

Almost non-cut & irritation-free shaving razor



The above 'innovation in progress' is inspired by Function-Cost-Analysis which is a corollary of Value-Analysis Methodology created by iconic GE design engineer, Lawrence D. Miles in 1948.

Main Inventive Step



From Mono-System (Mach 1)

to

Bi-System (Mach 2)

to

Poly-System (Mach 3 – 4)

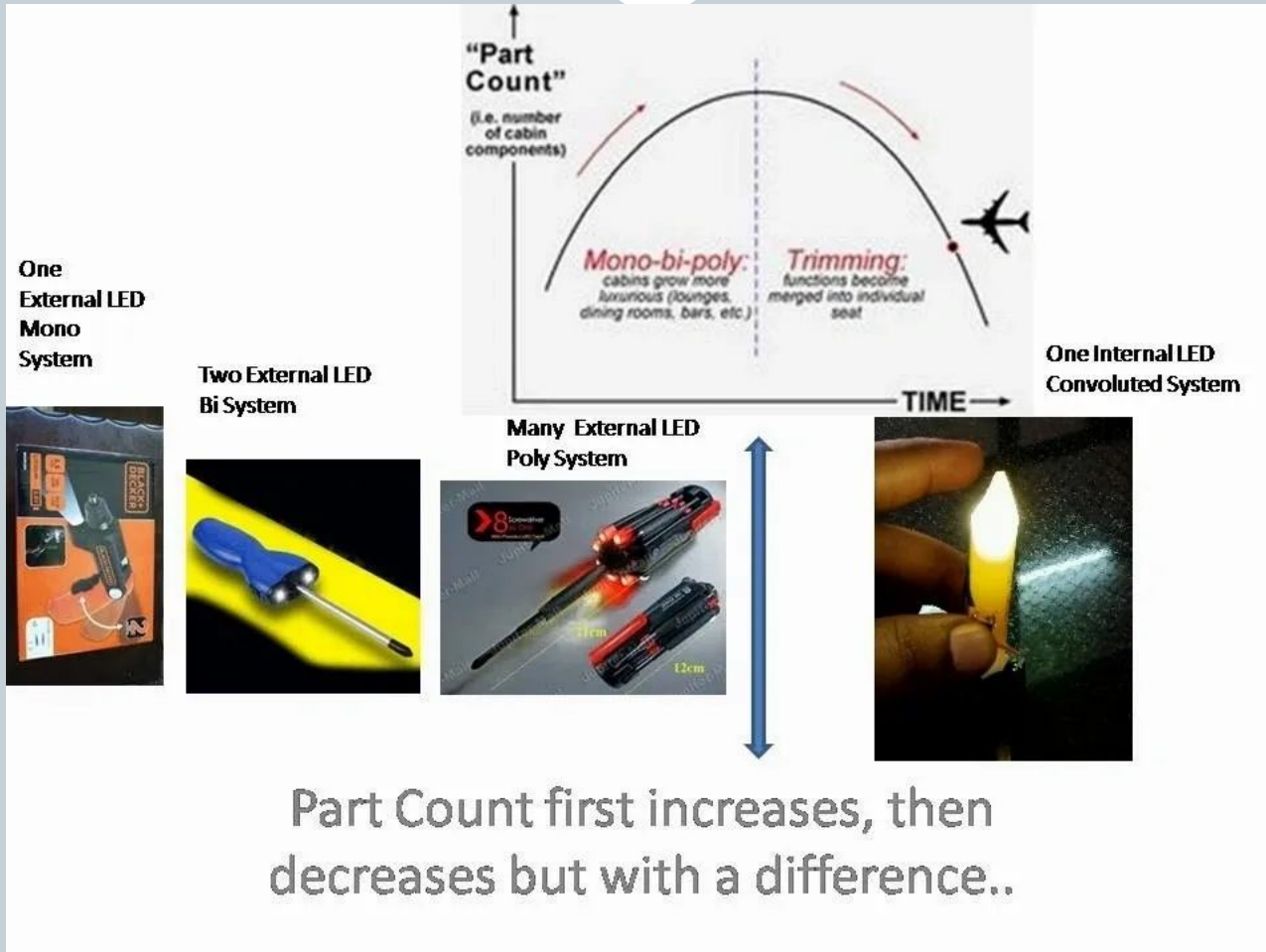
to

New Mono-System (Novel Mach 1 !)

