

Another look at evacuated tube cookers

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SLiCK
www.slicksolarstove.com

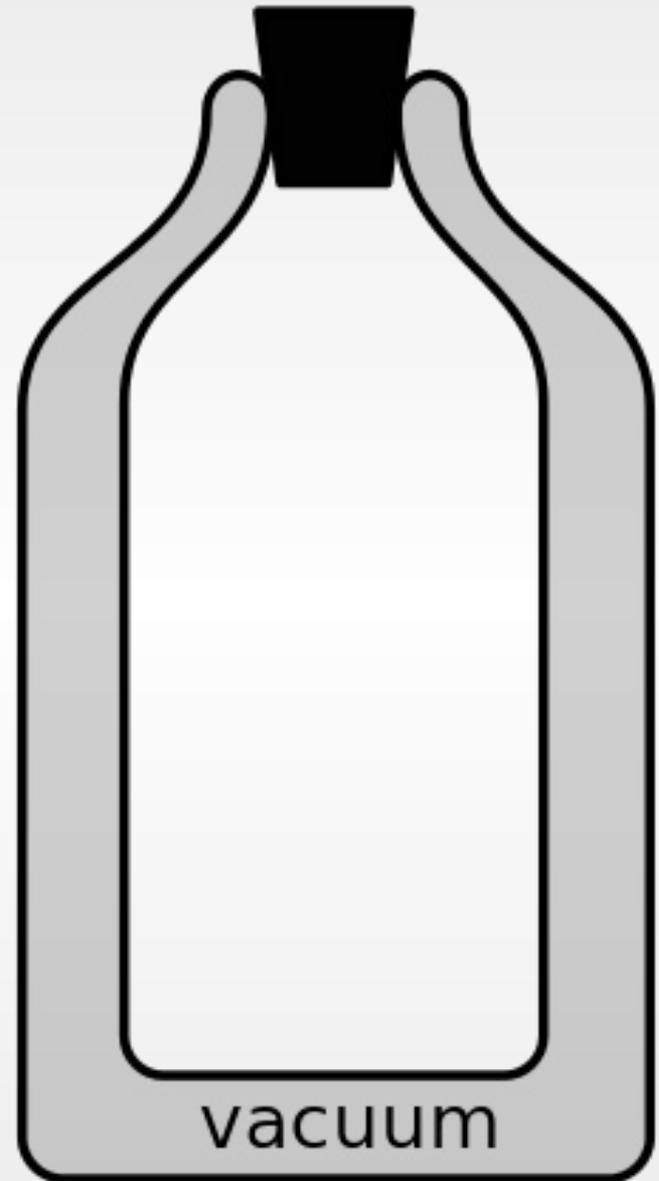


● **Dewar flask,**
invented in 1892

No convection
losses

Very small
conduction losses

Diagram: Wikipedia



In 1904, the
Thermos company
was formed.

