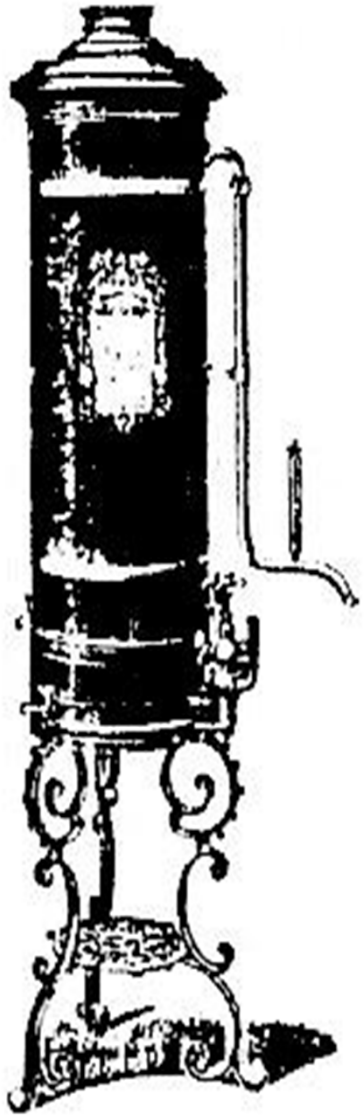
Water Heating: Nuts and Bolts of New Technologies

(along with ramblings and musings on where we came from, where we're going and how it all might fit together)



two condensing heaters, new and old

94 to 96% efficient
2011

About 90% efficient
3 moving parts
1895

I collect old water heaters

We can learn from them things about:

- Equipment longevity
- Simplicity of design
- Using natural (durable) forces
- Low energy usage

Old heaters offer up lots of ideas for us to pick from

Likewise:

