GOLDEN OLDIES 54

The 1890s were the first age of the automatons. A journalist of the time wrote:

"One cannot enter a public place nowadays without seeing a weighing machine, a chocolate machine and frequently also a penny-in-the-slot machine rendering some popular waltz at the cost of a copper or two... There are automatons for beverages dispensing refreshments for a few coins, hens laying tin eggs filled with sweets and, as benefits a chicken, cackling loudly as the eggs emerge..."

In 1893, the streets of Paris saw the automatic hot water dispenser where "eau chaude" could be purchased by the jugful.

Contributed by CIBSE Heritage Group

Automatic hot-water dispenser in Paris (1893).

GOLDEN OLDIES

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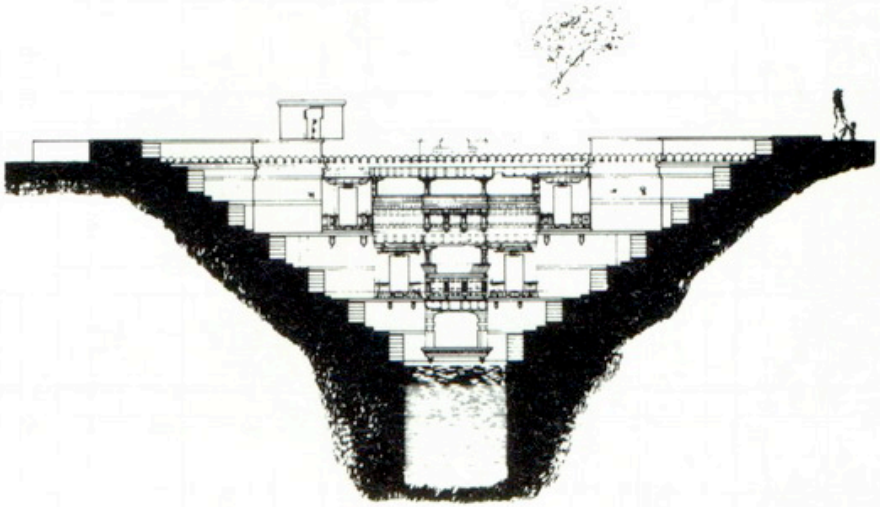
Bath tubs made of stone and clay can be traced back to the 25th century BC, but it was in ancient Rome that bathing became a well developed social habit. Throughout their Empire the Romans set up the thermae or bathing establishments which served as communal leisure centres. The Greek and Roman sweat bath developed into the Turkish Bath and appeared in eastern Europe and Spain. The Muslim bath (Hamman) is believed to be directly inherited from the Classical World, but with emphasis on the Islamic concern for both ritual and cleanliness, rather than social and sporting aspects.

Further afield, in India, there developed, from the 8th century onwards, a form of water architecture which included stepped wells, bathing fountains and ghats, reservoirs and stepped tanks. Over the next 1000 years, these became extremely elaborate, many examples providing facilities for ritual bathing and festivals, with water storage and retreat rooms.

Contributed by the CIBSE Heritage Group.



A stepped tank or bath: the Sabali Kund-way, Gujarat, India (around 1500).

