IN THE HIGH COURT OF AUSTRALIA

WITTY AND ORS.

v.

TURBON ENGINEERING COMPANY PTY. LTD.

REASONS FOR JUDGMENT

Judgment delivered at Sydney
on TUESDAY, 7th NOVEMBER 1961.

Queensland Writ No. 12 of 1961

REASONS FOR JUDGMENT.

Court	High Court of Australia, Brisbane Registry.
Parties	Witty and Others v. Turbon Engineering Company Pty. Ltd.
Nature of Proceedings	Action for infringement of a patent by the plaintiffsand counterclaim for revocation of the said patent by the defendant.
Members of Bench	Kitto J.
Order of the Court	Action dismissed On the defendant's counterclaim, order that Patent No. 148,442 be revoked in so far as it relates to the claims numbered respectively 1, 2, 3, 7 and 20 of the complete specification, and order that the plaintiffs lodge at the Patent Office a disclaimer of the said claims. Order that the plaintiffs pay the defendant's costs of the action and of the counterclaim.
Date of Judgment	7th November, 1961.
Delivered	Sydney.

WITTY AND OTHERS

v.

TURBON ENGINEERING COMPANY PTY LTD

This is an action for infringement of a patent. It was commenced in the Supreme Court of Queensland and was removed into this Court by s. 116 (1) of the Patents Act 1952-1960 (Cth), the defendant having applied by way of counterclaim for the revocation of the patent.

The patent, No. 148,442, was sealed on 13th May 1960, a complete specification having been lodged under s. 63A of the Patents Act 1903-1950 (Cth) in respect of two provisional specifications for cognate inventions. The date of the earlier application was 4th February 1949, and that is the priority date as at which validity is to be considered in respect of all the claims that come into question in this action, except one. The claims to be considered as at that date are claims 1, 2, 3 and 7. The exception is claim 20, the priority date of which is 12th October 1949: see s. 63A of the Patents Act 1903-1950 and ss. 5 (3) and (4) of the Patents Act 1952-1960.

The invention referred to in each of the relevant claims is a water heater for hot water systems, the principal object of the invention being, according to the body of the specification, to provide a heater adapted to be connected directly to a source of domestic water supply, so that heated water can be delivered at the pressure prevailing in the water supply.

Claim 1 is for a water heater including six features: (1) a tank adapted to contain a static body of liquid, that is to say (as the body of the document makes clear) a body of water that is not drawn off by the hot water system, but remains in the tank as a heating medium, to heat by conduction the below-mentioned coil of tubing within it which carries the water to

be drawn off in use; (2) a vent from the upper part of the tank to atmosphere, ensuring (as appears elsewhere in the document) that the static liquid will never be under more than atmospheric pressure, and therefore that its boiling point will never be excessive, i.e. in the case of water will never exceed 212° F.; (3) a coil of tubing within the tank, adapted to be substantially covered by the static liquid therein, and extending down into the lower half of the volume of the tank, thus (as appears) reaching as near to the thermostat and heating element as practicable while remaining spaced from them; (4) an inlet to the coil adapted to be connected to a source of domestic water supply under pressure; (5) an outlet from the coil adapted to be connected to a supply pipe of the hot water system (i.e. the reticulation system through the house); and (6) a thermostatically controllable electric heating element within the lower part of the tank, spaced from the coil and adapted to heat the static body of liquid in the tank to heat by conduction the water under pressure in the coil.

Claim 2 is practically identical, except that the static body of liquid is water.

Claim 3 is a heater according to either claim 1 or claim 2, wherein the coil is substantially helical, its convolutions being spaced from each other.

Claim 7 is a heater according to any of the preceding claims wherein the tank is enclosed within an outer casing, and heat-insulating material is interposed between the tank and the casing.

Claim 20 is a heater substantially as described in the specification with reference to the accompanying drawings. These add nothing significant, except a condenser which the specification says that the inventors prefer to provide in association with the tank. This is shown in the drawings as an external accessory by which vapour from the static liquid

is collected and condensed and the resultant water is returned to the tank.