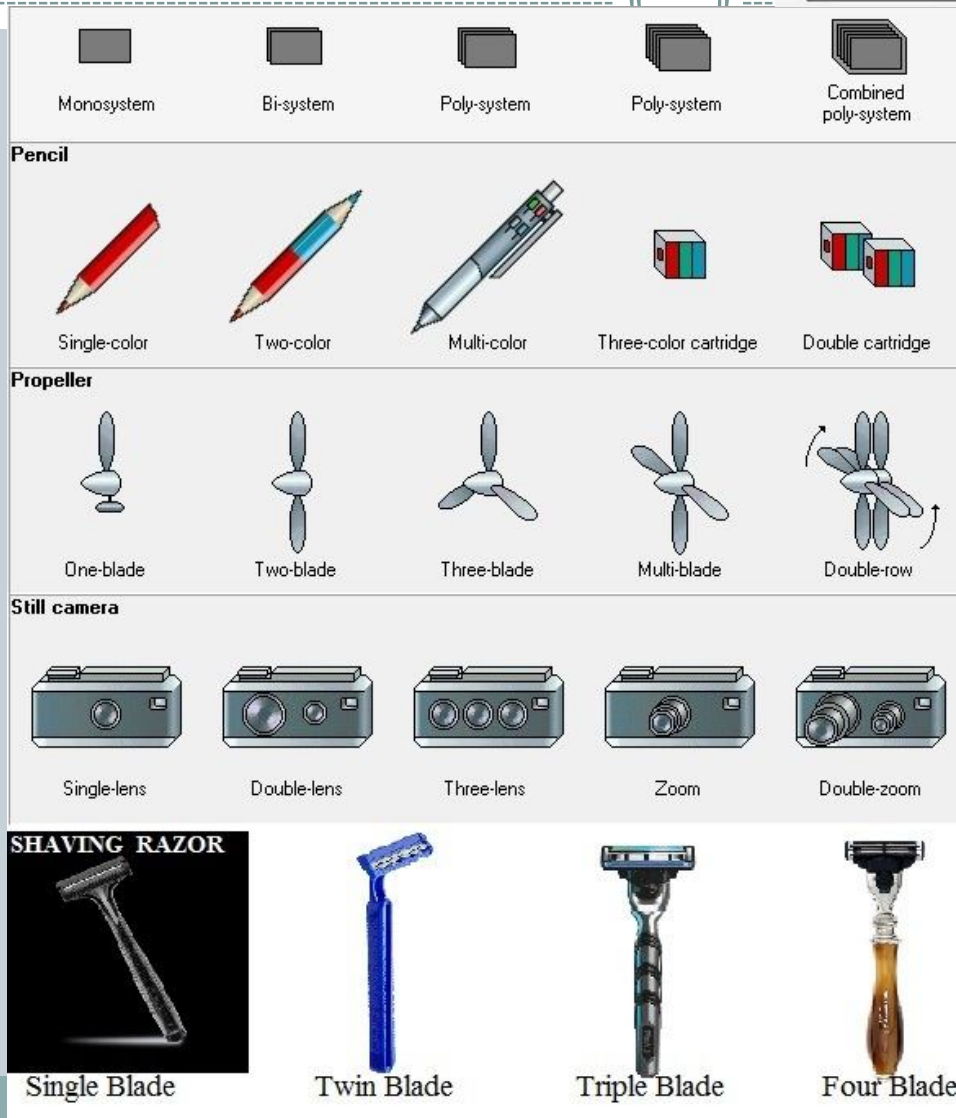
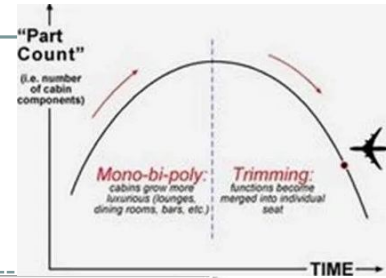
Mono-systems turn into the bi and poly-systems, number of objects in the poly-system increases. Further poly-systems form new mono-systems at a higher level.

In English there is an idiom: back to square one. Here it is back to square one squared (appears same but we have advanced much). So the present invention of single blade razor (it is segmented – in two halves but is single) may apparently appear as age-old single blade razor of 1940's - 50's but in reality it outperforms Mach 3 or Mach 4.

From Mono to Bi to Poly to New Mono



Shaving Razor Evolution



⇒ Convolved Mono-System that exceeds Combined Poly-system

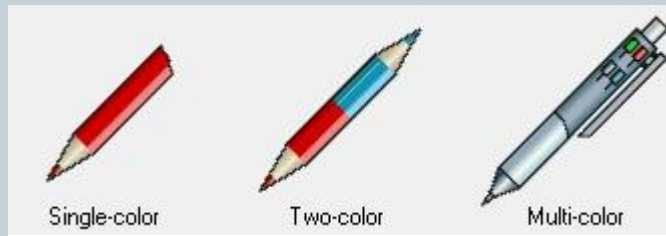
⇒ Single Cartridge that writes Multiple Colors

⇒ Single Blade Propeller that exceeds Double-row multi-blade propeller

⇒ Single lens that exceeds double-zoom lens

⇒ Single blade razor that exceeds four blade razor

Case study: Pencil



Awaited!

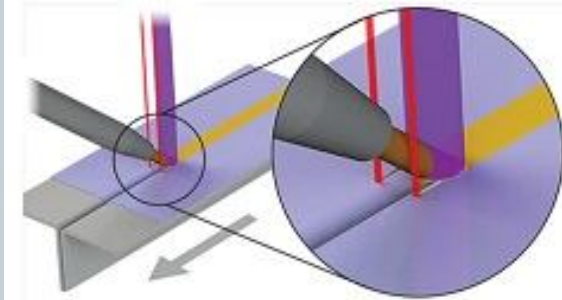
- Mono-system: A standard pencil has one lead. The pencil makes a trace of only one color
- Bi-system: A two-color pencil combines two pencils. Contrasting colors may be drawn with such a pencil.
- Poly-system: A multi-color mechanical pencil has several leads in one case. Thus, several different colors may be used.
- *Next invention on a pencil with single lead that can write all colors is awaited!*

Case Study: Anchor



Ancient anchor was a hook with one fluke. Then anchors with two flukes and poly-flukes appeared. A drawing-pin (thumbtack) with one spike is simple system. But bi-thumbtack (two spikes) and poly-thumbtack (three spikes) were invented. What came next? A mono-system made at a higher level. One fluke-anchor does better than 10-fluke anchor. It (anchor) is made in the form of a metal plate with the refrigerating unit. At the weight in 1 ton and capacity of the-refrigerator- 50 kilowatts the restraining force reaches 200 tons in 1 minute and in 10-15 minutes 1000 tons!

