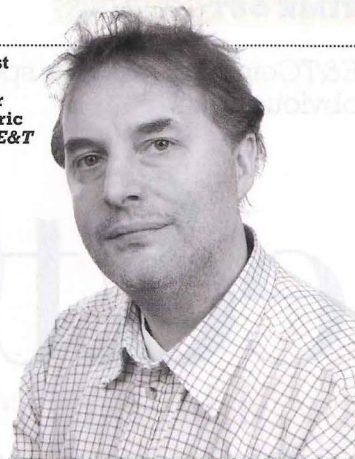


The most useless invention to come out of the Second World War was set to become one of the best-selling toys of the 20th century.

Justin Pollard has just won the 2014 BSME Columnist of the Year Award for his Eccentric Engineer column in E&T



The Eccentric Engineer

by Justin Pollard

HISTORY

A WARTIME INVENTION THAT BECAME A TOY



WITH THE ever-circling year, comes round the time for wondering what on earth to put in the children's Christmas stockings. Generally I like to give them things with a use or which demonstrate something fun. They get puzzle locks, nitinol wires, polymorph, pseudoscopes, microscope slides, anatomical models – let's face it, I buy things that I'm going to enjoy playing with too. But if it wasn't for adults secretly buying their children what they want, we wouldn't have one of the great toys of the modern era.

A surprising number of toys have emerged from the maelstrom of war – we've talked about Slinky's in this column for one. But there's one delightfully pointless toy that had its genesis in a desperate attempt to mitigate damage done by the expansion of the Japanese empire through the Far East in the 1940s.

Far Eastern territories were particularly useful to the Allies as they were home to vast rubber plantations, many of which had had their start thanks to the Ward Cases we looked at last month. With the Japanese

invasion, there was a real danger that the West's supply of latex for making rubber would dry up. And without rubber to put on the soles of soldiers boots and the wheels of their vehicles along with ten thousand other applications, the war would literally grind to a halt.

Finding an alternative or a synthetic substitute became something of a priority, and so a memo went out from the mighty US War Production Board to the chemical engineers of America asking for a solution. It was this memo that landed on the desk of Scottish engineer James Wright, who was working for General Electric at their New Haven research facility in Connecticut. Casting around for a similar starting material to latex, he came up with the idea of using silicone oil.

The first job was to find a plasticiser to add to the oil to turn it into a rubbery mass. Wright chose boric acid but was disappointed to find that instead of getting a solid he got a gooey, stretchy material that wasn't going to fit the bill. It was an interesting substance, however;

Competition

What might the father be thinking in this traditional Christmas scene? The wittiest caption emailed to engtechmag@theiet.org by 14 January wins a pair of books from Haynes.

it behaved in a very unusual way. When rolled into a ball and dropped, it bounced like a rubber ball. If the ball were left at rest, it slowly pooled, whereas if subjected to sudden force, it shattered. Here was a liquid that behaved like a solid depending on the forces applied to it. What useful war service could those properties be applied to?

This was a harder question to answer than you might think. By the end of the war, Wright was still sending samples of his 'bouncy putty' to colleagues in the hope that they might help. They couldn't. However, they had enormous fun trying and discovered that as well as bouncing, flowing and shattering, it made a passable adhesive, could lift lint from clothing and transferred newsprint.

Then, in 1949, a sample ended up in a very different research facility – the toy shop of Ruth Falgatter. She asked her marketing consultant friend Peter Hodgson if he thought the putty had potential, and he agreed that while useless, it was novel and that in itself might make it a good toy.

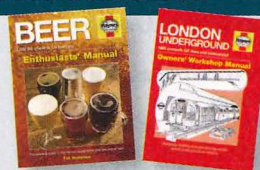
Having successfully sold chunks of the stuff in Falgatter's shop, Hodgson decided that there might be a worldwide market for the material with no use. So in February 1950 he took out a loan to buy and package samples of what he now called 'Silly Putty' for display at the International Toy Fair in New York. Always the keen marketer, Hodgson also noted that the fair was just before Easter, so he began packing his putty in plastic eggs, hoping to make them the unusual gift of the season.

You probably think you know the rest of the story. Children

swarmed around his stand and 'Silly Putty' became an overnight sensation. Sadly that's not what happened. Children, or at least those toy buyers who claim to know them, weren't interested. What would make 'Silly Putty' a household name was an article sometime later in the *New Yorker* which pitched it as a novelty for adults. Now grown-ups not only know what they like but can award themselves pocket money to buy those things. Within three days a quarter of a million orders flooded in and the toy's future was secured. In 1968 they even found a use for the stuff, as a means of securing tools in weightless conditions aboard Apollo 8.

