

4-1-1964

## The Irish Plumbing and Heating Engineer, April 1964 (complete issue)

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April 1964

Published by ARROW@TU Dublin, 1964

Vol. 4 No. 1

*Special Monthly Supplement*  
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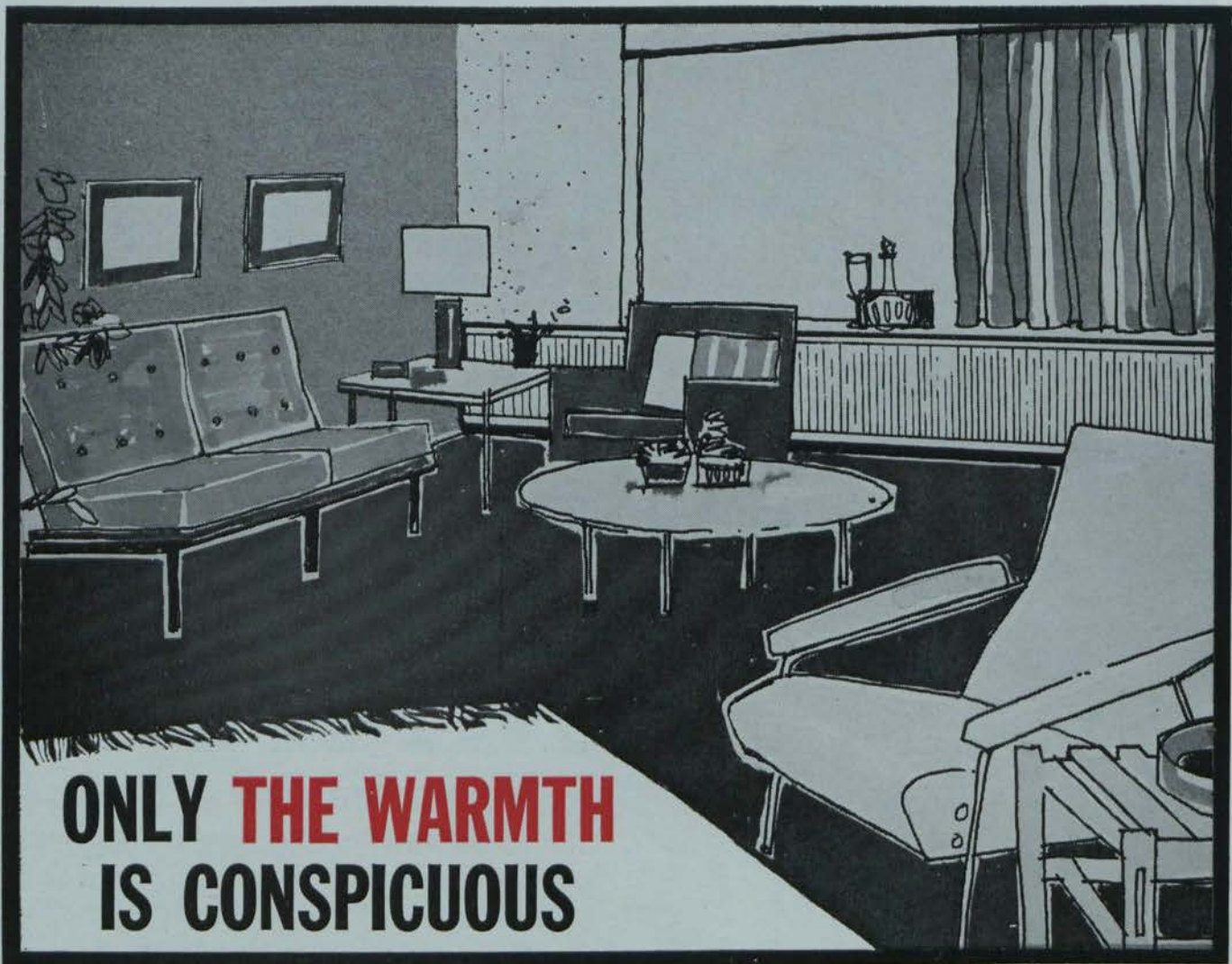
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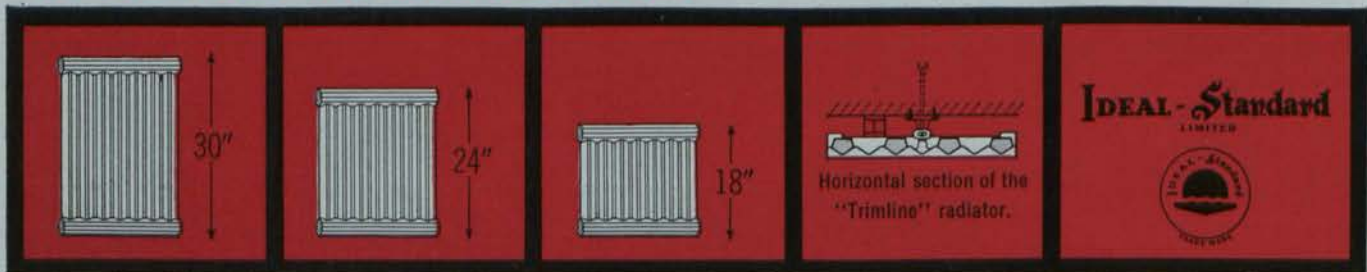


