Cedar Chase – since 1966

Heating System at No.23

Background

In 2016 we refurbished our house completely, stripping walls and ceilings back to bare brick and reconfiguring the house to meet our needs for the next 50 years, it's important to understand that we were also installing new flooring downstairs, and wanting new flooring in the bathroom too. Flooring is key to heating systems, as pipework needs to run through the floors and walls to remain invisible/concealed. With a lot of valuable input from Jane and Andrew at no, we commissioned our heating engineer Pawel Ratajczak, to design and build us a system. Pawel had undertaken similar projects at No.2 and No.10, and went on to do more at ours and No.18 and various houses since. Everyones needs and priorities are different, so it's important to think things through and way up the options before commissioning an installation.

Options to way-up

Loft Space - there is a large cold water tank installed in the loft (usually accessible from a high cupboard door in the bathroom) - this water tank provides the house with a reliable rate of water pressure for showers etc. but it takes up a lot of space, it's at risk of being easily contaminated (it's not a sealed water tank), and is arguably unnecessary. Modern houses tend not to have such tanks, and water pressure and flow rates are meant to be reliable and are guaranteed by the water company (although we have had problems at times with flow rates being lower than the guarantee promises, thankfully the water company investigated and fixed the cause recently) - so we chose to remove this cold water tank completely, and to reclaim a significantly useful area of loft space, boarding out our loft and creating a hatch in the small bedroom with extending ladder to access and use this (essential to us) storage area.

Instant hot water vs stored hot water. You can reclaim a lot of space in the airing cupboard by eliminating the need to have a hot water tank. But this isn't something we wanted to do. We like the fact we can heat water from electricity (we have solar panels and battery storage) which we can utilise to heat the hot water tank. And I know from experience in previous houses that without a hot water tank you can be more susceptible to fluctuations in mains water pressure and flow rates.

Upstairs Bathroom Heating - this room is unheated and can be transformed with underfloor heating and a large towel radiator. Underfloor heating requires the flooring to be removed, insulated and then flexible plastic pipework laid, with a new radiant surface creating a new floor, usually a ceramic tiled floor is preferred. At the same time pipes can be hidden in the wall to feed a wall mounted towel radiator to dry the inevitable wet towels, the bigger the family the larger the towel radiator needed to cope with the demand.

Downstairs loo Heating - this room is unheated, and in original form it didn't have a hot

water tap fed from the central boiler, instead it had a small electric instant hot water unit over the hand basin. - there is an opportunity to run hot water feeds from the central boiler to this room, and install a towel radiator and also to provide a hot water feed to the basin.

Our system specification

We wanted:

A) to replace all hot and cold water pipework (it was old, full of >50 years of mineral build up (we are in a hard water area) and some of the water pipes were lead.

B) a gas fired heating boiler installed in the upstairs airing cupboard, with the following water circuits being driven from this single boiler:

1. A heat exchanger installed in the under-stairs cupboard to drive all the existing hot air heating ducts.
2. A hot water tank being optionally able to be fed from the new gas boiler or switched to run on it's electric immersion heater.
3. Under floor heating in the upstairs bathroom, and central heating feeding a towel radiator, with a wall mounted thermostatic controller in the bathroom to control the bathroom heating timing and temperature.
4. A small towel radiator in the downstairs loo, as well as new hot water supply to feed a mixer tap for the downstairs loo basin.

Project Planning Considerations

In order to provide hot water from the new boiler upstairs to the downstairs heat exchanger and the downstairs loo, there are various pipes that need to be run, and finding a suitable routing for these pipes resulting in laying pipes under the bathroom floor and drilling holes in the stairway wall then chasing pipes into the stairway wall to bring them down into the understairs cupboard area, from here pipes were then run onward, with one set running to the kitchen sink and one set running to the downstairs loo. Since we were re-flooring it was easy enough to cut a recessed channel into the concrete floor-base downstairs for these pipe-runs to be laid into. We were installing new wood flooring throughout downstairs so we could easily do this option.
An alternative route for these pipes would be running between upstairs flooring and downstairs ceiling, but finding a suitable route through joists and around the other services such as electric cables etc. is not easy and will require either the ceiling to be removed downstairs or the upstairs flooring to be taken up to allow pipe routes to be found and installed.

I strongly advise planning to vacate the house when this work is being done, as it's pretty much impossible to live in whilst this work is being undertaken, due to the upheaval, lack of water/ heating and excessive dust involved.

Pictures to illustrate

here are some pictures and explanation of our finished setup at 23.

A question raised was about how to keep the hallway vent operating downstairs. For many this is a key warming vent in the entrance hallway, often used for drying clothes or if you have boathooks in the hall then drying wet coats etc. This picture hopefully illustrates it best, It's taken with the stair cupboard door open and shows the vent down to the left of the door and the heat x-changer inside the cupboard.