Thus the most useless invention of the Second World War became one of the most successful toys of the century, all thanks to adults liking to play just as much as children. In our house this Christmas, you'll find not a sugar mouse, but a small plastic egg of putty in the toe of Santa's stockings. *

**CAPTION PRIZES
BAG A BOOK**



This month's competition winner will receive copies of 'The Beer Enthusiasts' Manual' and 'London Underground Owners' Workshop Manual', two new titles from the ever-expanding range of Haynes Manuals (haynes.co.uk). Winner of our November issue competition is Martin Pate: "That isn't a Langmuir-Blodgett lens in my pocket."



An ambitious man with no experience in engineering pioneered the world famous 'Disappearing Bed', all for the sake of young love.

The Eccentric Engineer

by Justin Pollard



DESIGN

WILLIAM MURPHY AND HIS AMAZING DISAPPEARING BED



I HARDLY NEED to tell an engineer that necessity is the mother of invention, but there's always something rather pleasing when that invention stems from something the engineer personally needed.

Such was the case with William Lawrence Murphy. He was the son of a gold rush 49er who hadn't struck gold. In 1900, Murphy found himself living in a one-room apartment at 625 Bush Street and Burritt in San Francisco. For those of you with a passion for 'The Maltese Falcon', Burritt Street is where Brigid O'Shaughnessy killed Sam Spade's partner, Miles Archer. But that's another story.

Aged just 24, Murphy had already been a stagecoach driver, a horse breaker and even for a short stint a rural sheriff. Now he needed a new job and necessity was about to present him with one. Murphy was not an engineer by trade, he was a lover. Or at least that's rather

what he hoped to be. Specifically, according to the family tradition which may have been somewhat embroidered, he had a passion for a local opera singer. But this was proving rather problematic.

It was hardly appropriate for a young chap to invite a girl back to his one-room apartment when that room was dominated by a bed. "Would you like to come and see my bedroom?" wasn't something you said to a well-bred young lady in 1900, not even in California. What Murphy needed was for his bed to disappear and disappear is what he made it do.

With the help of a local blacksmith, Murphy cobbled a system together using a closet doorjamb and some old door hinges to build a pivot that allowed his bed to be attached to a wall and fold up against it. In a moment his bedroom could now be turned into a parlour, wholly suitable for entertaining ladies in – assuming they ignored the bed propped against the wall.

Competition

What does the poor poodle think? The wittiest caption emailed to engtechmag@theiet.org by 15 April 2015 wins a pair of books from Haynes.

Fortunately for Murphy, that's just what the young singer did and they were married soon after.

Having achieved his primary goal, Murphy might have lost interest in folding beds, but he did not. Borrowing some money from his new father-in-law, he went into business designing and building beds whose ingenious mechanisms would allow them to be folded entirely out of sight in cupboards and closets.

Murphy did not invent the hidden bed, though. Some say that Thomas Jefferson's alcove bed at Monticello could be hoisted out of the way during the day, though there's no hard evidence for this. In fact, on 14 July 1885, Sarah E Goode became the first African American woman to receive a US patent for a folding cabinet-bed that was a fully functional desk by day and bed by night. Leonard C Bailey also received a patent in 1899 for his folding bed.

What made the Murphy bed unique though, was the pivot and counterbalance system. This proved to be an idea whose time had come. A booming population was creating a housing shortage on the US West Coast. As a result, builders were fitting tiny apartments onto ever smaller blocks of land. These were just the sort of spaces that needed what Murphy, rather alarmingly, called his 'Disappearing Beds'.

The early development of Murphy beds was not entirely without incident. In 1906, San Francisco was victim to the infamous earthquake and fire. As the city shook, there were several reported incidents of people being folded up and disappearing in their Disappearing Beds, sometimes with fatal results. On a happier note, there was one instance where a two-year-old was gathered up by the bed and protected from the surrounding

turmoil until his grandfather could recover him from the mechanism. The problems of getting entangled in a Murphy bed were more humorously dealt with in 1916 by Charlie Chaplin in his film 'One A.M.'

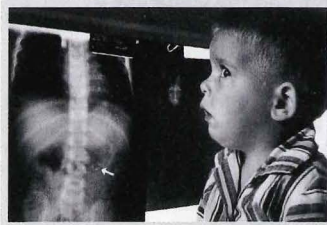
After the earthquake, business boomed as the city was rebuilt and Murphy patented various new designs. Having moved the company to New York City, pre-war production peaked at over 100,000 beds a year, along with a new range of equally space-saving kitchenettes.

Wartime rationing and the post-war housing boom rather dented sales, as did the after-war appearance of the 'sofa bed'. In 1989, the company received the ultimate back-handed compliment when a judge ruled that the term 'Murphy bed' no longer merited trademark protection as the phrase had entered the language. But in a new era of overpriced and unfeasibly small apartments, the company Murphy built on love is still going strong. *

CAPTION PRIZES BAG A BOOK



This month's competition winner will receive copies of 'Top Fuel Dragster: Owners' Workshop Manual' and 'Alien Invasion: Owners' Resistance Manual', two new titles from the ever-expanding range of Haynes Manuals (haynes.co.uk). Winner of our February issue competition is Jerzy Zarach: 'Not another biometric authentication!'.