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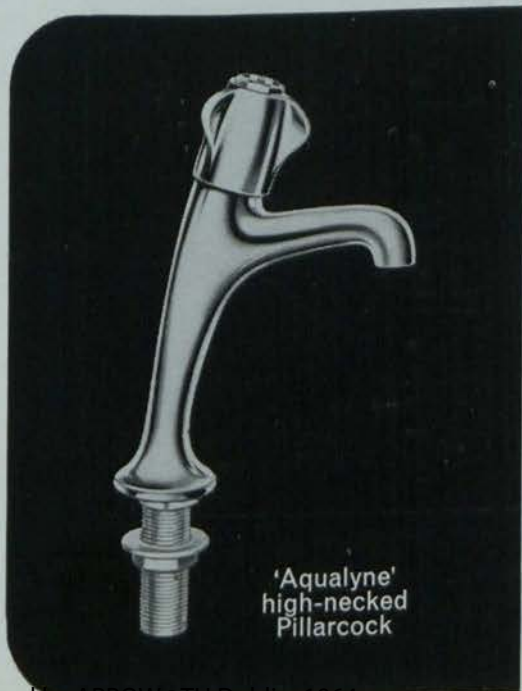
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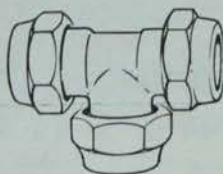
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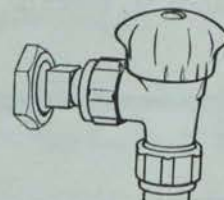
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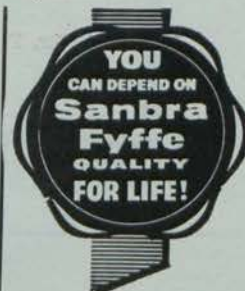
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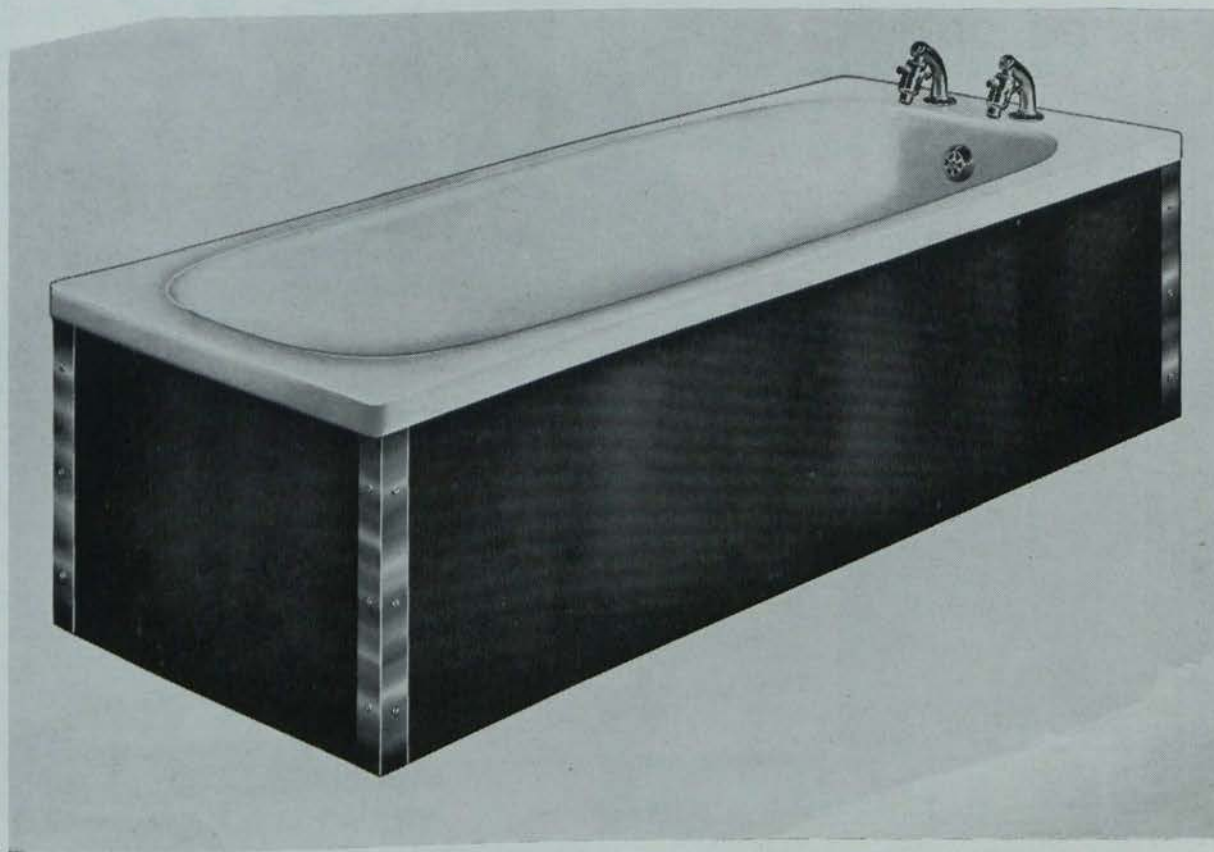
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## HEVAC EXHIBITION

