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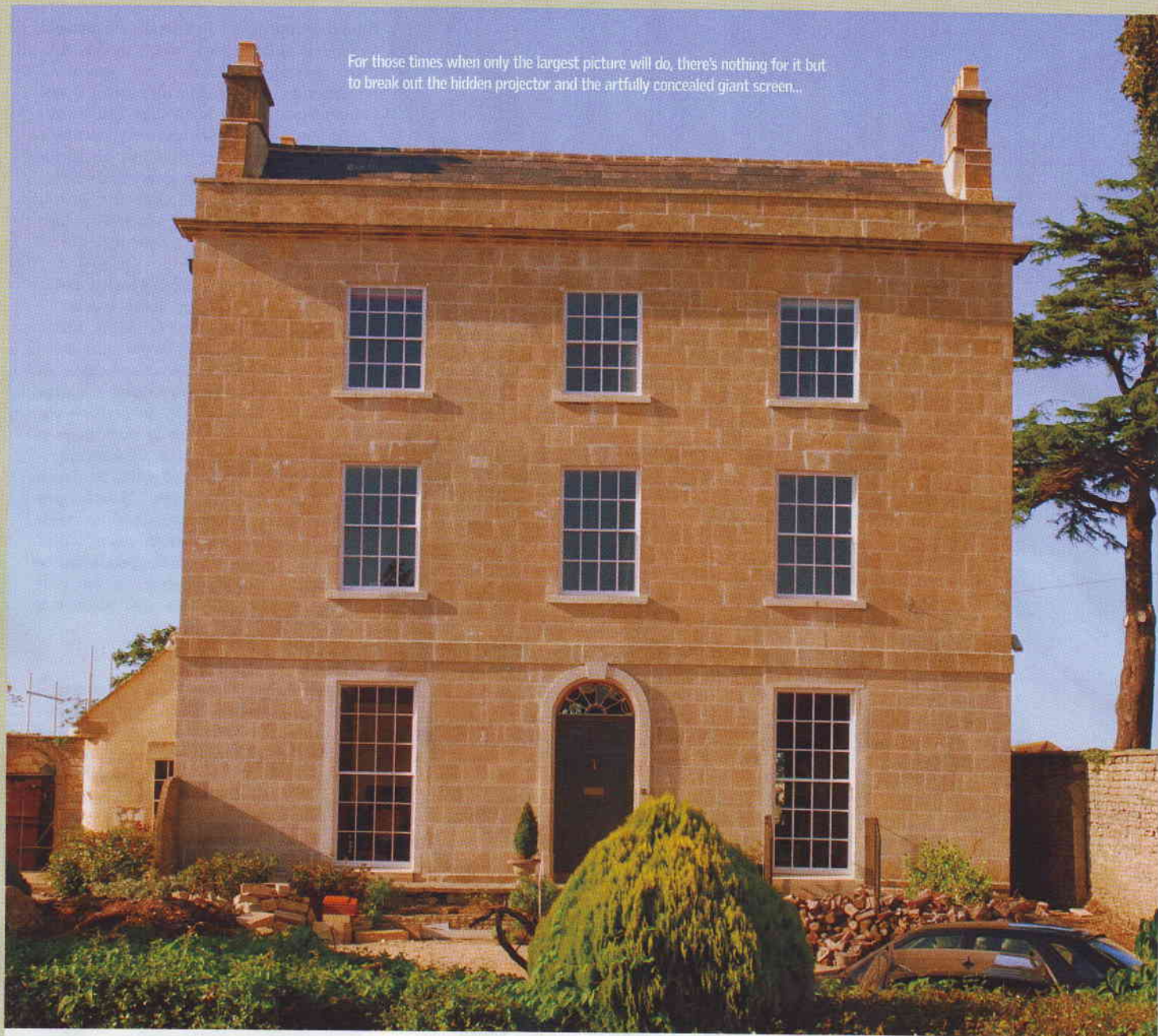
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For those times when only the largest picture will do, there's nothing for it but to break out the hidden projector and the artfully concealed giant screen...



# tunnel vision

**Conservation, restoration and advanced whole house technology rarely sit comfortably together. However, RICHARD HALL visited one property where this normally awkward *ménage à trois* was a thing of beauty...**

In 1836 Isambard Kingdom Brunel, one of the greatest engineers of the Victorian Age, encountered a problem when building his London to Bristol Great Western Railway. The issue was Salthouse Village, or rather the hill it was sitting on. On analysing the situation he realised it would take too long to go around it, it would be impossible to climb its slopes with a steam train, so on consideration he decided to tunnel through it, as you would. But there was

one further thing he needed to sort quickly – he needed to buy the house he would be dynamiting under...

There was a choice of two. The owner of the first house, however, recognised Brunel (probably on account of his massive hat and cigar) and tried to hold him to ransom. So when Brunel approached the neighbour he was more circumspect and managed to buy the house for £700. And in a practice that would delight MPs

today he even put it through on expenses (down *Telegraph!* Down!). So, with a few changes to the railway line's approach, GWR was back on track and The Tunnel House had its new name.