Case Study: Laser Welding

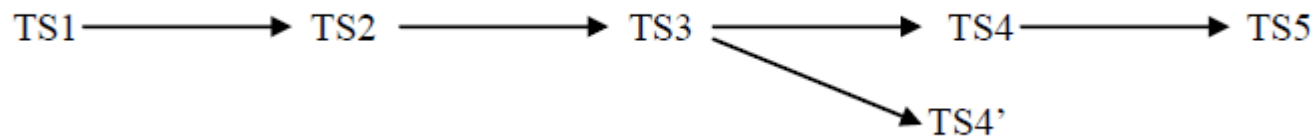


We have seen that for the stability of the capillary (keyhole) during the welding of aluminum alloys, it is necessary to use two (bi-system) or more (poly-system) laser beams. Can this stability be achieved by a single laser beam (new mono-system) if it is coordinated with substance being welded? It has been shown that the use of one single laser beam stabilizes keyhole if the beam is pulsed with some definite frequency, and with time gaps in some multiple of wave period. If these parameters are coordinated with time-driven functions of the keyhole physical phenomena, optimized result is obtained. New properties: better keyhole stability, and consequently less porosity and explosions (blowholes). Industrial applications confirm these results.

Case Study (Long): Refractometer *can be ignored if in hurry*

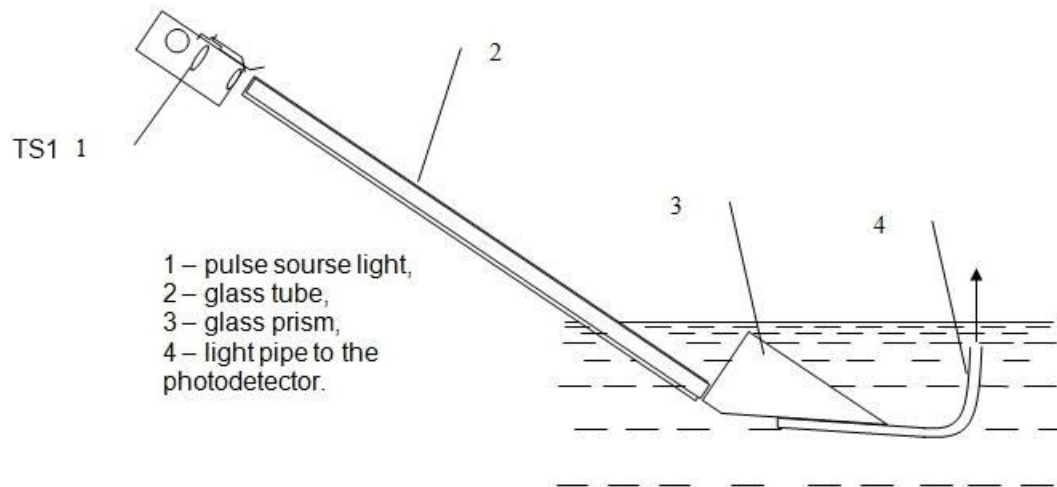


Refractometer is a device to measure value of light refraction in a transparent or translucent medium (substance) and hence deduce the refractive index of that medium. Why is this measurement so important? Any change in value of index corresponds to changes in several physical-chemical properties of the substance. Hence accurate measurement of this index is important in controlled processes.



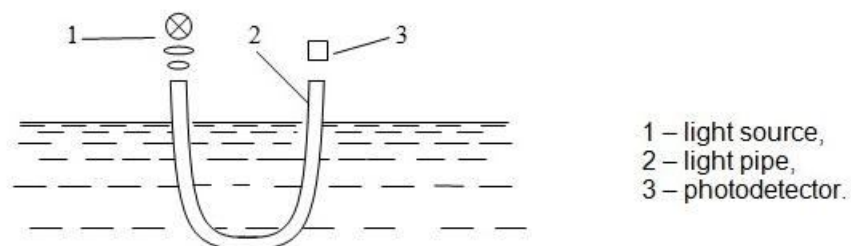


TS1 represents refractometer in its simplest form. Mechanism of measurement used is unchanged since ancient times: one makes a prism of a substance if substance is solid or pours it into the glass prism if substance is liquid and passes a light ray through it. The ray declines. This declination is recorded and a concrete optical property called refractive index is defined. Refractometers can measure tightness and concentration of solutions, pulps, and suspensions; hence their use to control processes in tinned, sugar, alcohol and other industries. In aviation, refractometers can sensitively determine and control contamination of water in fuel while it is stored in tanks.



Refractometer is immersed into the solution to measure density. Light current changes through the prism depending on liquid density.