The defendant admitted at the trial that in 1959 it manufactured and sold two heaters, being those which were put in evidence as exhibits C and D respectively, and it concedes that exhibit C is precisely covered by the first four of the claims that have been mentioned. It denies infringement of claim 20, because exhibit C has no condenser. Exhibit D contains only one difference upon which the defendant placed any reliance in order to take it out of claims 1, 2, 3 and 7, and that is that the water to be drawn off for use is heated not in a helical coil of tubing but in a series of vertical tubes. Each of these is of much greater cross-section than the tubing used in exhibit C. One of them draws cold water from the domestic supply by an inlet at the top and passes it out from its lower end to narrow tubing which conveys it to the top of the next large tube; and this arrangement is repeated in respect of all the remaining large tubes until the narrow outlet tube from the bottom of the last large tube takes the heated water out to the hot water system of the house. There was some difference of opinion among the experts as to whether this arrangement of pipes or tubes should be called a coil of tubing, but on the whole I think that the heater exhibit D is substantially and in all essential features the same as that which the four claims describe. Heaters of which it is an example were manufactured by the defendant as a new model to supersede the earlier model exemplified by exhibit C. Advantages from the broad tubes were suggested in the evidence, but the historical reason for their adoption was not explained sufficiently to remove the prima facie inference I would draw, namely that the change was made in order to produce a difference which might succeed in defeating a claim of infringement. However this may be, I do not think that the difference is

sufficiently significant. I find infringement in respect of this heater, as well as exhibit C, so far as claims 1, 2, 3 and 7 are concerned. I find also that each heater infringes claim 20, despite the absence of a condenser; for the body of the specification describes the condenser as no more than a preferred provision in association with the tank, and its omission leaves the heaters substantially as described.

I turn to the question of validity. I am satisfied there was no mains-pressure domestic hot water system on the market in Queensland before 1949, and that the plaintiff Chappel, after original experimentation, evolved the system which is claimed in the specification. Mr Chappel, I am sure, believed that he was the first inventor of it; and to Mr Monaghan, a former president of the Federated Master Plumbers of Australia and a master plumber of wide experience in the relevant field, it appeared to be revolutionary. Its utility is unquestioned, and commercially it has been very successful. Large numbers of units made in accordance with it have been sold. The local market was evidently waiting for a satisfactory mains-pressure hot water system to be placed on sale. When, therefore, the defendant says, as in effect it does, that the invention by means of which the plaintiffs succeeded in meeting the requirement of a waiting and remunerative market was not novel in Australia in February 1949, and, having regard to what was know or used in Australia at that time, was obvious and did not involve any inventive step, the plaintiffs are entitled to demand a close, not to say sceptical, examination of the evidence adduced in support of the assertions.

But the evidence is very strong indeed. In the first place it includes the prior publication in Australia of a number of patent specifications, several of which appear to me to cover the whole ground of the plaintiffs' invention. The

defendants, naturally enough as it seems to me, draw attention first to an Australian patent No. 161,58/44, the specification of which was admittedly published on 8th March, 1945. For convenience this has been called the Major patent. It is for instantaneous hot water systems directly connected with the main, employing what it describes as a heat exchanger unit in which a heat exchanging element is surrounded by the contents of a low-pressure storage tank containing a heat-carrying medium such as water or any other suitable liquid. The heat exchanger consists of a coil of small diameter pipe with closely arranged convolutions, inserted in a cylinder of only slightly larger diameter. If fig. 1 of the drawings which accompany the specification be examined it will be found to present every feature of the plaintiffs' invention (omitting the condenser) with a variation due to a difference of idea as to the way in which the coil containing the water to be heated may be exposed to heat in the most efficacious manner. There is (1) the tank containing the static liquid; (2) a vent from the upper part of the tank to atmosphere (it is through a small cistern above the tank, but the small head of water thus existing would not make the pressure in the tank significantly higher than atmosphere); (3) a coil of tubing within the tank, covered by the static liquid; (4) an inlet to the coil for connexion to the water supply; (5) an outlet from the coil for connexion to the pipes of the house reticulation system; and (6) a heating means which may be a thermostatically controlled electric heating element within the lower part of the tank, spaced from the coil and adapted to heat the static liquid to heat by conduction the water which is under pressure in the coil. The difference in regard to the exposure of the coil to the maximum heating influence consists in this. On the one hand, the plaintiffs' invention carried the coil of piping down from somewhere near the top of the tank into the lower half of it so as to approach