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# trade Topics

## BETTER BATHROOMS DISPLAY

**S**POTLIGHTING the great business potential of the bathroom is a six-week display in the London Design Centre.

Theme of the display is simply "Better Bathrooms" and it stresses the urgent need for better design and fuller use of the available advanced equipments for this room.

A typical example is instanced in this picture from the display, where the design has been arrived at to show how to make the best use of a small space.

A particular feature of this bathroom setting is the dual-control Leonard thermostatic shower installed over the bath. Elegantly unobtrusive, this shower set provides independent choice of shower temperature as well as spray force and, once set, the temperature is maintained thermostatically.

THE first house in the Republic to have the new Ductair gas central heating method has been opened by Mr. N. J. Robertson, General Manager and Director of the Gas Company.

It is one of 25 houses being built by Mr. T. J. O'Reilly, Donnybrook, in the new Glenageary Estate, which will have 150 houses and a complete shopping centre.

Mr. Robertson said the five-



● In this bathroom design the best use has been made of a small space.

bedroom house was built especially to incorporate the levels of comfort demanded by ordinary people, and at £4,250 represented exceptional value within the resources of the average family.

The Ductair system has been fully reviewed in previous issues of The ENGINEER.

The opening was also attended by Mr. L. F. Young, Area Manager, Radiation Central Heating Ltd., and Mr. E. W. Apsey, Installation Engineer, Gas. Co.

The Ductair heating method will also be used in 93 houses now being built in Clondalkin.

In the Six Counties, local authorities have installed it in 1,600 houses built in the last six months.



Another big HEVAC Exhibition opened at Olympia this month. The I.P.H.E. had its own correspondent at HEVAC and his report will appear next month. Watch for this report of what made news at Olympia this year.

## IRISH PLUMBING & HEATING

# ENGINEER

Vol. 4. No. 1. APRIL, 1964  
THE IRISH PLUMBING AND HEATING ENGINEER is the only publication produced in Ireland catering exclusively for the heating, plumbing and ventilation industries with a guaranteed circulation covering the Republic of Ireland and Northern Ireland every month.

Our correspondent was at Olympia earlier this month for the opening of the International HEVAC Exhibition. His report did not reach us in time for inclusion in this issue but will appear next month.