TS2 2) Czech patent 124740

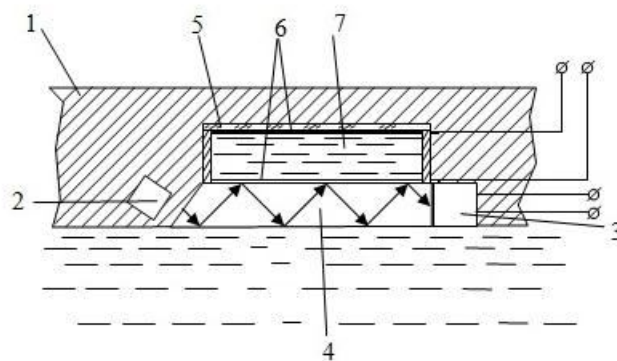




- **TS2:** TS1 appears as highly 'expanded state'*. So system begins its evolution wave with convolution. Prism is absorbed by light conductor. Or otherwise: light conductor, which earlier only conducted light, now fulfils prism function. Whatever view is selected, two components blend into one. Light conductor of approximately U-shape is immersed into liquid. Light is sent from light source at one end. It is received by a photo-detector at opposite end. Percentage of light energy which is successfully transferred depends on refractive index of medium. Where is remaining energy lost? Part of it is lost to medium, part of it is absorbed. Disadvantage: change of liquid level causes light current to change.
- **TS3:** NO FIGURE: Light conductor is enclosed in safe covering with only the lower (measuring) part uncovered. TS2 expands to TS3. Still, few disadvantages remain: exactness of measurement depends on diameter of optical fiber & in the areas of light conductor bending there are substantial light losses. TS3 evolves either to TS4 or TS4'. While TS4 can be considered as next step to TS3, TS4' is a branch line end product for specialized applications like airplanes.



4) Patent 840711: TS4'



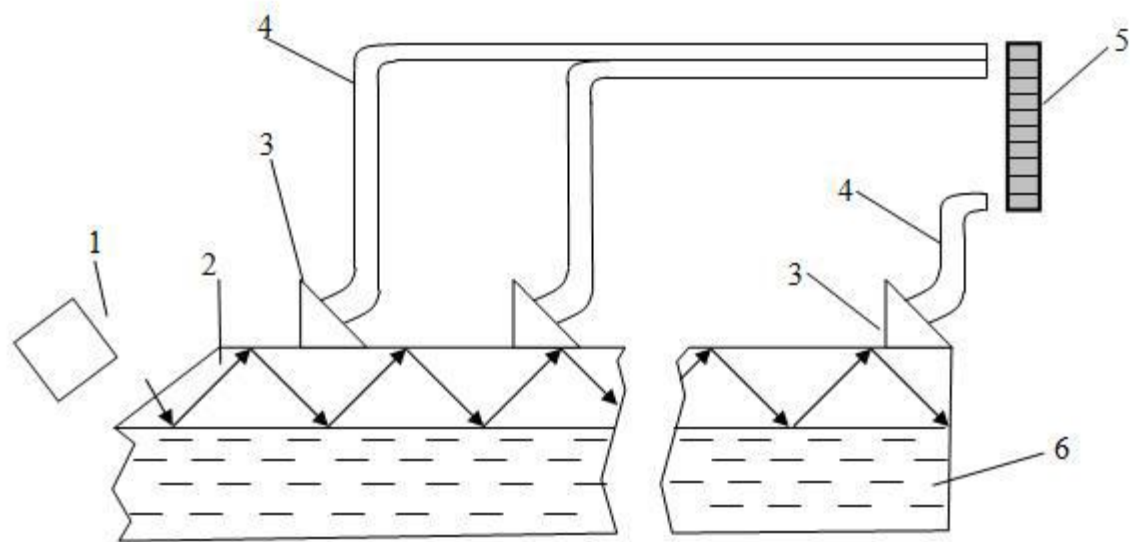
1- wall of the fuel tank of the plane, 2- source of light, 3- light receiver, 4- parallel-sided plate (light conductor), 5- glass lid, 6- transparent electrodes dusted on the glass, 7- electrooptical material (liquid crystal).



TS4': This is a severe case of expansion again but should not be so annoying if huge gain of MUF (Most Useful Functions) in terms of increased sensitivity is accounted. Refractive index of fuel in tank (1) of airplane is to be measured. Light conductor is made in the form of plate. Light travels from source at one end to receiver at other end via a highly efficient (up to 100%) mechanism of total interior reflection. Electro-optical material changes the value of refraction under the influence of electric field. Receiver transforms light into electric current. Block of control directs the current to electrodes of liquid crystal and changes the refraction in it – till it is equal with that in liquid. Exactness – on hundredth and thousandth part of coefficient of refraction can be achieved. The disadvantage: instability of device characteristics when subjected to exterior influences like temperature variations, electro-magnetic irradiation.