GOLDEN OLDIES

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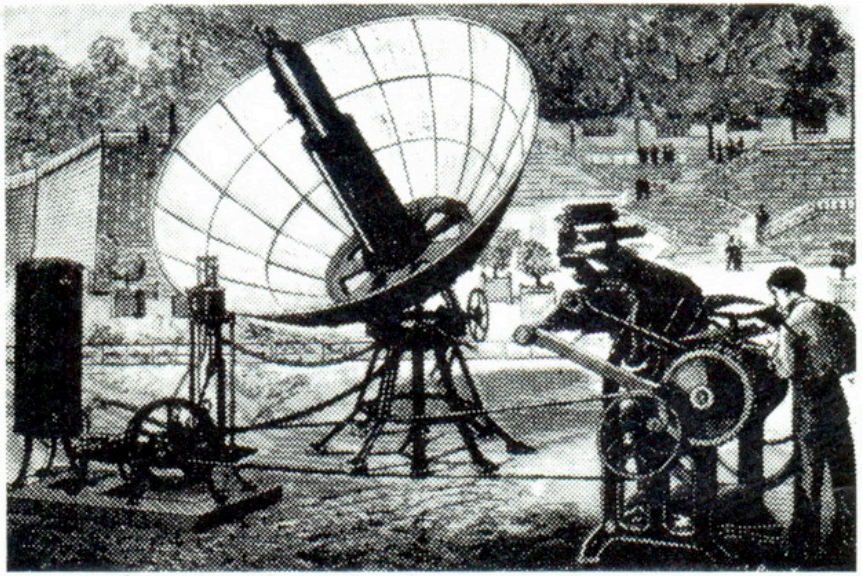
In Paris, on 6 August 1882, Abel Pifre demonstrated his solar engine—a concave mirror 3·5 m in diameter, in the focus of which was placed a cylindrical steam boiler. The steam generated by the reflected sun-rays actuated a small vertical engine of 0·4 hp to drive a Marioni type printing-press. Even under a weak sun and overcast sky the press operated continuously from 13.00 to 17.30, turning out an average of 500 copies/h of a journal which was specially made up for the occasion.

This confirmed Pifre's previous experiments in which he showed that 50 litres of water could be brought to the boil in less than 50 mins, after which the pressure of steam increased 1 atmosphere every 8 mins.

Contributed by the CIBSE Heritage Group.



Printing press driven by solar energy (1882).

GOLDEN OLDIES

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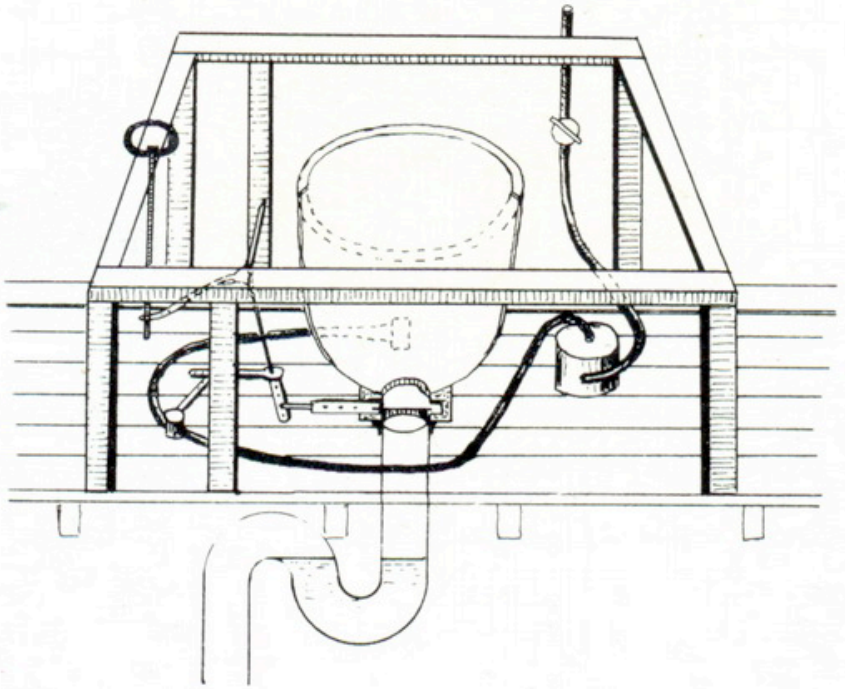
It appears that during the 17th and early 18th centuries only a few rich and enterprising persons had water closets built for them. At Windsor Castle, Queen Anne (1702-14) is said to have had, "a closet that leads to a little place with a seat of easement of marble and sluices of water to wash all down"; other stately homes followed suit.

In 1775, Alexander Cummings, a London watchmaker, patented a closet which incorporated an important advance. A water seal was used to isolate the bowl from the drain. He also used a sliding plate at the base of the bowl to effect a mechanical closure, which had the advantage of retaining a quantity of water in the bowl after use. A single lever worked both the mechanical valve and the flush.