the heating element, with the idea (as the specification makes clear) that, the convolutions of the coil being spaced apart, the convection currents in the tank will be substantially unimpeded by the coils. This, it is considered, will minimise stratification of the heating water, and, if the cold water is directed to the bottom of the coil (a point upon which none of claims 1, 2, 3 and 7 insist), the water round the thermostat will be kept down so that the heating element will be kept in maximum operation. On the other hand, the Major invention aims, in its arrangement of the coil in the tank, to take advantage of stratification in the heating water. The coil is in an enclosing cylinder which enters the tank at the side but near the top, and slopes slightly downward from the horizontal. The coil enters and leaves its cylinder at the closed end outside the tank. The other end of the cylinder is open and leads into a perforated duct which travels down the side wall of the tank, to a perforated shell surrounding the heating element, and then up to the opposite side wall. The object is to effect automatic strata selection, so that the hottest strata will enter the cylinder, lose heat by conduction to the water in the coils, and sink to the stratum possessing the same temperature as that to which it is thus reduced. The explanation in the specification need not be repeated here. It seems to me that a person at all familiar with water heating problems, and indeed many people with little or no technical knowledge, would have understood, after studying the Major specification, that it was easily practicable to provide a domestic hot water system in which cold water taken directly from the main could be heated by conduction from a surrounding body of water (that body of water being heated by a thermostatically controlled electric element and remaining always at atmospheric pressure) by passing it through a coil set in that body of water and leading out to the distribution points in the house. Such a person would see at once, even if he did not know independently, that if he

cared to put aside the Major idea for taking advantage of heat stratification in the surrounding water he could make a mains-pressure hot water system by putting the coil in any position at all in the tank, and that if he made the cold water enter the coil at its lowest point, and put the lowest point in the vicinity of the thermostat, he would assist the heating of the liquid in the tank and consequentially the water to be drawn off from the coil. In other words, if Mr Chappel himself had had the Major specification before him when he started his experiments, he would have had all the knowledge that he needed, and more, to enable him to produce his hot water system.

Then there is the Stanley specification, No. 11,327/47 (exhibit T), which was admittedly published on 11th March 1948 but on which no patent has been granted. It describes an indirect storage hot water heater in which the elements are a tank which is filled with water open to atmosphere and therefore not under pressure, the water being heated by gas or other source of heat; a pipe coil immersed in the tank and receiving water directly from the water main and issuing it, heated, to the taps; a baffle pipe rising from a little above the bottom of the tank to just below the lowest point of the coil; and (for the case where a gas burner is the heating means employed) a flue within and concentric with the baffle pipe and passing through the whole height of the tank. The essence of the invention seems to be the baffle pipe, the purpose of which is to concentrate the hot, upward-moving convection currents onto the pipe coil and guide the cold downward currents back to the bottom of the tank where the heat is being applied. Exhibits 3 and 4 are drawings of the same invention, with squat and tall tanks respectively, fitted with a thermostatically-controlled electric heating element and omitting the flue which that kind of heating-means renders superfluous. These drawings were made for the purposes of the case, and they make it very clear that the plaintiffs had nothing to tell which a person acquainted

with Stanley's specification would not already understand. The six elements of the plaintiffs' patent are all provided for by Stanley, except that he keeps the coil to the upper part of the tank; and any competent worker in the relevant field, if he were not concerned to retain the baffle pipe, and therefore had no particular reason for keeping the pipe coil high, would naturally, and almost necessarily, spread the coil over the greater part of the height of the tank. There is no suggestion in Stanley of a condenser, but otherwise anyone who considered Stanley had the whole of the plaintiffs' invention before him with the addition of the baffle pipe inserted between the heating means and the coil of pipes.

There is, thirdly, a Swedish patent No. 104,979, published in Australia on 8th April 1946. It takes a furnace-type boiler, such as in winter is used for central heating purposes, and introduces into it, from the top down into the water room (or tank) of the boiler, a coil of piping to receive cold water, to enable it to receive transferred heat from the water of the boiler, and pass water thus heated out to the hot water taps of the house. In winter the water of the boiler is heated by the furnace, in summer by an electric element. The specification takes for granted that all this is familiar. The invention aims to overcome a deficiency in such heaters, which may be explained by saying that the electric heating in summer is unsatisfactory because, where cold air enters the furnace compartment and the smoke channels it cools the water immediately above, and, when heated water is drawn from the coil and replaced with cold water, currents at once arise which mix the cooled water at the bottom with the warm water above. The method used in order to overcome this is to divide the water room into two parts by means of a horizontal partition, and to place the electric heating element in the upper part which contains the coil of piping for