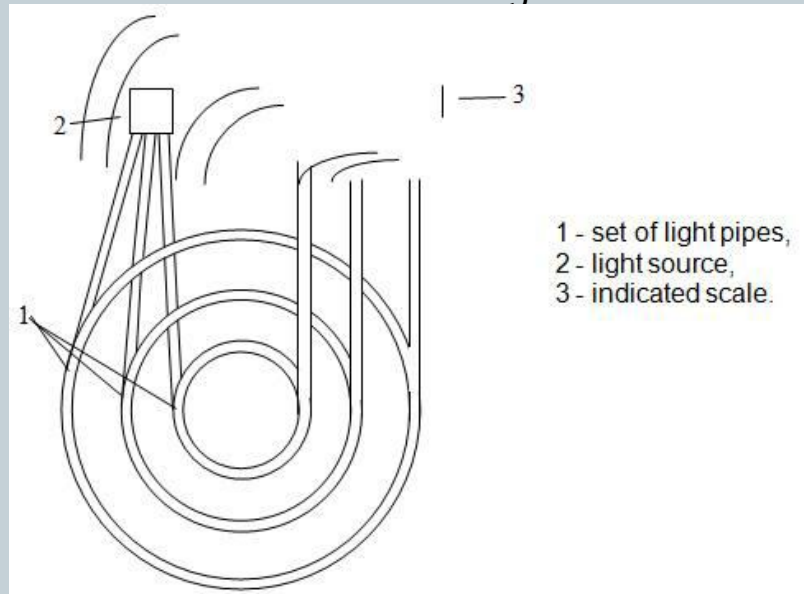
TS4: Poly-system with biased characteristics: case of partial Convolution: There is only one source of light and multiple light conductors. Refractive index of liquid (6) has to be measured. Main light conductor has a linearly descending refractive index along its length. Series of output prisms with light conductors are installed along main light conductor at intervals of 5mm. Light spreads from the source along the plain light conductor in the form of successive complete interior reflections. Through the output prisms and light conductors, light comes to the indicator scale. Refractive index can be higher, equal and lower at different sites of the plain light conductor. At site where the value of refractive index of light conductor is lower than that of liquid, light moves into liquid and indicator scale is dark there. Location of border of light and shade on the scale defines refractive index of liquid. Exactness of measurement is one degree higher than best refractometers. Added advantage: protection against electromagnetic radiation as well as thermal compensation isn't required.



- 1 - source light,
- 2 - flat light pipe,
- 3 - prism for output of radiation,
- 4 - light pipe,
- 5 - indicated scale (flanks of light pipe),
- 6 - controlled liquid.



- **TS5:** Poly-system turned into new poly-system with more idealization (akin to a new mono-system): high level of convolution. Operating principle: for every liquid there exists, radius of bending of light conductor at which, condition of complete interior reflection in the light conductor is broken. Ends of the light conductors with radius of bending lower than this critical radius won't shine while ends of the light conductor of a bigger radius will shine. Ends of the light conductors make an indicator scale. In this highly convoluted poly-system with biased characteristics (new mono-system), we have **one light source is left** and a beam of differed light conductors.



Technical Contradictions in Existing Designs and their resolution/relaxation

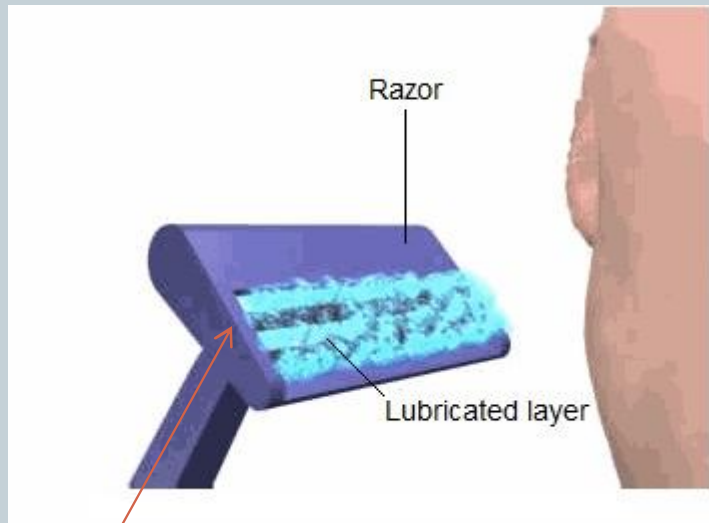


1st

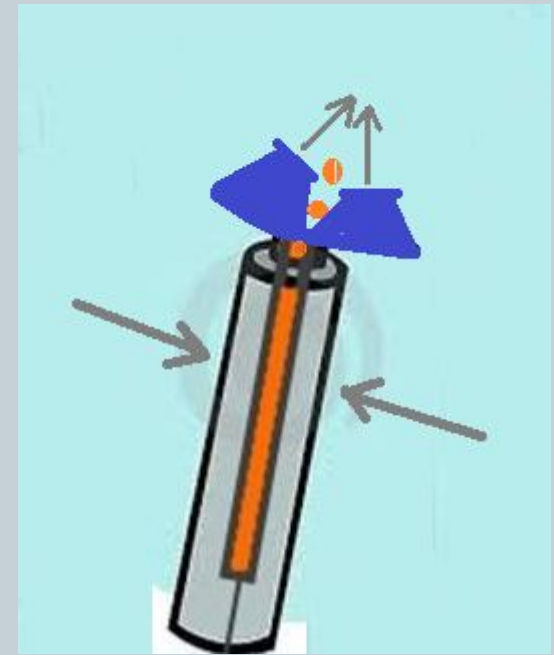
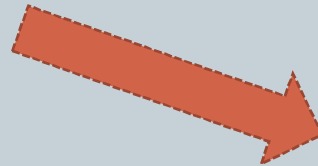
- If hot water is used in shaving, process is comfortable but it is bad for clotting blood-cuts if any.
- If cold water is used in shaving, process is uncomfortable but it is good for clotting blood-cuts if any.