Cumming's water-seal closet (1775).

Contributed by the CIBSE Heritage Group.

GOLDEN OLDIES

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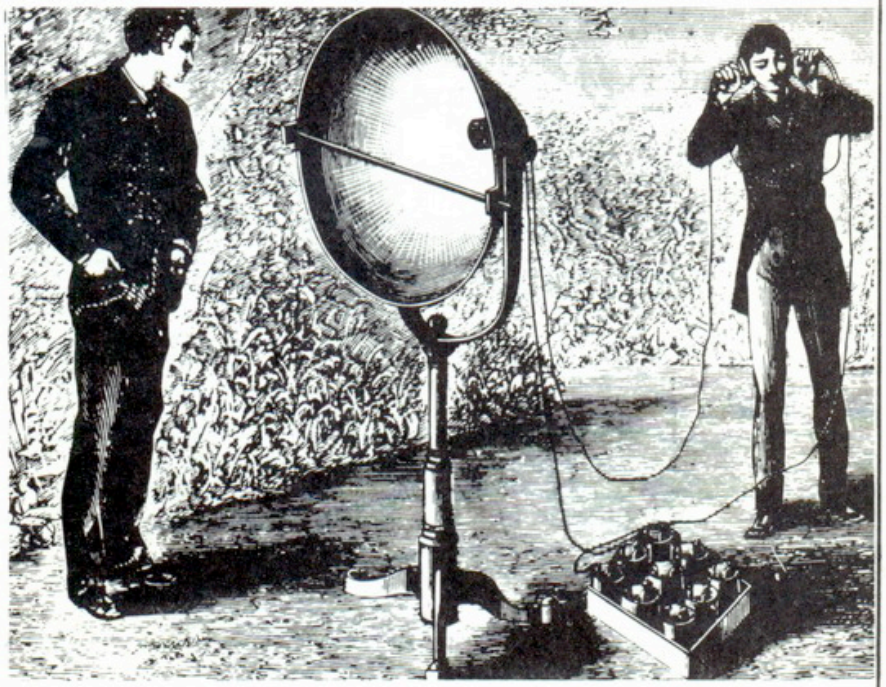
On the 26 April 1880 Alexander Graham Bell, working in conjunction with Summer Tainter, revealed the "photophone", an instrument enabling sound to be transmitted and received by means of light. In the transmitter the rays of a powerful light source were reflected by a flat mirror into a system of lenses which projected the beam onto a silver-coated glass plate which was vibrated by the human voice in a connecting speaking tube. The "modulated" light rays were concentrated into a parallel beam by lenses and reflected towards the receiver. This latter instrument comprised a parabolic mirror of silver coated copper with a central seleniom cell connected to a battery and earphones.

Bell and Tainter devised and tested some fifty different designs and succeeded in transmitting the spoken word by light a distance of 213 metres. When Bell put the phones to his ears he heard Tainter say quite clearly "Mr Bell, if you can hear what I am saying come to the window and wave your hat".



The photophone of Bell and Tainter: the receiver (1881).

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GOLDEN OLDIES

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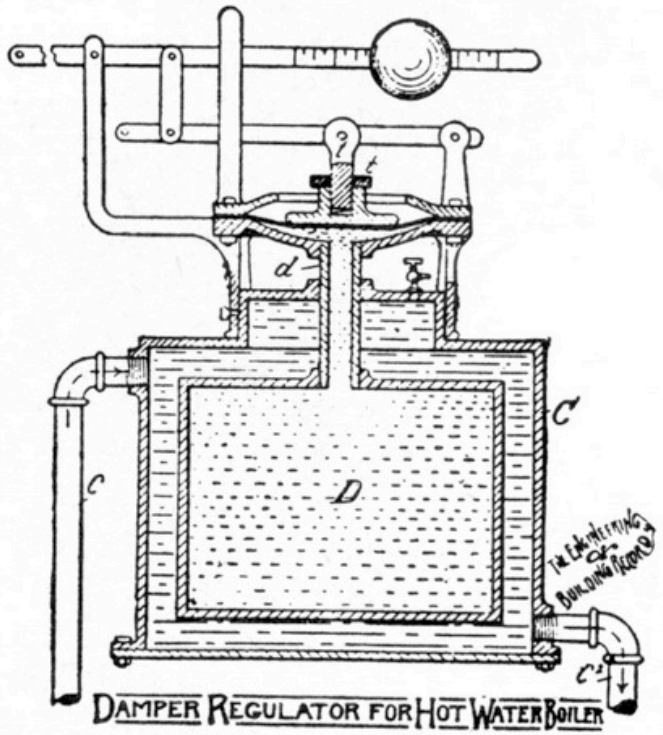
A M Perkins, the pioneer of high pressure hot water heating systems, used a draught regulator on the second version of his system. It is described in his book of 1840. It relied upon the linear expansion of the flow pipe to open or close the furnace damper. The Nason regulator, used in America in about 1868, appears to have been rather similar in principle. Later versions were employed by Blake in New York and Grouvelle in France.