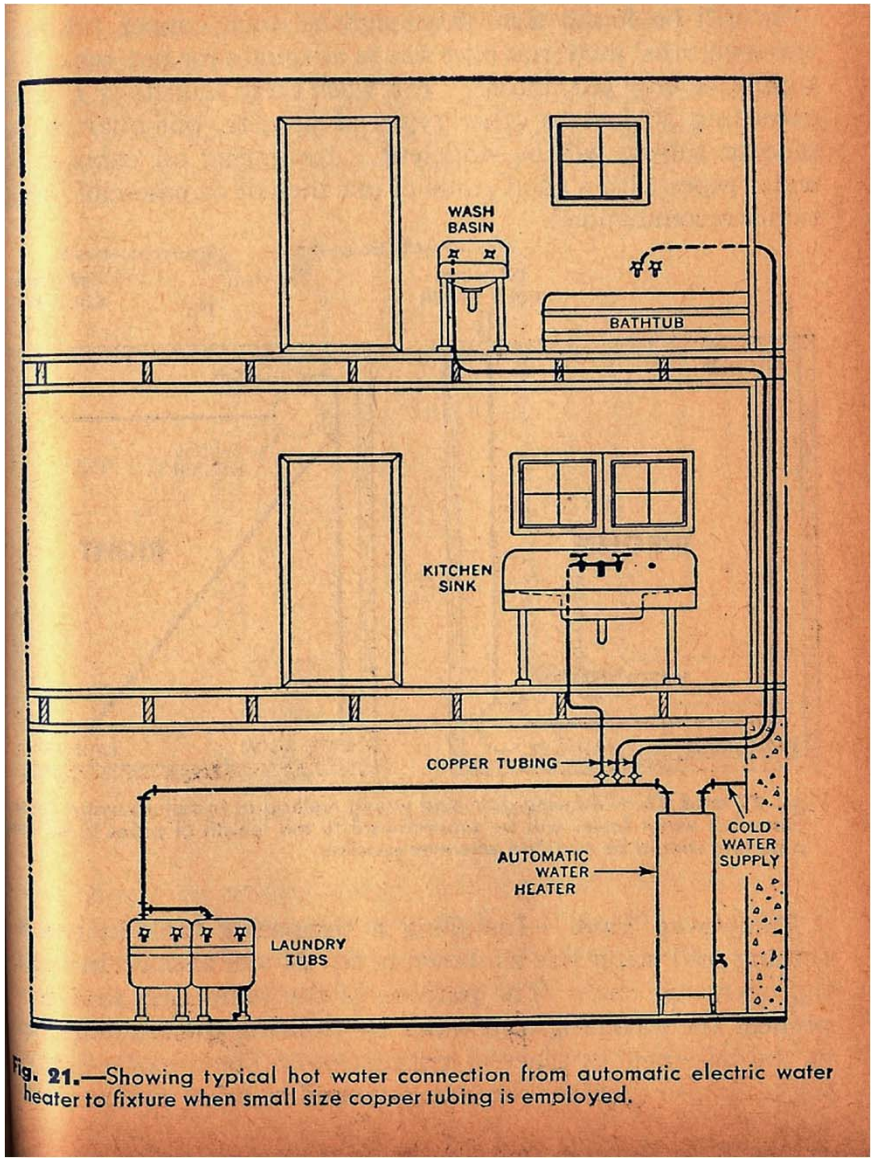


Fig. 21.—Showing typical hot water connection from automatic electric water heater to fixture when small size copper tubing is employed.

From 1960, we have

very efficient plumbing,

using 3/8” or 1/4” tube.

From Audel's “Domestic Water Supply”

And then...

We have other technologies like drain water heat recovery, tempering tanks and solar to reduce loads.

After...

You've gathered the low hanging fruit:

- Efficient (low volume) distribution
- efficient fixtures
- low grade BTUs
- keeping the heat where you want it

...then look at the heat maker

Two “new” technologies

- Heat pump

- Condensing gas

Who makes the new heat pumps?

Manufacturer	Sizes (in gallons)
AO Smith*	60 & 80
AirGenerate	50 &66
GE	50
HTP	40 & 50
Rheem*	65
Steibel Eltron	50
USI Green Energy	80

* Also produce units under other brand names

Courtesy of Chris Gray, Southern Company

Heat pump things to remember

- Installation makes or breaks the job
- Multiple modes, each different COP
- Air flow around & through unit
- Filters need cleaning
- Noise is a concern
- Placement (attic, garage, indoors)
- Condensate removal
- Serviceability, machine & installation

What to avoid: Overly dusty conditions

Laundry Room = Dirty Filter

Woodworking Shop = Dirty Filter

Courtesy of Chris Gray
Southern Company

Placement

Attic

Garage

Indoors

Courtesy of Chris Gray, Southern Company

Around the corner?

- Talk of ducted heat pump water heaters. If so, the unit can truly be used for space conditioning (cooling and dehumidification).

- Talk of natural gas powered heat pumps. Imagine heating water for half the cost of gas, (or less)!

Who makes condensing gas heaters?

Manufacturer	Size (gallons / btus)
AO Smith	50 & ? 76 to 100K
American	34 to 50 100 to 199K
Bradford White	60 120K
Grand Hall	6 145 to 199K
Heat Transfer Products	55-119 100 to 199K
Navien	1/2 150 to 199K
Rinnai	--- 199K
Takagi	--- 199K

Note: Things change !

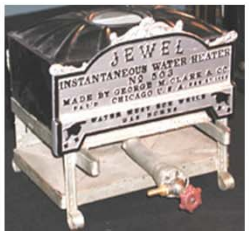
Condensing gas things to remember

- Available in tank or tankless
- Must deal with acidic condensate removal
- Noise (your or your neighbor's ears)
- Needs surge protected power
- Cannot combine venting with other burners
- May need bigger gas supply
- Good to check with combustion analyzer
- Could be source for both water and space heating

And more things...