Resolution in our design: While hot water makes a comfortable shave, cold water splashed after shave clots blood and moisturizes skin. This razor shaves with a little heated shaving oil and soothes skin immediately thereafter by cold water soaked (wet) tissue. Eatable Glucose powder can be added to cold water optionally to further lower its temperature (Glucose dissolution is an endothermic reaction).

Three in Series to Two in Parallel (reason in next slide)



Contemporary Razor :
Poly-System (Three Blades in Series)



Invention: Single blade (segmented into two but in parallel). Both segments are **individually withdrawable** to bypass acne or mole. Squeezing or jerking disperses shaving oil and blades move through it over skin

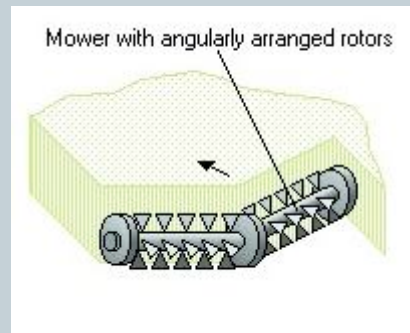
Reason for Two in Parallel: Technical Contradiction Resolved



- If full (normal) length blade(s) are used, shaving is faster but there is danger of moles or acne being cut.
- If shorter (lower than normal) length blade(s) are used, shaving is slower but there is no danger of moles or acne being cut.

Resolution in our design: Full length blade(s) cut across their entire length just like a wide grass mower without caring for moles or acne, though shaving is quicker. Shorter length blade(s) would be caring about moles or acne but then shaving time is impatiently high. This razor has transversely segmented and dynamic blades; when skin is clear ahead, all segments (narrow blades) function together, but when a mole or acne is en route, the corresponding segment (narrow blade) is lifted to bypass mole safely.

Reason for Two in Parallel: Technical Contradiction Resolved



Inspiration taken from Application Of France 2,706,786 of a grass mower. We can imagine rotors to be blades and grass to be hair. In my invention, either left or right or both will work depending on requirement.

Transparent Shave over Opaque Shave: Another Technical Contradiction Resolved



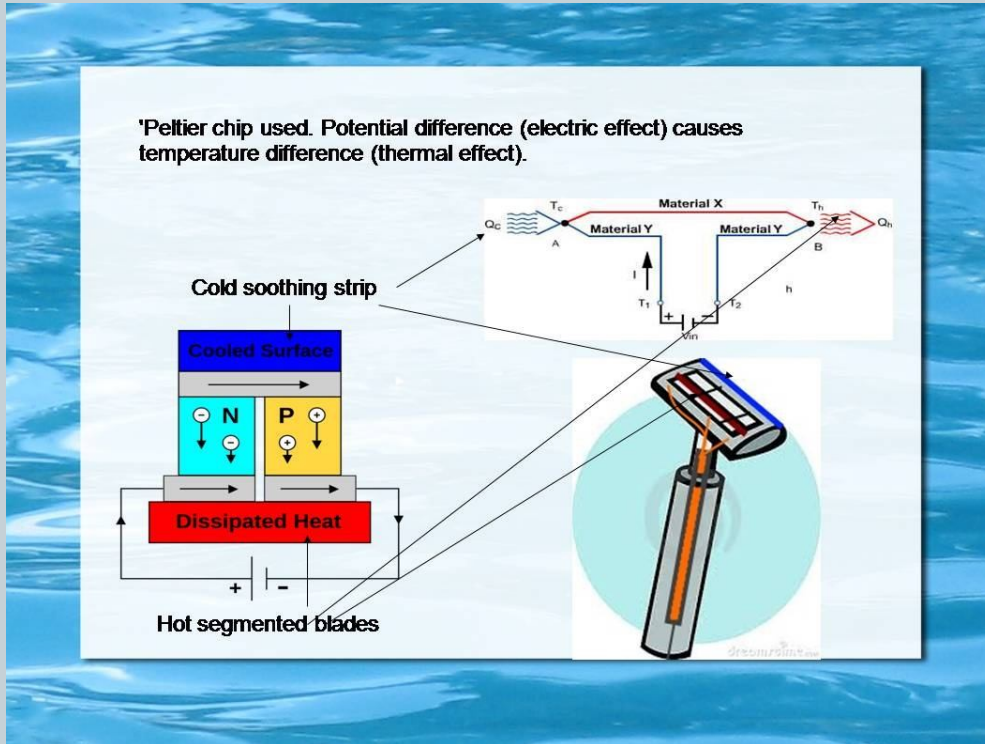
- If standard shaving foam (opaque) is used to shave, shaving is smoother but cuts are seen post bleeding (cuts can be more)
- If water (transparent) is used to shave, shaving is slower but harsher but cuts are seen before or during bleeding (cuts can be less)

Resolution in our design: Transparent natural shaving oil used in this razor avoids most cuts simply because viewing is possible. It gives lubrication of foam & transparency of water. It is superior to conventionally used opaque shaving foam wherein cut is discovered after it has happened. The shaving oil used in this razor also serves as after-shave balm. This saves time and skin needn't go through oiling followed by washing followed by post-shave wiping.