In 1870, The Pascal Ironworks of Philadelphia used a float valve in an expansion tank to control the chimney and ash-pit dampers. It had considerable time lag due to the volume of water in the vessels C and D, but it was noted, "The principle involved, however, is a good one, and is deserving of close consideration with regard to its practical development."

Contributed by the CIBSE Heritage Group.



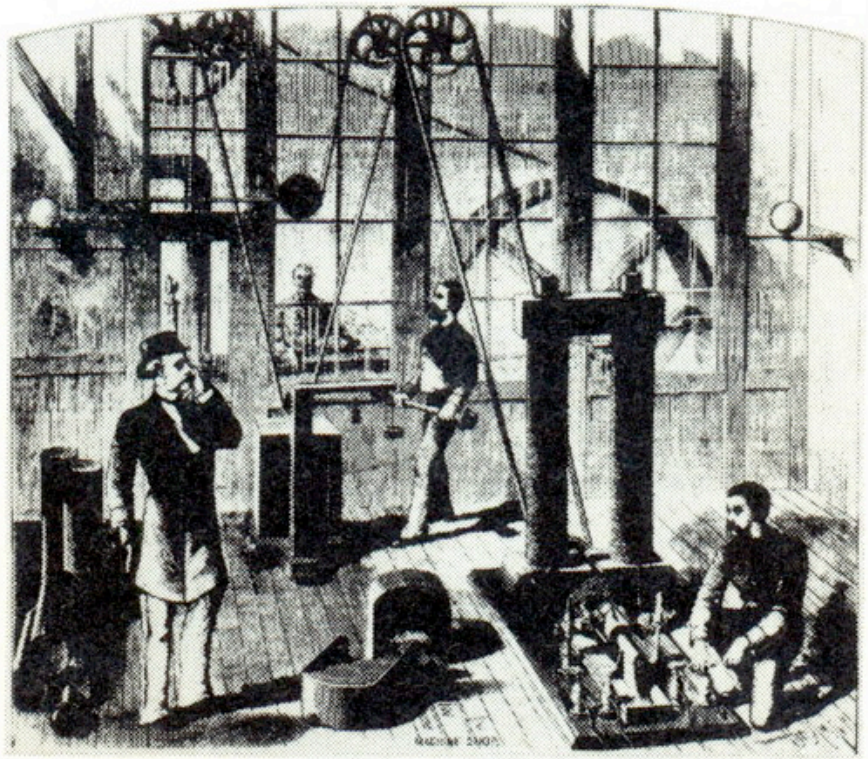
Damper regulator (Pascal Ironworks, 1870).

GOLDEN OLDIES

60

Shortly after a successful demonstration of his incandescent lamp in 1879, Edison selected an area south of Wall Street in New York to be converted into the world's first city district to be lit by electricity. His assistants reconnoitred every street and house, noting all the data about the gas-lighting systems and the lengths of pipes in the houses.

Edison then designed all the equipment necessary to replace the gas lighting with electricity: switch-boxes, fittings and sockets, wall-switches, fuse-boxes, consumption meters and a screw socket for accommodating the bulbs. He also designed a generating station capable of supplying electricity to 13 000 lamps, with 8 steam boilers and matching steam engines of some 2000 horsepower, driving eight dynamos. The generating station was brought into operation by Edison himself on the 4th September 1882.