Come forward 170-years and a new owner, with an equally enthusiastic view of technology, has taken over. While renovating and restoring this imposing property they also decided to integrate the latest AV technology to turn the house into a modern family home...

## Kingdom come

Tunnel House is certainly a house for those who like challenges. After slipping under the conservator's radar for 50-years, Jon, the new owner, now has the pleasure of their backing thanks to a meeting of minds. The plan was to enhance sympathetically, to reclaim or revise to the original and, at the same time, complete each step to a level of quality to last 100-years. A conservator's dream!

And that thoroughness is followed through to every aspect of the project – the cabling is Cat5 to ensure that, in the future, should there be there be a new technology or application that they may want to integrate into the smarthouse system, they can do so quickly and easily without having to rip holes in anything.

"Blind tenacity and an absolute commitment" is how Jon describes the attitude needed to take on a project as big and as complex as this. But at the same time there can be a lot of fun had in sourcing and installing the latest technology. For example, the house now features a heat reclamation system that takes the waste heat from the day-to-day areas and recycles the air to keep the bedrooms at a cosy temperature. This is echoed in a rainwater collection plant that supplies all the water for WCs and other areas. It's like living in the future! But in the past...

## Out of sight...

One issue that stuck out early on was that in renovating this Victorian mansion sympathetically, how do you get the AV Loudspeakers to invisibly blend in? Naturally, the first idea was to use speakers with smaller footprints, but that then led to concerns over the audio quality and the number of small speakers needed to fill these large rooms with sound. Trying to balance these dilemmas led Jon on a voyage of audio discover, ultimately leading him to the magical realm of Amina Plaster-In Invisible Loudspeakers –the ideal solution for providing invisible sound from the central media server, doing exactly what they

say on the box: install them in plasterboard or solid walls (as here), skim over with a thin layer of skim plaster, let it dry, then decorate to make them invisible.

In the end, four 40W Amina AIWX3 devices were installed in each of the main rooms to provide the required high quality, room filling audio. While the fitting of the speakers only took a few hours for each room, because traditional lime plaster was used it took eight weeks in total for all the layers of plaster that had been applied to dry enough for the surface to be decorated and the speakers tested. But this, it transpired, was the least of their worries...

Each ceiling was at a different height thanks to the house "moving" every time the navvies back in 1836 dynamited another stretch of the 176-yard tunnel directly below. In addition to this the conservators had stipulated that the ceiling had to be lime plaster and lathe, which in-turn meant all the joists had to be replaced with oak as it was the only wood strong enough to hold the new weight! All of which, of course, made the plastering a task an almost Sisyphean ordeal!

## Music to your ears

However, such talk of plaster and, erm, wattle and daub is the domain of our sister title *Period Ideas*, so back to the cool stuff: the speakers. Just what is so special about Amina that allows them to be invisibly concealed by a skim layer of plaster? Well, if you're asking, Amina Loudspeakers produce sound in a very different way to traditional pistonic loudspeakers. Their speakers mimic the way natural acoustic instruments produce sound – when a musician strikes the strings of a guitar, grand piano or violin, say, this action creates complex vibrations in the body on the instrument and it's these that excite the surrounding air molecules to create the sound we hear. And a similar process happens in Amina Loudspeakers, with each one taking the output from your amplifier and feeding it into its neodymium actuators. These then convert that feed into pockets of complex vibration on the

surface of the speaker's panel and, voila, sound!

The panels themselves are made from specialist composite materials similar to those used in the space shuttle, making them more responsive and configurable, and because the vibrational movements are so small and plaster in itself is relatively flexible, the vibrations can pass through the skim layer without cracking it or the sound being compromised. Then, once on the surface of the plaster, the vibrations interact with the air molecules to create sound in the same way as they do in acoustic instruments described before. Got all that? Good, there may be a test later.

As if invisibility wasn't enough, this method of producing sound has some other very valuable attributes too. In Amina's hidden panel speakers the Sound Pressure Level (SPL) fall off is more gradual than in standard traditional loudspeakers because the pockets of vibrations are formed all over the face of the speaker panel rather than emanating from a single point. This greater sound generating area means it is possible to move further away without appreciable loss in SP, which is great for larger rooms.

## Apple of his ear

The whole Tunnel House project was about blending technologies seamlessly together, staying true to the heritage and design of the house, and making the process of enjoying all that tech as simple as possible. And that's exactly what has been achieved, to the extent that Jon is able control all music functions over Wi-Fi from his iPod Touch, selecting music and volume for each room by wirelessly accessing the central server – engineering genius that Brunel himself would heartily approve of.

Thanks to all this careful planning, research, and intelligent use of the latest technology, Tunnel House is now an elegant mixture of loving restoration and pure innovation. The project is still far from finished, with many more rooms to be completed, but that's just an extension of the adventure, and we look forward to the next instalment...



A room with no view... of hideous looking speakers.

Control your home  
with an iPhone and  
just one massive digit.