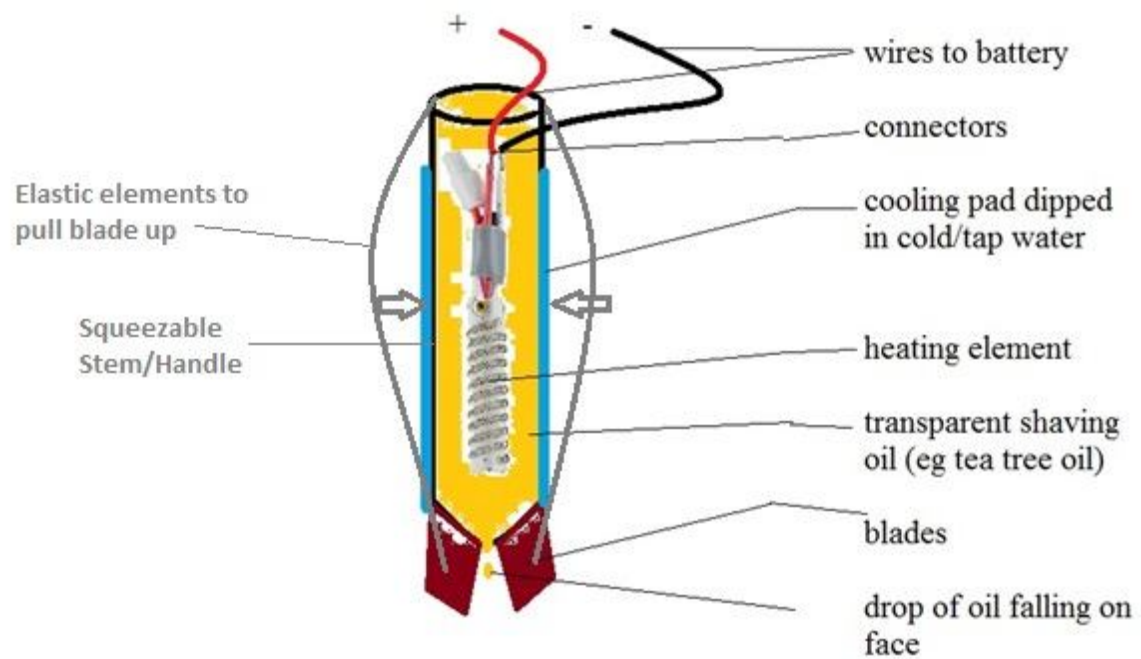
Our first prototype



It used Peltier chip powered by 12 V battery to generate heat and cold. It had a nanoLED too.



MVP-Version2





MVP-Version2

PLUSES!

Σ MUF or Most Useful Function(s)

1. Shaving with minimal irritation
2. Shaving with low probability of cuts, even on moles and acne
3. Shaving with all natural ingredients
4. Shaving with transparent oil, hence with high visibility
5. Shaving with no after-shave lotion required

MINUSES!