Edison's Machine Shop in 1880.

Contributed by the CIBSE Heritage Group.

GOLDEN OLDIES

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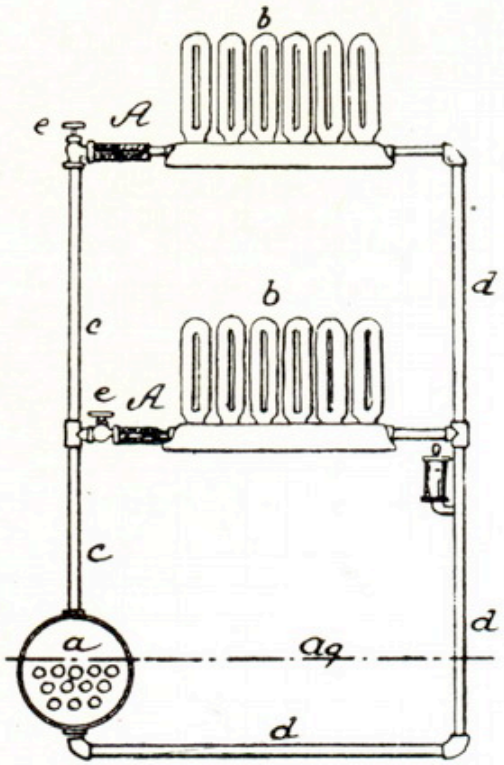
The American, Tudor, contributed much to the development of low-pressure steam heating in the years 1875-85. His first patent of 1875 was for a means of controlling the output of a steam coil by varying the airflow through the convector casing. It was used in an office block in Boston in 1876, and was still being employed in an hotel in 1901. A second Tudor patent described a system of mixed steam and water heating.

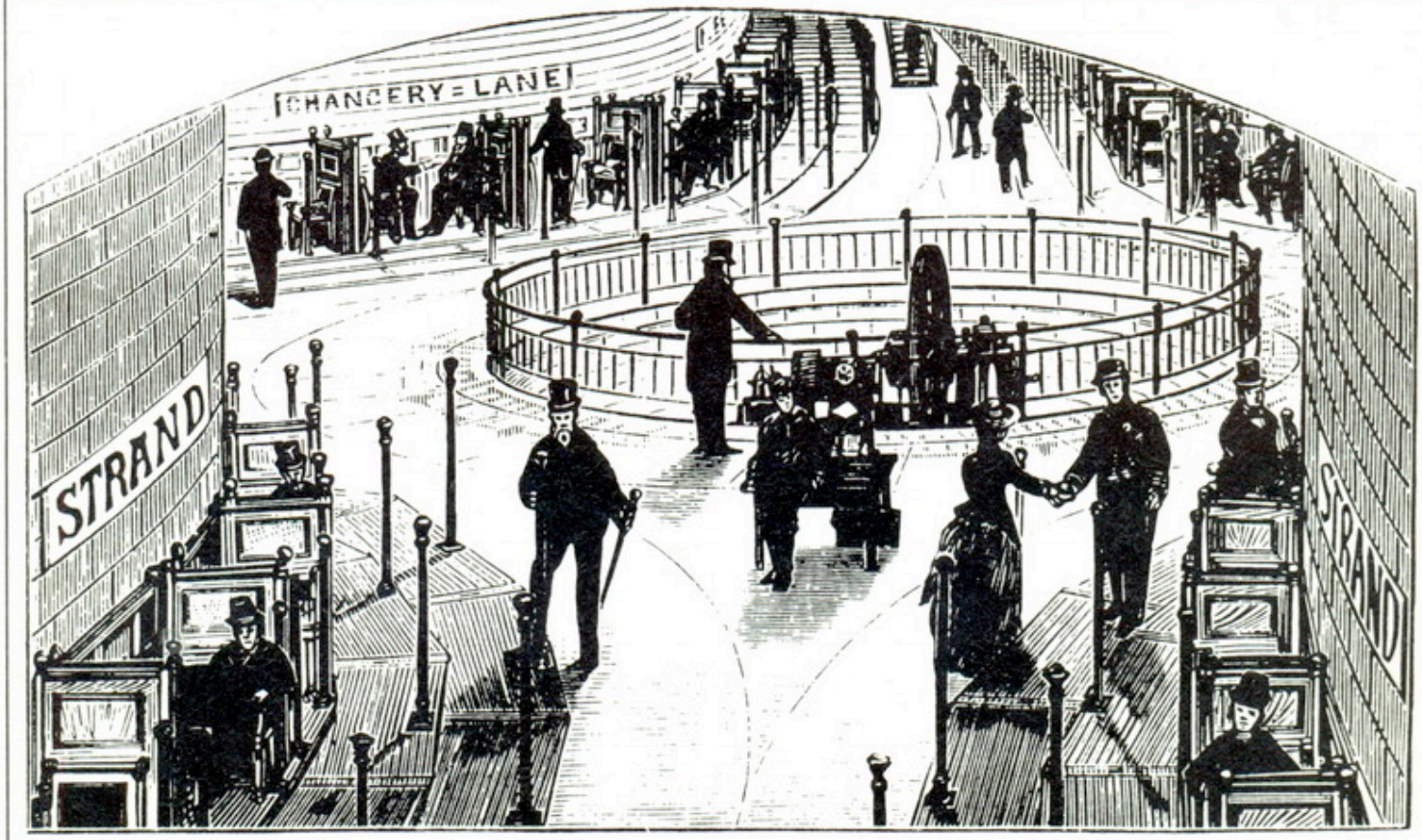
Tudor's fourth patent of 1885 eliminated the valve on the return of a steam radiator. Steam was admitted to the radiator via an orifice or capillary, sized to correspond with the maximum output required (a 6 mm orifice would pass enough steam at 15 kPa pressure for a radiator of 12 m^2 heating surface).