hot water. The partition does not completely seal the two parts from one another; there are apertures or pipes connecting the two, so that when the furnace is working in the winter the up and down currents due to the heating it supplies may pass through and warm the water in the upper part of the water room. But in summer, when the water in the lowest part of the water room is cold and the currents set up when hot water is withdrawn from the coil of piping would mix the water at the bottom of the boiler, cooled by the cold air in the unused furnace and smoke channel, with the water at the top, the partition substantially impedes the downward passage of the currents and so enables the water in the top part to be more effectively warmed by the electric element, and so more made effective to transmit heat to the water in the coil. If Mr Chappel had had this specification, the only steps he would have had to take in order to arrive at his invention would have been to introduce the cold water at the bottom of the coil (the Swedish patent puts both the inlet and the outlet at the top), put in a vent to atmosphere (which the Swedish patent assumes, subject to a small degree of pressure due to whatever head of water there may be from the tank which supplies the water in the water room of the boiler), and add the condenser if desired.

Some other specifications may be mentioned more briefly. A United States specification No. 2,318,913 (Aldrich - exhibit Y), published in Australia in November 1943, is interesting for the assumption from which it proceeds, namely that a domestic hot water heating system is well known in which water in a pipe coil is heated by means of transferred heat from a surrounding body of water in a boiler. The first stated object of Aldrich's invention is to provide "a domestic water coil which is readily renewable and installable relative to a vertical flue type of boiler in such manner that the coil has considerable volume and extends throughout a considerable extent of the space within the

boiler". An Australian specification, No. 3987/8 (Penninghaus - exhibit N), published as long ago as 1905, shows the heating of a continuous hot water supply by means of a coil of piping placed in a tank of heated water which is at atmospheric pressure. A United States specification, No. 1,560,528 (Baum - exhibit V), published in Australia in 1926, describes an "off-peak" hot water system which has no condenser, but otherwise differs from the plaintiffs' system in two respects only: (1) the thermostatically controlled electric heater is located outside the tank, drawing water from it at one point and returning it, heated, at a lower point; and (2) with the object of heating the water to high temperatures so as to be still hot at peak hours, the tank is strongly built, and is closed except for a relief valve. To make it resemble the plaintiffs' invention the counterweight on the valve would have to be increased to keep the valve open and maintain the water at atmospheric pressure. "A water heater, such as coils, are contained in this tank within the body of liquid", the specification says, "one end of the coils being connected externally of the tank to the source of water supply, and the other end being connected to the domestic hot water system or other place of utilization". The drawing shows the coil receiving cold water at a point near the bottom of the tank and emitting hot water at a point near the top. Mr Chappel, not wanting an off-peak system, had only to discard the means of creating pressure in the tank, put the heater inside the tank, and add a condenser if he wished, and he would have had everything his specification describes. To make these alterations, no knowledge or understanding was required which the ordinary worker in the relevant field would not have possessed.

I turn to the question of prior user in Australia before 1949. In this connexion it is necessary to consider a body of evidence concerning a piece of equipment used by Henry and Wightman Pty Ltd at their premises at Boundary Street, Brisbane,

some years before 1949. For the purpose of cooling oil in a process of testing thermostat valves for oil-cooling systems of United States aircraft engines, water was passed through coils of piping immersed in the oil in a tank. The water absorbed heat from the oil by conduction, and passed out to waste. At one period, employees used some of the escaping heated water for washing. About 1945 the testing equipment was dismantled, and the cooling tank was put to a new use. The oil was replaced by water, which, since the lid of the tank was loose-fitting, was always at atmospheric pressure. The coils of piping were removed, except one. The remaining coil, extending helically from near the top of the tank to a point well within the lower half of it, was connected directly with the town water supply and delivered the heated water to an external tap. A thermostatic switch, inserted from the top, operated an electric heating element inserted in the water in which the coil was immersed. The water-heating contrivance thus evolved was used at first inside the factory building, and later in an open yard outside, to supply warm water for the ablutions of employees. After some months it was moved to a vacant allotment, and it was not used again. But what is important is that its use for the production of hot water, particularly while it was installed in the yard, was an open use, without any attempt at secrecy or privacy, and in a place where it might have been readily inspected by many people not all of whom, by any means, were employees of Henry and Wightman Pty. Ltd. There was nothing to prevent anyone who passed by it from ascertaining, by inspection, of what integers it consisted and how they were employed in combination for the heating of the water which was taken into the coil and delivered from it at mains-pressure. And anyone who took advantage of the opportunity would have learned substantially all (apart from the idea of adding a condenser) that Mr Chappel was to work out later for himself.