There is another article for domestic heating installers from W. J. R. Couchman. This is part three of our Seven Deadly Sins series.

Due to pressure on space this month, Allen McDowell's Northern Notes have been held over for an issue

The Special Review topic this month deals with circulators and pumps, water and drainage pumping and storage equipment. A product review accompanies the survey.

Trade Topics report the month's plumbing and heating news.

●  
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the

7



deadly sins

## of domestic installation

PART THREE

**F**ROM the survey of the house—last month's subject—we may now progress to the detailed design of the heating system. More correctly one could say: "a detailed design of one of the many types of heating system that could be applied to any one job."

A domestic heating system may derive energy from solid fuel, oil, gas or electricity. If we exclude electricity from our considerations (as we reasonably may, since this does not usually come the way of the average heating engineer or installer), we are still left with systems on any of the other fuels that may be basically warm air or hot water heated, with or without provision of domestic hot water from the boiler or heater. A warm air system may be direct or indirect; the indirect system uses a water-to-air heat exchanger. A water heated system may disperse heat via various types of radiators, or skirting heating, or from convectors, or by panel warming, i.e., pipe coils in floors or ceilings.



I mention all these possibilities, although there is not space to fully discuss them, because it is important that an installer should keep an open mind and should be prepared to provide that system which best suits the customer's needs.

For our working example I have taken a small existing detached bungalow, illustrated here. (See overleaf).

Actually, this job is one of those cases where an existing dwelling can be quite economically heated using a warm air system. As a rule warm air systems, although very suitable for inclusion while building a new dwelling, are difficult to install in existing work because ducts are so much bigger, and harder to hide, than pipes. In this particular case I have assumed that we

have a timber floor with plenty of room under the joists, and this could take either ductwork or pipes. A bungalow can, of course, be heated via ductwork in the roof space, but low-level air distribution is usually better and cheaper.

All things considered, however, I have thought it best to treat this as a water heated system; I believe this is what most people want to read about and are concerned with.



The heat emitters would probably not, on such a small job, be fan convectors nor is panel warming likely. From the designer's point of view there is little difference between skirting heating and radiators. In this design we can settle for the commonly used steel panel radiators, with comment from time to time on the considerations that would be involved if skirting heating was used instead. One would expect, on a job like this, to have to provide a hot water supply from the same boiler. I leave the choice of fuel to you!

Normally, after discussion with the customer, we would have a fairly good idea of the sort of control system that would be needed for the job. I think it best, though, to leave the subject of controls for the moment. It is a big subject and deserves treatment in isolation at a later date in this series.

And now, after this lengthy (but I hope you will find necessary) preamble, we can get down to the design.

The first thing to do is to find out how much heat is needed in order to achieve the required temperatures, and our next "deadly sin" is to fail to do this properly.