Contributed by the CIBSE Heritage Group.



Tudor's fourth patent on steam heating; the orifice "A" for restricting steam supply (1885).

GOLDEN OLDIES



The Stepped Platform Railway (c1890)

The period saw numerous inventions concerned with the moving of people – lifts, travelling staircases (escalators) and moving pavements. A Mr Alfred Speer of Passiac, New Jersey, proposed a series of endless belts, arranged side by side, but moving at different speeds – the first at 5 km/h, the second at 10 km/h, the third (presumably) at 15 km/h and equipped with seats: "there is neither smoke nor dirt; no time-table, no late arrival; no waiting for trains".

Contributed by the CIBSE Heritage Group.

GOLDEN OLDIES

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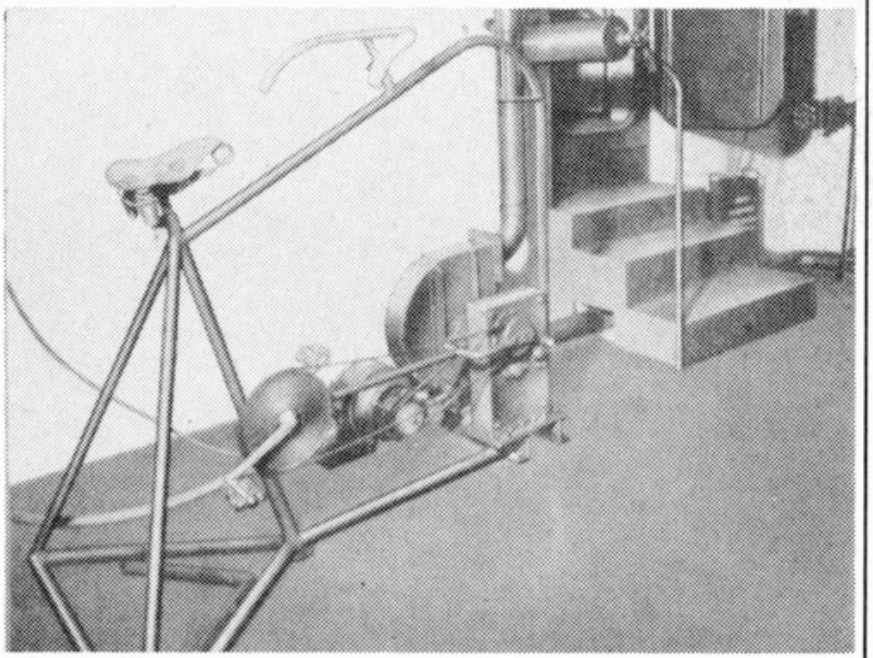
In 1938 the Chema Manufacturing Company published a catalogue advertising a range of gas filtration and ventilation equipment developed for gas-tight air-raid shelters. One method involved an auxiliary foot-drive, very similar to the device featured in the September issue of *Building Services*. The outside air would be sucked in by the ventilator which absorbs the chemical agents, and the cleaned air conducted to the different rooms in the shelter. The used air would then be extracted through special channels.

