>C5 infringed</u>	
<b>C6</b>			
6.1)	N see above	Y see above	
6.2)	N No thickness mentioned.	N No thickness mentioned, seems same thickness all around on F at P11	0.5  DEP 2 CONC. 1
<b>MARKS AWARDED 16</b>			
<u>NOVELTY</u>			0.5
DC is full prior art ∇ should have been published before summer 2011.			0.5
DD is novelty only prior art ∇ filed before filing date of DA, published after filing date of DA.			
<u>DC – Mark I</u>			0.5
<b>C1</b>	1.1) N Sprinkler not disclosed		0.5
	1.2) N " "		0.5
	1.3) N " "		0.5
	1.4) N " "		0.5
	1.5) Y See F1 on P13 • CH / DMF is expanding when heated (known from DA – should be intrinsic to PSA) • Also has air bubble • Glass bulbs breaking when used in sprinkler known in CGK – see L5-10 DD		0.5 0.5

			Examiner's use only
1.6)	N	Mark I bulb on P13, 10 s at 120°C not less than 7s 15 s at 77°C not less than 12s  ∴ C1 is novel	0.5
<div>C2</div>			
2.1)	N	as above	
2.2)	Y	air bubble is fluid CH, DMF liquid → (known from DA, intrinsic to PSA) P13, Mark 1 Figure  • ∴ C2 novel via dependency	0.5
<div>C3</div>			
3.1)	N	as above	
3.2)	N	no two liquids, P13 Mark 1 Figure  • ∴ C3 novel	0.5
<div>C4</div>			
4.1)	N	as above	
4.2)	N	no two liquids  ∴ C4 novel	0.5
<div>C5</div>			
5.1)	N	as above	
5.2)	N	F1, Mark I on P13 upper end is rounded, not pointed  ∴ C5 novel	
<div>C6</div>			
6.1)	N	as above	
6.2)	Y	Figure on Mark I on P13 side wall, i.e. between two ends is thinner than the rounded end	0.5

DC – The Bespoke Bulb

C1

- 1.1) N sprinkler not disclosed
- 1.2) N " "
- 1.3) N " "
- 1.4) N " "
- 1.5) Y P13, 2nd Figure + description.

The bulb which can be TRM (see my construction) has 2 liquids with bespoke activation profile thus intrinsic that at least 1 liquid will expand when heated to fulfil its duty as a bulb suitable for sprinkler heads.

- 1.6) N activation time not mentioned
- ∴ C1 new

C2

- 2.1) N as above
- 2.2) Y see figure 2 on P13 + description on Bespoke Bulb  
→ has 2 liquids.  
liquid is also a fluid (see my construction)
- ∴ C2 new via dependency

C3

- 3.1) N see above
- 3.2) N no not immiscible but homogenous (line 4-5 under Bespoke Bulb)
- ∴ C3 new

C4

- 4.1) N see above
- 4.2) N no mention of boiling point / density
- ∴ C4 new

C5

- 5.1) N see above
- 5.2) N Figure 2 on P13, no pointed end
- ∴ C5 new

1

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			Examiner's use only
<div>C6</div> <p>6.1) N see above</p> <p>6.2) N Figure 2 on P13 – wall thickness same all around</p> <p><u>∴ C6 new</u></p>			
<div>DD</div> <div>C1</div> <p>1.1) Y P14, L3-4 Sprinkler for fire extinguisher</p> <p>1.2) N P14, L5-8 Frame seems to hold parts of sprinkler together. the release member activates when heated P14, L11-15 ▽ when it is heated it bursts /explodes.</p> <p>1.3) Y P14, L6, 7, 8 there is a valve closing the opening opening should be connectable to a source of extinguishing liquid as it is a sprinkler for fire extinguisher → it is intrinsic to a PSA.</p> <p>1.4) y P14, L5-8 • frame holds the TRM (release member held vertically) • TRM holds valve in closed position (the valve held with release member)</p> <p>1.5) Y P15, L7-9 + L14-15 + P16 there is a liquid (5), air bubble (7), liquid displacement member (6) all of which can be species at least the liquid, is capable of expanding when heated – P14, L28.</p> <p>1.6) N P15, L29 10 s at 70°C so must be less than 12s at 75° but no info on 120°C. <u>∴ C1 novel</u></p>			0.5
<div>C2</div> <p>2.1) N see above</p> <p>2.2) Y P15, L9 + 14 gas is fluid, and there is a liquid. <u>∴ C2 new</u> via dependency.</p>			0.5

C3

- 3.1) N as above
- 3.2) N no mention of immiscible liquids.  
∴ C3 new.

C4

- 4.1) N as above
- 4.2) N no two liquids.  
∴ C4 new

C5

- 5.1) N as above
- 5.2) N P16  
pointed end is not upper  
∴ C5 new

C6

- 6.1) N as above
- 6.2) N P16 + P15, l6  
the thickness is the same  
∴ C6 novel

MARKS AWARDED 14.5

INVENTIVE STEP

- Using Windsurfer / Pozzoli

1a) PSA is knowledgeable in the field of sprinklers as this the title of DA.

1b) The CGK of PSA includes

- all aspects of the frame, ∇ mentioned as 'commonplace' & 'industry standard' in your letter – P2.
- sprinklers described on P14, L5-8 ∇ these are known for decades (P14, L10)

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DEP 1  
CONC 1

1.5

- Probably CGK does not include DC  $\nabla$  although it is an excerpt from a catalogue
  - we do not know if this is a well-known catalogue in the art
  - it was only for Summer 2011, just before the filing date of DA – so may not be a very well-known document.