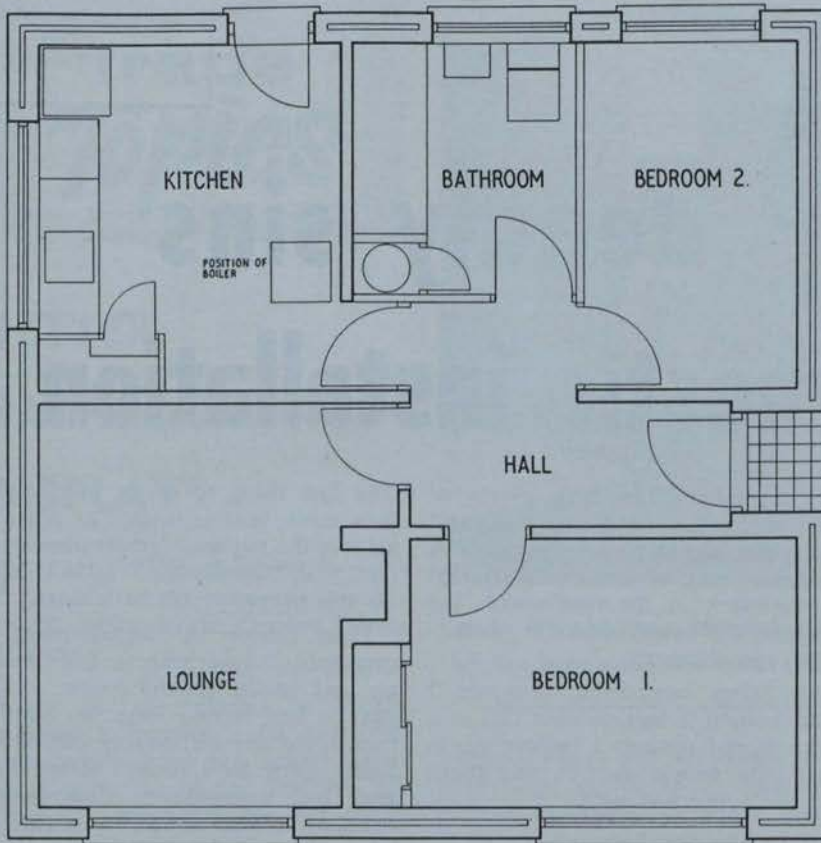
**Heat Losses:** A heated house is constantly losing heat to the outside air and to the ground below. The heat is lost in two ways; by ventilation, since any air moving out of the house must have been heated first, and by transmission through the structure of the house. The rate of loss will depend on the temperature difference between inside and outside, and on the ability of the house to retain heat. This is why it is important to ensure that the house does not have too many air leaks, and that as far as possible the house is well insulated. If the rate of heat loss is established, then it becomes possible to replace heat at the required rate as it leaves the house, thus maintaining a reasonably constant temperature. It's rather like hanging a leaky bucket under a tap and adjusting the tap to keep a constant level in the bucket—it helps a great deal if you know how big the leak is!



Life is never simple. The big difficulty with heat losses is that the outside temperature varies all the time. Because of this we have to take a fixed point for the outside temperature and work all our heat losses to that fixed point. This fixed point used to be taken as 32 degrees F., but

*Continued overleaf*

**T**HIS sparkling and well-informed series is by W. J. R. COUCHMAN. His name will not be unfamiliar to many readers, as Mr. Couchman maintains close contact with the trade throughout Ireland and is ideally informed to compile this new series.



## domestic installation

from previous page

nowadays is generally taken as 30 degrees F.—two degrees of frost. There will be odd times when the outside temperature will be less than this, in which case we may get a little more out of the system by putting the boiler thermostat up a bit, but, unless the customer has specially asked for the system to be designed against, say, 20 degrees F., there is no more we can do. In practice it has been found that an assumed outside or "design" temperature of 30 degrees F. is generally satisfactory. At other times, of course, the outside temperature will often be well above the "design" temperature, and too much heat could be fed in from the system. A good control system, or the householder's common sense, should take care of this problem.

Having read this you may feel that, since the computation of heat requirements seems to be an art rather than a science, there is little point in trying to be too precise. This is not the case. If you contract to provide

certain temperature conditions, then you are in no position to take chances, and in any case one has a duty to give every care and attention to the customers' needs.

For those cases where precise temperature levels have not been promised or guaranteed, or when a quick preliminary assessment is required, some form of heat loss estimator may be used. Most people in the trade have seen these instruments; there are three different types in use in this country and in Great Britain. I think they can be useful; in fact one of them was designed by myself.



If, however, the most precise results are required, then there is no alternative to doing things the hard way. Most installers are familiar with the basic method but, for the benefit of students and those who have not had occasion to work out this part of the design, I will start from first principles. It may help to keep this article, as I will in later issues refer back to this drawing.

First, then, two units of measurement are involved. There is the familiar British thermal unit or "Btu." One Btu. is the amount of heat required to raise the tempera-

ture of one pound of water by one degree Fahrenheit. There are ten pounds to the gallon, so ten Btu's will heat a gallon of water one degree. A thousand Btu's will heat a gallon of water through one hundred degrees Fahrenheit. A gallon of water at a good washing-up temperature, say 140 degrees F., represents therefore about one thousand Btu's. So much for the Btu!

The other unit is the "U" value. Put simply, this is a measure of the rate at which heat will pass through a given material. The correct definition is: "British thermal units per square foot per hour per degree Fahrenheit difference in air temperature." You can see why a short name had to be found for it!

Full lists of "U" values for different materials, structures and conditions are given in a number of standard text books. A short list of the

*Continued page thirty-five*



**MR. PHILIP McNAIR**, who will move from Gateshead to Sigmund Pulsometer's Reading works to take up his duties as group publicity manager with responsibility for all advertising, public relations, exhibitions and sales literature, is pictured here.