Alfred Hobbs, a talented man with a knack for picking and a dislike for ego, was about to give two heavyweight lock companies – and bankers – a massive shock

The Eccentric Engineer

by Justin Pollard



DESIGN

A MAN WHO PICKED BATTLES AND BEAT THE LOCKSMITHS



THERE ARE very few items that will panic a banker outside of a newspaper article on their tax arrangements or a sawn-off shotgun, but in the mid-19th century one small piece of engineering caused them the greatest of panics.

The Great Exhibition of 1851 was designed to showcase the wonders of the world and demonstrate the superiority of British manufacturing and commerce. At the heart of that success lay money, and money was the province of the bankers who entrusted it in large part to two lock manufacturers, Brammah & Co. and Chubb. In many ways, the art of lock-making summed up what Britain was trying to sell at the exhibition – original thinking, combined with intricate engineering and industrial production. Unsurprisingly both companies had displays on the site and both declared that they produced unpickable locks.

A modern cat burglar is likely to tell you that any locksmith who claims their work is unpickable has lost touch with

reality. That was certainly the view of one American visitor to London, Alfred Hobbs. He wasn't a cat burglar; he worked for New York lock company Day & Newell and was at the exhibition to promote the firm's Parautoptic lock. He believed that all this tub-thumping about the wonders of British locks might have left the makers resting on their laurels.

This was a great age for locksmiths, especially in Britain. As the nation industrialised and people moved *en masse* to the cities, it became necessary to find ways of protecting property in areas where you no longer knew all your neighbours. Engineers produced ingenious solutions for worried householders, the pre-eminent among which were Chubb's Detector Lock and Brammah's Challenge Lock. Chubb's device had been patented back in 1818, but the firm believed it was not only still unpickable but would also betray any attempt to pick it.

Brammah's lock was even older, having been patented in 1787, and used a different system based on 18 sliders, which could

Competition

What is this sneaky gentleman thinking? The wittiest caption emailed to engtechmag@theiet.org by 13 May 2015 wins a pair of books from Haynes.

produce 470 million possible permutations. So confident was Brammah that since 1801 a large padlock using his system had been displayed in the window of his shop on Piccadilly. It was painted with a legend offering 200 guineas to anyone who could open it without the key. Many had tried. None had succeeded.

Not that this impressed Hobbs, who thought that such boasts for locks that were 33 and 64 years old respectively might be a bit rich. So he announced that he intended to crack both. He began with the Chubb Detector, picking one at the Great Exhibition in front of a group of eminent gentlemen in under 5 minutes. This had the desired effect of creating a stir in the press, along with a chorus of complaints that the lock was clearly 'fixed'.

Hobbs wrote to Messrs Chubb saying he would pick any other of their locks in front of a panel of judges. Chubb declined to send a representative, but the demonstration went ahead and Hobbs cracked a Detector lock attached to a strongroom door in Westminster in less than half an hour. The news sent shockwaves through the strongrooms of England and the breakfast rooms of bankers everywhere.

Next was Brammah's famous Challenge Lock. It was taken from the shop window and moved to an upstairs room. A group of witnesses watched as it was encased in a wooden box so that only the keyhole was visible, preventing direct access to the mechanism. Despite being the older of the two locks this proved more complex. Hobbs took 51 hours to crack the mechanism, after which he demonstrated the opening and closing of the lock repeatedly to the assembled judges. The result was uproar. For weeks the newspapers ran stories on the state of the ancient

lock, the 'unfair' methods ascribed to Hobbs, and the exact legal terms of the challenge until Brammah finally relented and paid up the 200 guineas.

So shocked were the London locksmiths that the challenge was thrown back, and one of them offered to crack Hobbs's Parautoptic lock. After 30 days he had to admit defeat.

But the result of all this was not a crime wave or the collapse of British lockmaking. Chubb and Brammah went back to the drawing board and improved their locks, beginning an arms race between lock-maker and lock-picker that has kept both firms busy up to the present day.

Hobbs used the prize money to set up his own London locksmith company before returning to America to see out his days working on arms manufacturing – the only other business to ever really worry a banker. *

CAPTION PRIZES BAG A BOOK



This month's competition winner will receive copies of 'Top Fuel Dragster Owners' Workshop Manual' and 'Alien Invasion Owners' Resistance Manual', two new titles from the ever-expanding range of Haynes Manuals (haynes.co.uk). Winner of our March issue competition is Steve Salmon: 'Watch what you are doing with that propeller, I had a shave this morning!'