- Training from manufacturer may be necessary to install equipment
- A list of maintenance items and timing for them might be something you need to assemble
- Keep spare parts in stock if your supplier doesn't *(heaters leak on weekends & holidays)*
- Have a “go to guy” for troubleshooting

Many choices :~)



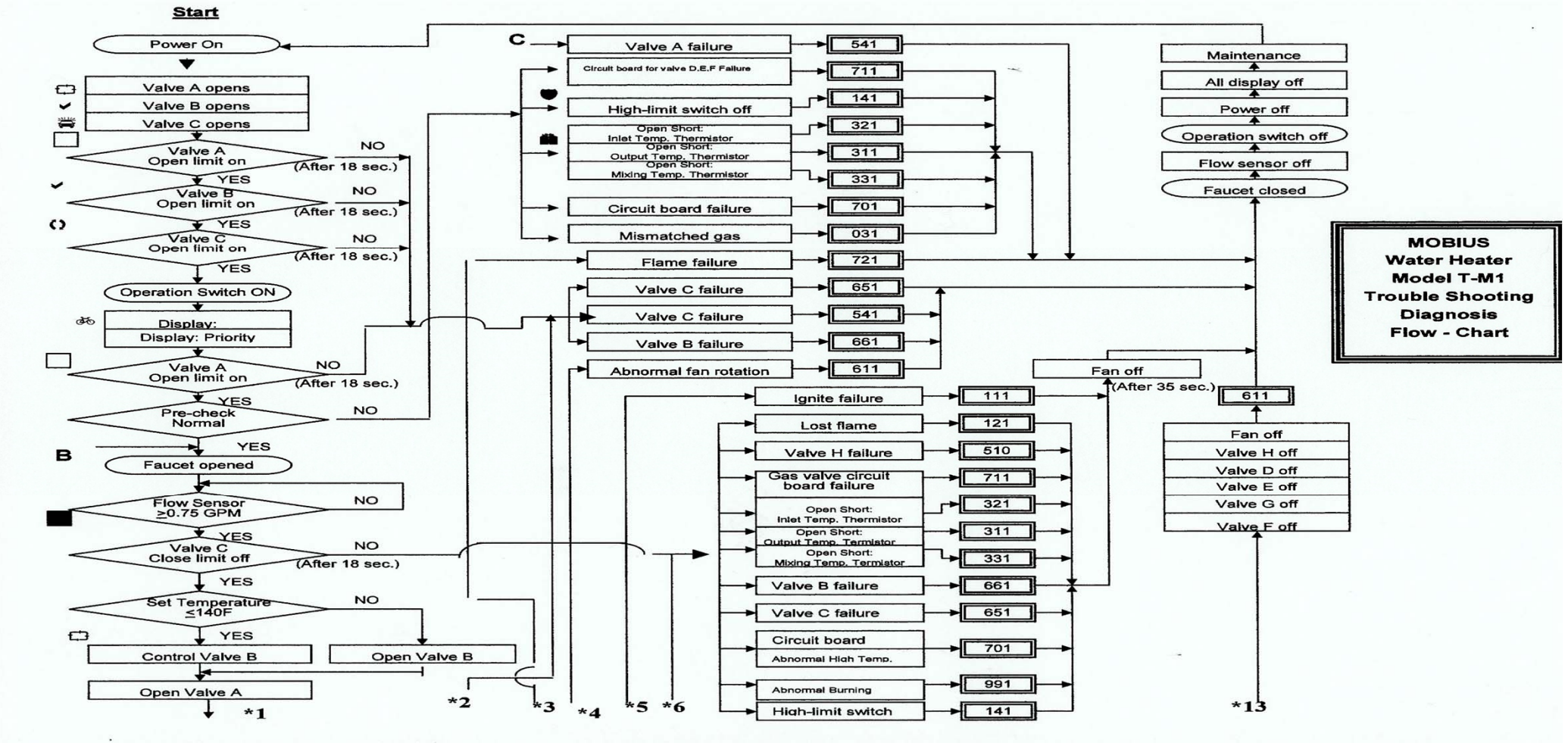
Both technologies

- Is there a good local source of supply?
- Does it meet occupant's needs?
- Who will maintain it?
- Must be installed for easy maintenance!
- How long will it last? (*relates to above*)
- Life cycle cost?

Not install and forget

Complex technologies demand attention.

We get to rethink our relationship with water heating equipment and treat it like boilers or cars.



Benefits other than energy savings?

- Possibility of single heat source in efficient home rather than two systems
- Simplification of mechanicals
- Possibility of reduced cooling loads
- With good system design and integration; better comfort
- Space and dollar savings

Now...

If we can just simplify the equipment so it lasts a very long time with minimal effort!