It would be useful to check with a PSA. (i.e. Client.)

(2) + (3), (4) – claims as construed above, differences as in my novelty analysis & below.

**C1** The inventive concept of C1, is to be checked with expert evidence but, seems to be that the TRM has two species, one of them expands to break when heated and the actuation time is less than 12s at 75°C and 7s at 120°C

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The best starting point can be Mark 1 in DC as DD cannot be used in inventive step analysis, and DC teaches TRMs for standard sprinklers. and mentioned to be suitable for standard sprinkler heads.

1

The difference between Mark 1 in DC & C1 is that DC does not teach all features of sprinklers and the actuation time is different.

1

Features of sprinklers is part of CGK. Also features of the frame part of CGK. Considering my novelty analysis on DD, (P14 L5-8 part of CGK) I assume features (1.1) – (1.4) will be obvious to a PSA when DC is combined with CGK.

1

The actuation time, is something that could be achieved by routine workshop experimentation by a PSA. The bespoke activation time taught in DC, in relation to a separate embodiment but on the same page. Thus there is a motivation for PSA, looking at DC try workshop improvements to achieve slightly better activation times using CH and DMF. The times disclosed in DA should be achievable by routine experimentation  $\nabla$  DA also gives CH and DMF as potential liquids.

1

$\therefore$  C1 not inventive over DC + CGK.

**C2** The features dependent to C1 will not be inventive.

The inventive concept is that 1<sup>st</sup> species is fluid and second is a liquid. This is disclosed in DC – see novelty analysis. Thus obvious for PSA to arrive at, combining DC + CGK

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$\therefore$  C2 not inventive.

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Examiner's<br>use only |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <p><b>C3</b> Dependent features will not be inventive.</p> <p>The inventive concept seems to be 1<sup>st</sup> and 2<sup>nd</sup> species being immiscible liquids.</p> <p>This is not taught in the available prior art. The advantage is that they tune the operating temperature and actuation time, thus activates quickly (P7, L5-7)</p> <p>There are no pointers to the PSA to make workshop improvements on homogeneity / or not of the liquids to achieve in a better activation time</p> <p>∴ C3 inventive.</p> | 1                      |
| <p><b>C4</b> inventive as dependent on C3.</p> <p>∴ inventive</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                      |
| <p><b>C5</b> it would be obvious for PSA to turn the bulb in DC the other way around – routine workshop improvement.</p> <p>∴ not inventive</p>                                                                                                                                                                                                                                                                                                                                                                          |                        |
| <p><b>C6</b> taught in Mark 1 DC, obvious</p> <p>∴ not inventive.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1                      |

**MARKS AWARDED 10.5**

Sufficiency

- Need to mention strength of bulb in the claims. Required, see P3, L22-23.  
P5, L11-12

**MARKS AWARDED 1**

Amendment

- Could amend C1 to include P6, L21-25.

**MARKS AWARDED 0**

Advice

- Patent granted

- Renewal fee due March 2016. Check if paid.

If not paid, 6m grace period is passed on end of September.

3<sup>rd</sup> parties can use between the end of grace period – until you pay and it is declared.

If not paid, need to show a reason as to why.

- thus may or may not be enforceable.

- Bulb-US offers to dispose of the SP and SL.  
Assume they make, keep as well (not launched)

Potential clients will use the SP and SL.

SL and SP when sold with sprinkler, seems to fall under the scope of C1.

SL & SP when used by a potential customer falls under C2, C3, C4.

Bulb-US – knows about the patent, aware that SL & SP is suitable to put the invention into effect.

- SL & SP relate to the essential element of invention
- Bulb-US & potential customers are in the UK.
- SL & SP are not staple products
- Bulb-US induces infringement by supplying sprinklers.
- Customers of Bulb-US not authorized by you

→ Thus Bulbs-US indirectly infringes C1.

Potential customers will directly infringe as they will use the whole sprinkler, C2-C3-C4.

Claims 1, 2, 5, 6 not valid as lacking inventive step.

Could amend claims as proposed, check if DB still falls under could fall as it is a fast acting glass bulb.

- Check the assignments. Is there any other agreement to let Bulb-US

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**MARKS AWARDED 2**



# Claims

1. <sup>1.1</sup> A sprinkler for automatically expelling a fire extinguishing fluid, <sup>1.2</sup> the sprinkler attachment to surface comprising a frame and a thermally responsive member, <sup>1.3</sup> the frame having an opening which is connectable to a source of fire extinguishing fluid and a valve closing the opening, <sup>1.4</sup> the thermally responsive member being held by the frame to bear against the valve and containing a first and a second fluid that when exposed to heat, at least one <sup>1.5</sup> of the species will expand to break the thermally responsive member to actuate the valve and allow fire extinguishing fluid to flow, <sup>1.6</sup> the actuation time being less than 12 s at 75 °C and less than 7 s at 120 °C. 1
2. A sprinkler according to Claim 1, wherein the first species is a fluid and the second species is a liquid. 1
3. A sprinkler according to Claim 2, wherein the first species and third species are immiscible liquids. antecedent
4. A sprinkler according to Claim 3, wherein the first liquid has a boiling point and density less than the second liquid. water
5. A sprinkler according to Claim 1, wherein the thermally responsive member is a glass bulb with an upper pointed end and a lower rounded end, the upper pointed end being for accommodating an air bubble.
6. A sprinkler according to Claim 5, wherein the glass bulb has a wall between the two ends, which wall is thinner than the lower rounded end.