Σ MDE or Mass, Dimensions, Energy Consumed

1. Mass – less than 3 ounces
2. Dimensions – approx cylinder: length 6", dia 1"
3. Energy consumed – 4.5W

MVP-Version3



MVP-Version3 – Interchangeable Blades

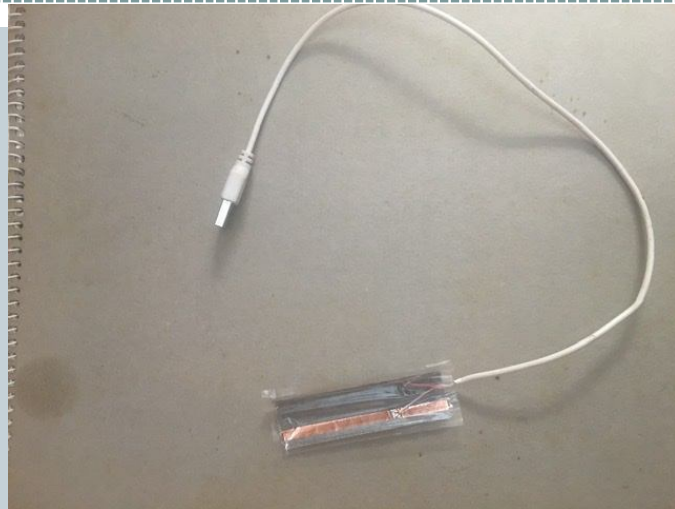


Standard Blade for faster shave

Shorter Blade for bypassing moles, acne



Assembly of MVP Version3

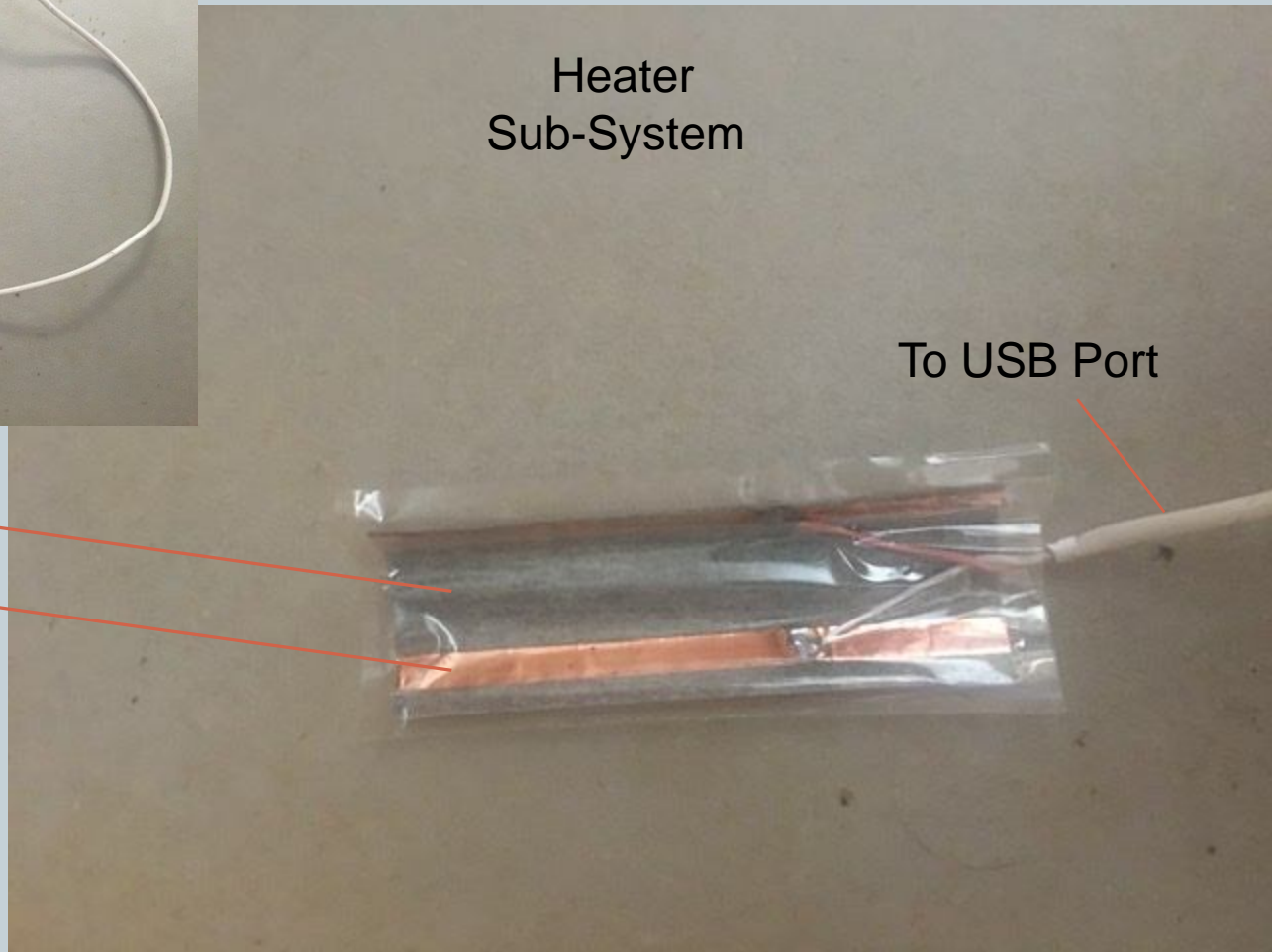


Heater
Sub-System

To USB Port

Mica

Resistor Element



All* Sub-Systems 'Connected'



*Cooling and Soothing Sub-System NOT shown here

The Set-up



Dummy Face

Tap Water

Glucose salt

Tea-Tree Oil+

Razor

Charger

The Process..



Filling Oil

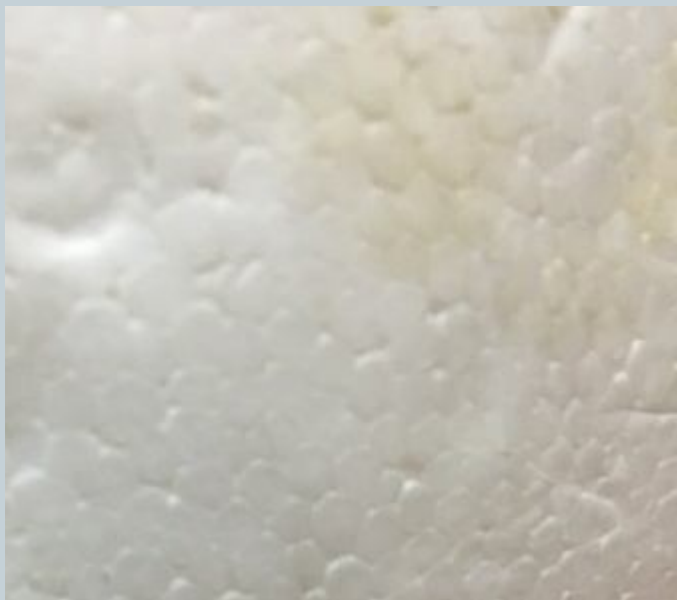
Electrically Heating Oil



The Process.....



Spraying Oil



SHAVING

The Process...



Adding Glucose to Water



Wetting Wipe in Solution

The Process...Ended!



Wiping Cool
Tissue Paper
(Cloth here) on
Shaved Skin...