They produce the
flasks that are
familiar today

Picture: Thermos website



Mr. C. G. Abbot,
secretary of the
Smithsonian Institute
1939

Inner and outer tubes
with vacuum between
them

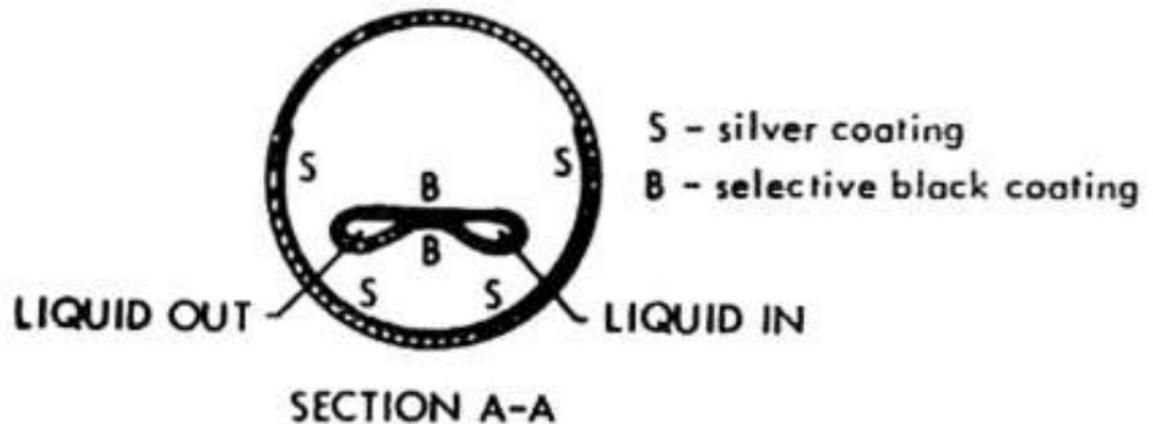
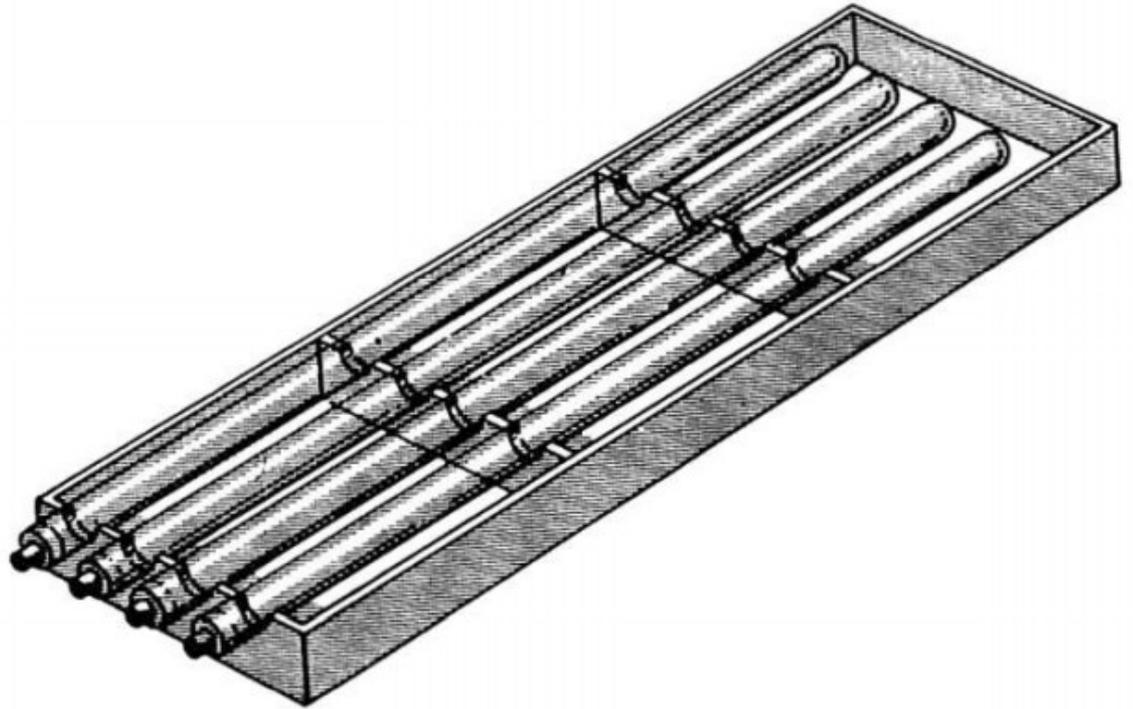
Black liquid moves
between inner tube and
oven