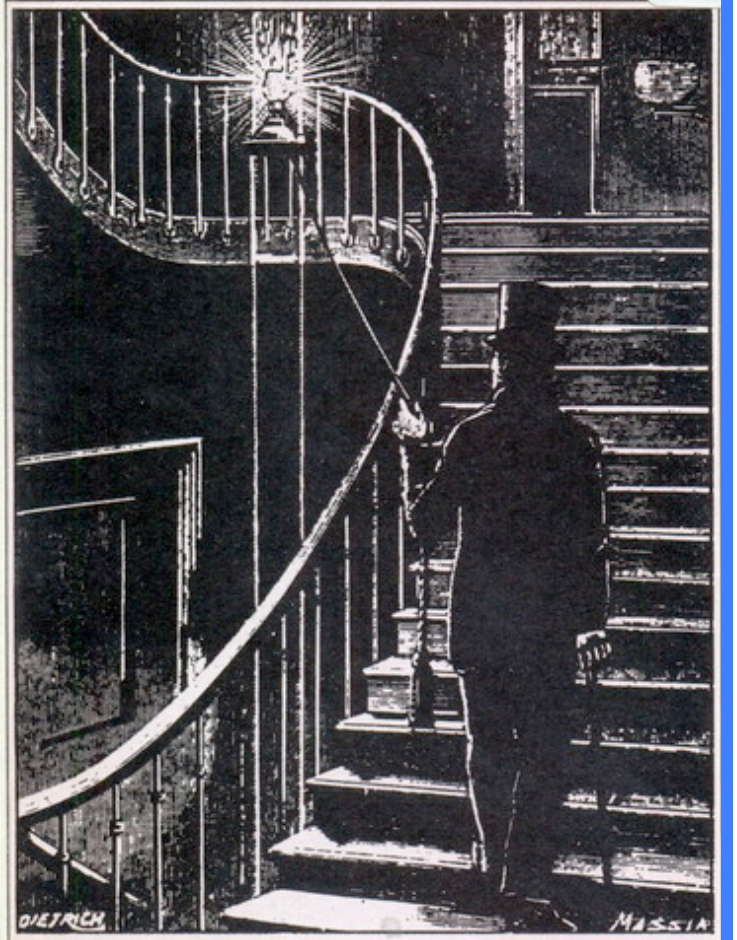
The shelter could also be ventilated by regeneration of the air inside by chemical means. The excess CO_2 would be retained by an absorber and oxygen released from steel cylinders with the flow regulated by spray diffusers. It was claimed that this equipment gave complete protection for chemical concentrations "up to 400 times those that would exist in a chemical offensive".

Courtesy of the Chema Manufacturing Company via W H Carter FCIBSE.



Auxiliary foot drive for shelter ventilator.

GOLDEN OLDIES 72



A climbing stairway lamp (1895)

Armand Murat devised his incandescent electric stairway lamp "to light the way of those who come home after the gaslight has gone out. There at the foot of the stairs glows the lamp and the latecomer need only lift the cord to find that (the lamp) will rise upstairs before him as he mounts the steps."