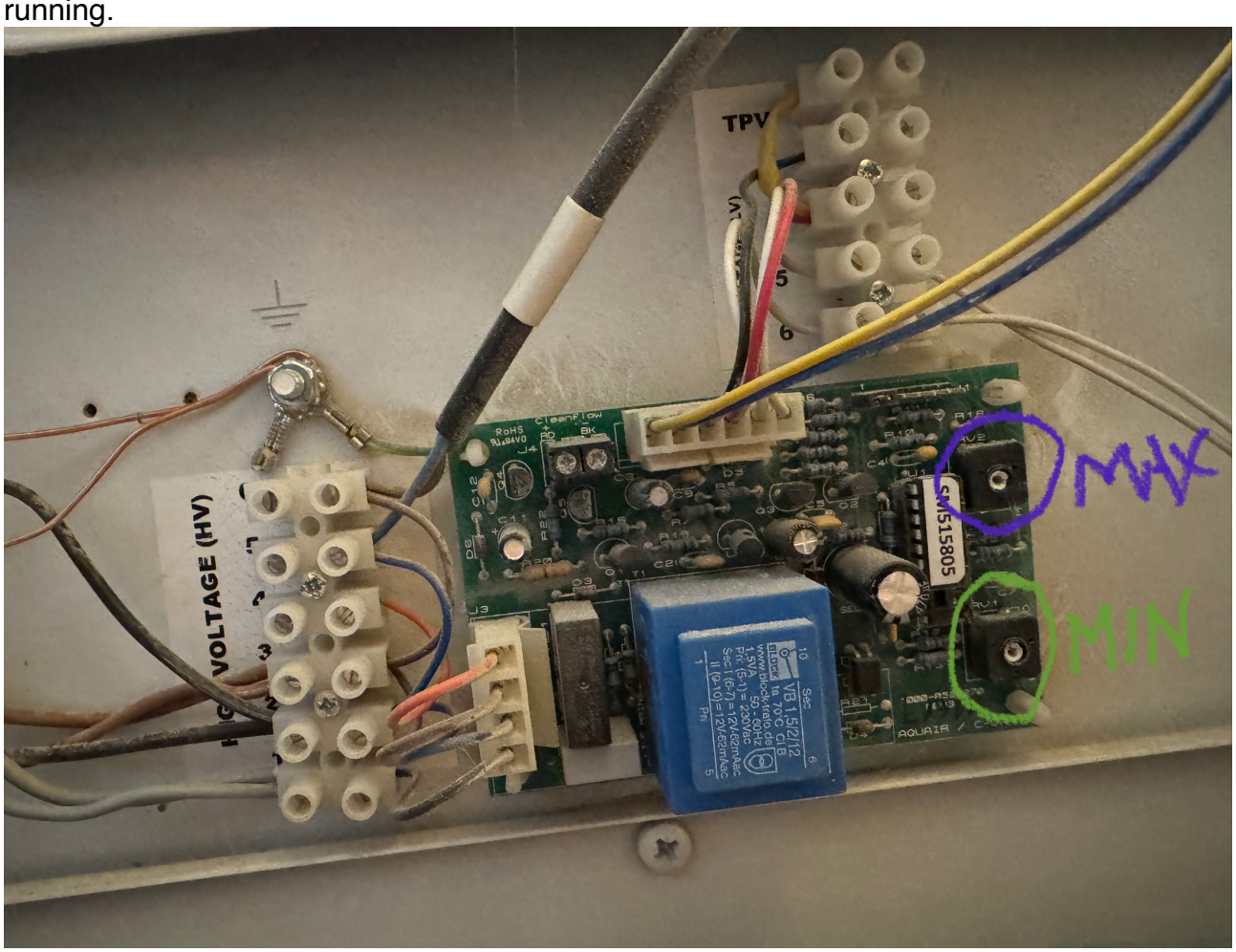
Note that the x-changer is mounted on a breeze block box that raises it 32cm above the floor level. This is the key to keeping the hall vent operable.
This breeze block box that it sits on is built over the top of the main air-vent pipework that runs to each of the rooms heating vents. The heat exchanger draws air in from the top of the big white box and sends it down into that breeze-block box after it passes over the internal heat exchanger from where it is distributed around the house, including that vent in the hallway which is as you can see perfectly located to dry our coats.

The model of the exchanger is a Johnson and Starley AquaAir S-20

This second picture shows the internal workings of the x-changer with the cover off. The fan is in the upper curved shroud. The two pipes coming in from the right side are the feed

and return of the hot water from the boiler that's located in our upstairs airing cupboard. And the electronic circuit board control unit is above that pipework.