1. TOY SOLAR COOKER

E. Speyer,
1959

Pipe with
selective black
surface inside
an evacuated
tube



Picture: Bernie Mueller



Cu

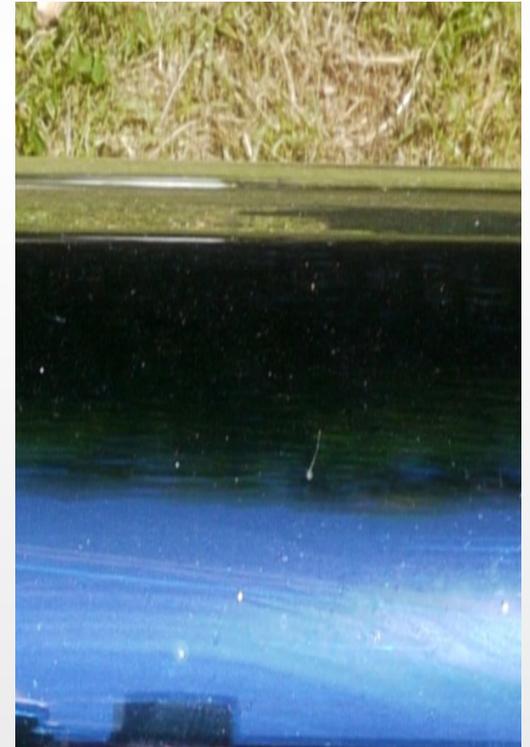
AlN



A selective
surface:

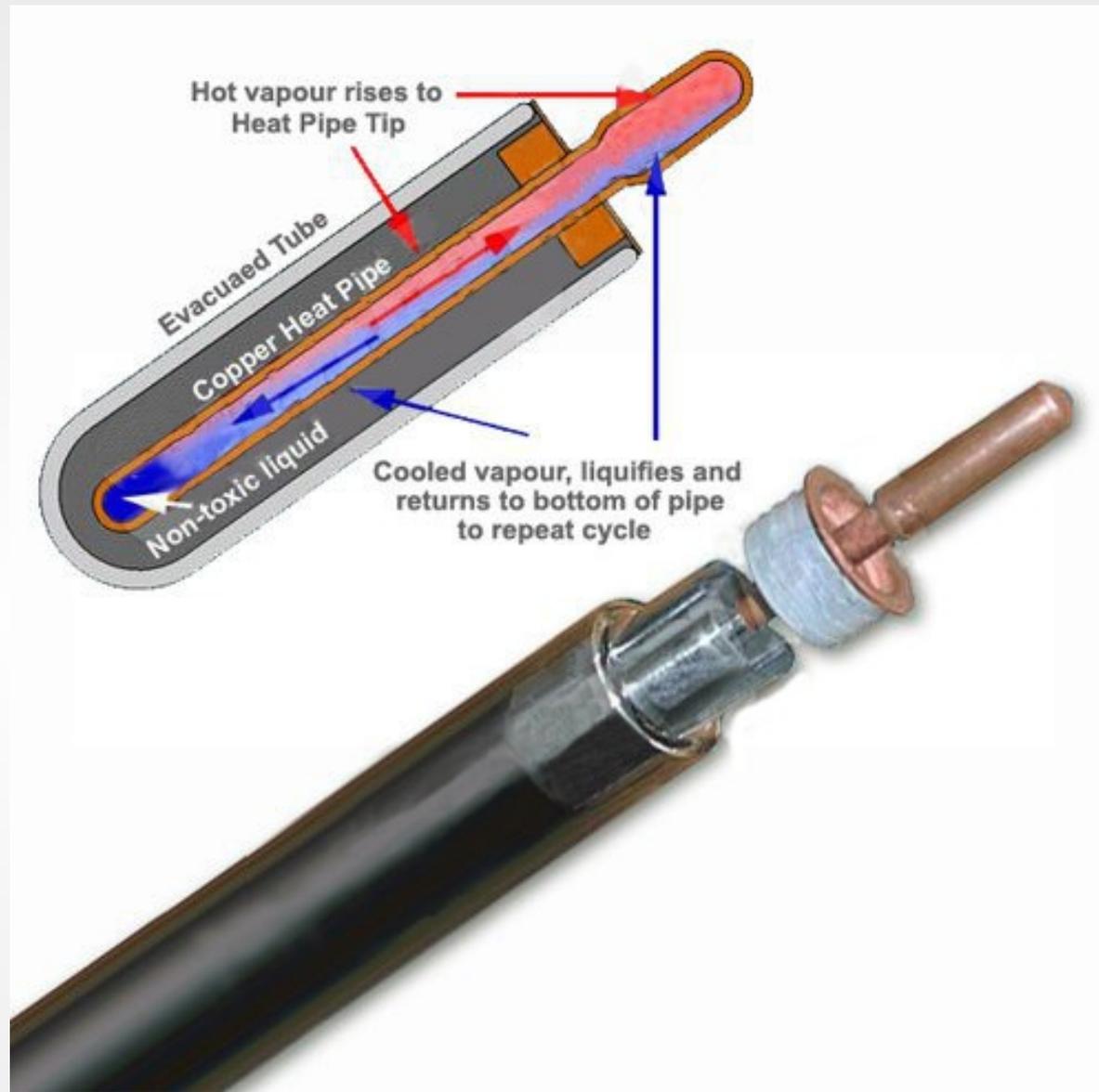
Absorbs
~93%

Emits
~6%



Evacuated tubes for domestic hot water

Heat is transferred from inside the tube to the copper rod at the top



Roof mounted solar hot water collector



Chinese manufacturers, like Hi-MIN, have highly mechanised production lines

In 2009, China produced more than **8 SQUARE KILOMETRES** of these tubes

So, they should be cheap.

Solar vacuum tube—Himin tube factory for solar system



Solar water heater vacuum tube manufacturing



In 2006, Alex Kee suggested using these tubes to pasteurise water

**Picture: Alex Kee Koo Yak (2006)
'The Solar Kettle-Thermos Flask:
A cost effective, sustainable, &
renewable water pasteurization
system for the developing world'
Paper presented to SCI world
conference, Granada, Spain.**



In the same 2006 paper, Alex Kee suggested these tubes could also be used as ovens, for cooking ...

Picture: Alex Kee Koo Yak (2006) 'The Solar Kettle-Thermos Flask: A cost effective, sustainable, & renewable water pasteurization system for the developing world' Paper presented to SCI world conference, Granada, Spain.



**SK-TF Oven Baked
"Strip Pizza"**



By 2014, small evacuated tube cookers on the market, and larger diameter 'Rand' tubes



Rand cooking tube

10 cm internal diameter

No reflector fitted

Same tube with
8-sun reflector

Cooks 500g loaf of
bread at 200C in 35
minutes, even in the
winter

at 50 degrees North

Why hasn't
everybody got one?



Why hasn't everybody got one?

1

Who knows about them?



We display solar cookers at festivals



We have talked to hundreds of people

And we have
solar cooked in
public

..... So,
what have we
learned?



In the UK, our experience is:

- 1. Most people have never heard of solar cookers**
- 2. Even if they know about them, they don't believe they work in the UK**

Why hasn't everybody got one?

2

Glass fear?



Some breakages occur in transit



Our first tube failure – in public



Frozen food leads to thermal shock breakage



This cooking competition contestant learned about thermal shock the hard way



A crack can develop in the glass, then propogate, until



... the next morning, underneath the wall mount

Why hasn't everybody got one?

3

Financial risk?



Is there a market? In 2015, SliCK imported 100 SM70 tube cookers from China – and only sold 25% of them in the UK



The market for large diameter tubes is small. These cost \$28-50. Long, thin ones cost \$2-3

Why hasn't everybody got one?

4

Current market prices?



'Sun Bun'
Bozina
Komatina
Montenegro



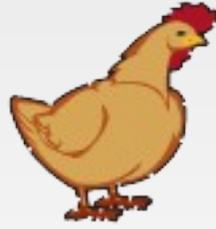
'Tilty'
Dave
Oxford
UK



Gosun 'Sizzle'
Glen MacGillivray
Canada

£570
€660
\$800

**Cost may
be important**



A chicken and egg problem

Low demand, so low production

Low production, so high prices

High prices, so low demand

Solutions ?

1. Raise awareness

(Youtube videos, demonstrations, etc.)

2. Standard tube size

(like light-bulbs, batteries, etc.)

3. Purchasing consortium

(to bulk purchase, ensure supply)