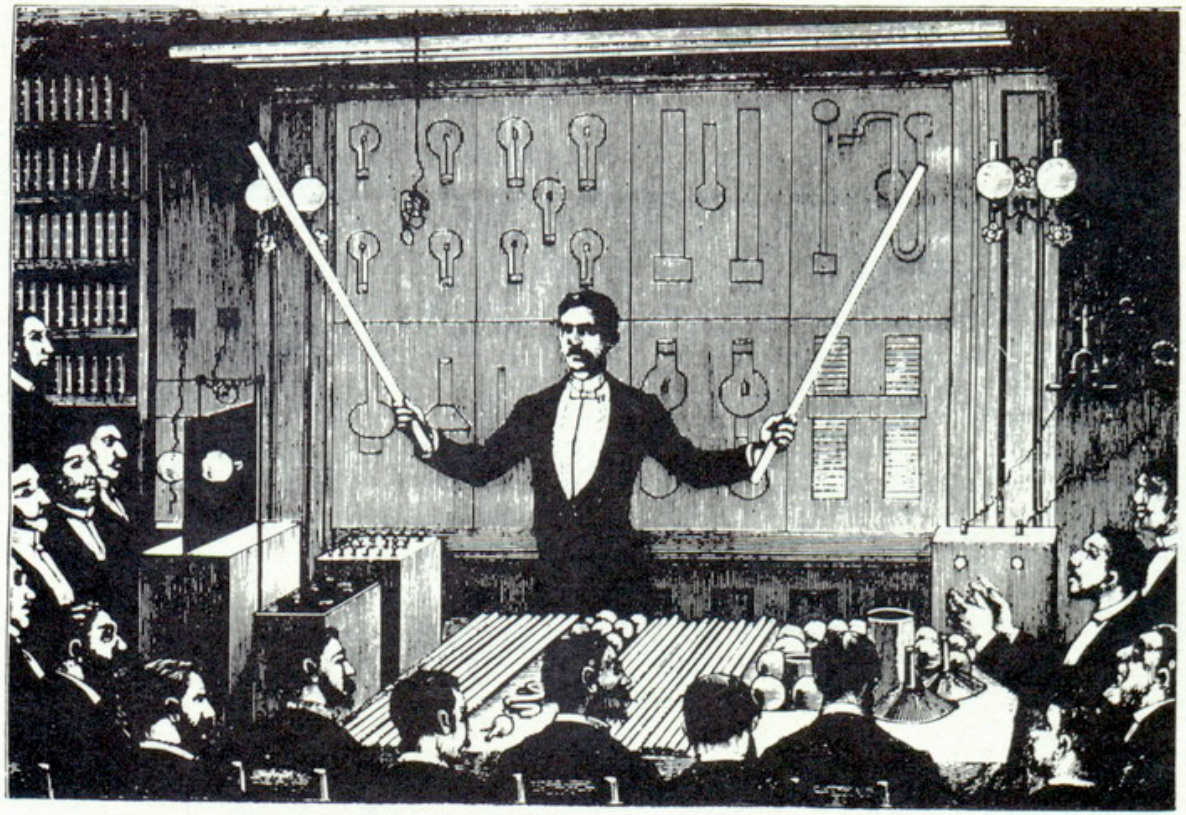
The lamp was designed to move up and down between two cables (the conductors) connected to an accumulator. It was said to be "complicated, employing pulleys, rollers, balls with holes drilled throught them, and a counterweight."

Contributed by CIBSE Heritage Group.

GOLDEN OLDIES

The Hungarian inventor, Nicholas Tesla, while working for the American Westinghouse company, conducted a remarkable series of experiments into alternating currents of extremely high voltage and frequency. Two metal bars, 3m length, attached to the floor and ceiling, were connected to the poles of his special high voltage transformer (500 kV at frequencies of around 20 kHz). When Tesla moved two unconnected *Geissler* tubes into the field between the two bars thay became luminous over their entire length, causing one reporter to comment, "Tesla stood there like an Archangel, brandishing the flaming sword".

Contributed by CIBSE Heritage Group.



Tesla's Experiments (1893)