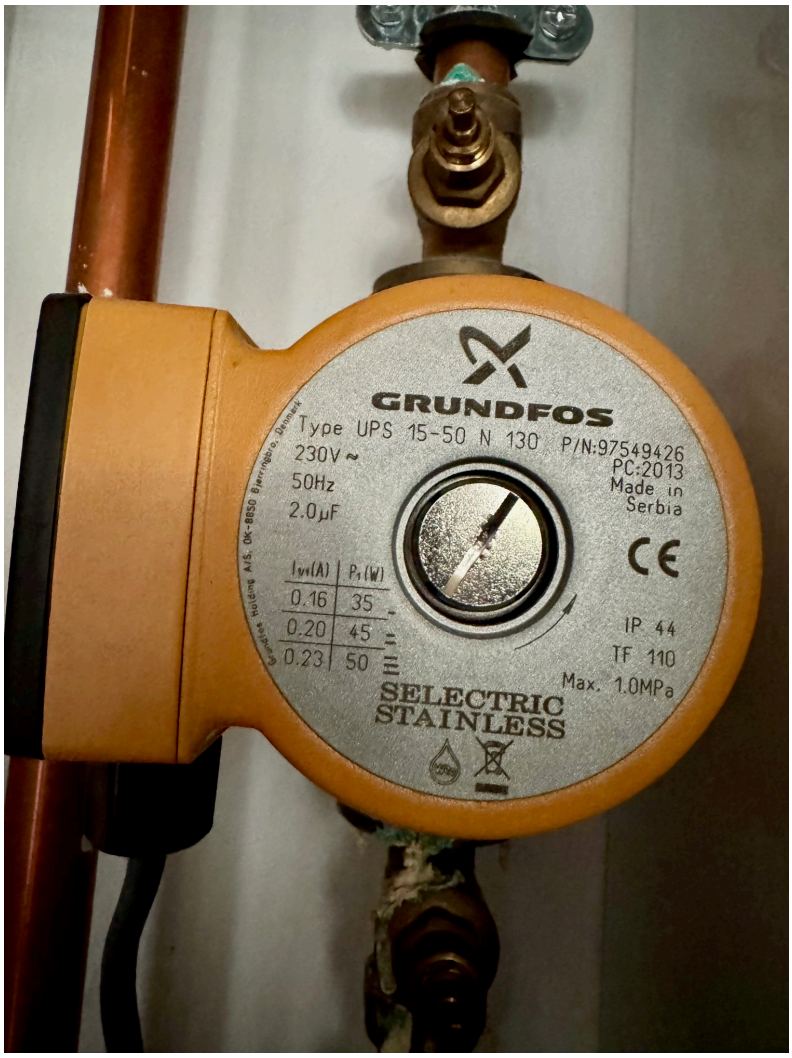
The third picture below shows the circuit board and I've highlighted two key controls that need to be adjusted and tuned over time to make the unit work best for you. The upper control in purple is the control of the Maximum speed of the fan, the lower control is the Minimum speed of the fan. By tuning these two settings you can get your house comfy and warm without having to suffer a noisy tornado of air being blasted through your system.
When ours was first installed we didn't like the noise. And once I'd adjusted those dials (use a mini screwdriver, and turn the central dial clockwise to increase speed and anticlockwise to reduce speed) then we have a lovely heating system we can barely hear running.



Airing Cupboard Layout and Pumps

This next picture is of the airing cupboard shortly after it was installed. In addition to the hidden internal pump within the boiler, It shows 3 external bright orange water pumps that drive all of our hot water circuits.
The 6 white pipes going into the floor on the bottom right are for under floor heating in the bathroom.
The 5 white pipes going down through the floor on the left are I believe for towel radiators and hot water taps in the bathroom and downstairs loo (although I'm not 100% sure to be honest)

The Stelflow unit on the left is the highly insulated large hot water storage tank. In my view essential to ensuring great showers and baths. But it is optional. Some people just use the gas boiler to provide instant hot water (like a combi boiler) where as we use this as our main hot water supply.



One thing to note is that within a year of installation, I replaced the bright Orange pumps shown in the picture above, the original pumps were cheap (about £35 each) and noisy, they started rusting internally and gave a constant whine that we heard at night when the house was silent and in bed. I replaced with much better stainless ones from Grundfos (next picture) which cost 7 times the price but are totally silent and worth the peaceful nights rest and massive longevity expected.

The next two pictures shows the airing cupboard in it's final state of dress and daily useage, over an easter weekend I constructed a wooden frame of shelving. It's important to make the shelves easily removable so that the boiler and associated pipes and valves can easily be maintained and worked on when needed. We find it's capacity as an airing cupboard is generous for our household. Allowing us to store all our bedding, towels etc, as well as store of dried washing and their baskets, plus some handy space for folded drying horses to be stored when not in use..

Downstairs Loo

The following picture shows details of how the pipework to the downstairs loo was installed and hidden. We reused the original sink waste pipe, but everything else is new.

Two plastic flexible pipes run to the sink (hot and cold water)

another cold water pipe is embedded into the wall in an arc (embedded in builders expanding foam) and heads left to provide a new water supply to the loo cistern.

Two more plastic pipe arc to the right behind the vertical waste pipe and embedded into the wall to the right, these are central heating flow and return pipes to provide heating water to the radiator about to be installed and connected to those two copper pipes sticking out of the wall.