What anyone who understood this contrivance needed in order to beat the plaintiffs to the waiting market was, not the exercise of any inventive faculty, but the acumen to realize that there, in Henry and Wightman Pty Ltd's yard, stood revealed a mains-pressure hot water system which needed only to be given a presentable form, and one convenient for installation in homes, to become a profitable commercial proposition. A full account of the facts on this part of the case was given by Mr L. D. Henry, whose evidence generally I accept.

But I am satisfied also that before 1949 a person possessing the knowledge common in Australia among those whose business it was to be concerned with methods of water heating, and applying his mind to the production of a mains-pressure hot water system for domestic use, would not have been saved any inventive step by this object lesson. Heat exchangers were well-known, that is to say contrivances such as calorifiers in which one liquid took heat from another liquid by conduction, being contained in or passed through a pipe or other receptacle (of copper or some other efficient conductor of heat) which was immersed in that other liquid. As long ago as 1896, W.R. Maguire, in the second edition of his book "Sanitary Drainage and Plumbing", which was available to the public long before 1949 in public libraries in Sydney and Brisbane at least, described at pp.443-445 a "safety" hot water system consisting of a coil of pipes placed in an open boiler, the ends of the coil being extended to a tank or cylinder as ordinary flow and return, and pointed out that the advantage of having the water in the boiler at atmospheric pressure was that no dangerous pressure of steam could accumulate in boiler or in pipes. He added that better results would be obtained by having "ordinary closed circulating boilers" instead of open boilers, because less heat would be wasted. Then he added: "There is also to be mentioned the double boiler, or

gluepot boiler system, which consists of a circulating boiler immersed wholly or partially in an open boiler, gluepot-wise, with circulating pipes from the inner boiler to and from a hot cylinder or tank at a higher level. The safety here is undoubtedly secured, provided that the outer boiler is always full; temperature in inner boiler cannot reach 212°, no steam can be formed, and therefore no explosion can occur.".

But I rely more on the evidence as to the prior state of the art which was given by Mr Stanley, an engineer employed by Malleys Ltd, who had had considerable experience in the relevant field and was the author of the Stanley specification above considered. I shall not attempt to give a precis of his evidence, which included a good deal of detail; but its general account of the relevant knowledge of hot water engineers and other persons in the trade prior to 1949 satisfies me that the plaintiffs' specification made no inventive advance. Even Mr Sheridan, senior lecturer in mechanical engineering at the University of Queensland, who was called as a witness in the plaintiffs' case, agreed that Mr Chappel's invention had no new element in it. He asserted that there was inventive ingenuity in realizing that the water surrounding the tubes in the tank might be kept relatively unmoving, that is to say that attempts made by others to induce or increase circulation in the tank by convection currents might be abandoned, with the result that a simpler device than theirs could be satisfactorily employed. I shall not recount in detail his cross-examination on this topic; it will suffice to record my conclusion that Mr Sheridan, sincere though I do not doubt that he was, failed to substantiate his opinion that Mr Chappel, in combining as he did integers which were all well known, took any step that was truly inventive. The problem which Mr Chappel faced and solved to his own satisfaction was only that of so regulating the dimensions and arrangement of

known integers, particularly the coil of piping - integers which were known, and the combination of which for such a purpose as that of heating water was known - that the capacity of the system and the rate of delivery of hot water would meet the needs of the majority of homes. That was a problem of adapting what was already known to a potential demand in such a way that commercial success would be likely. Mr Chappel's solution of it is not a proper subject-matter for a patent monopoly.

For all these reasons I am of opinion that the action fails, and that the counterclaim for revocation of the patent succeeds so far as it relates to the claims to which attention has been directed in this case.