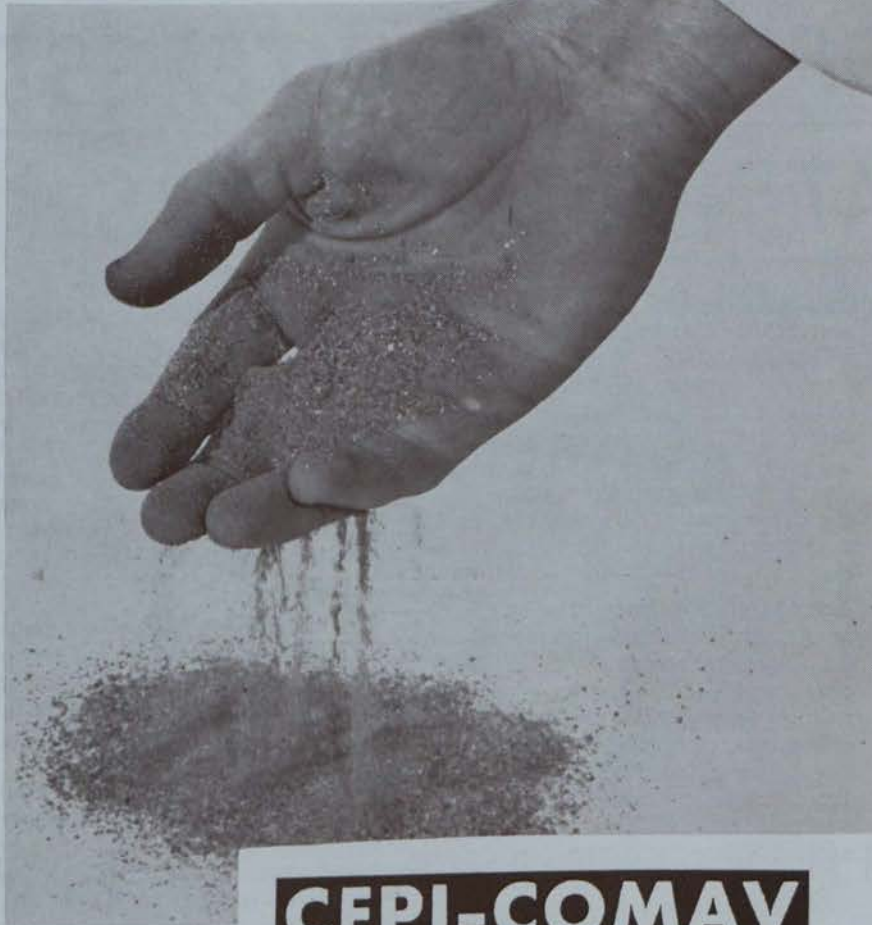
Mr. McNair will be responsible to Mr.

**A. L. Cramb**, sales director, and will be assisted with publicity matters by **Mr. F. A. Colbert**, publicity officer. In addition to his other duties, Mr. McNair will establish a printing department at Reading to handle Sigmund Pulsometer's printing needs.

\* \* \*

A FULL colour eight page leaflet on the new B.S.A. Harford range of Panel Radiators has been published. The leaflet gives full details of the B.S.A. Harford range of panel radiators, including dimensions, heat transmission and number of brackets recommended.

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— IN IRELAND

THIS MONTH the industrial section has a double special survey programme. The first deals with drying apparatus and ovens.

The second of the section's special surveys covers calorifiers and cylinders, pressure vessels and tanks.

Daniel Heeney contributes another article under the heading Mechanical Refrigeration To-Day. It is the last article but one in this series.

An automatic combustion control scheme for small oil-fired boilers is discussed in the section this month.

Trade Topics review the month's news.

NUMBER 4 — Presented with the April, 1964, issue of the Irish Plumbing and Heating Engineer.

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# MONTHLY SPECIAL REVIEW

## DRYING APPARATUS AND OVENS

# DRYING OF GREAT INTEREST TO HEATING ENGINEERS

**DRYING** is one of the fundamental operations in many industrial processes, and while it is normally considered to be in the realm of chemical engineering, it is also of great interest and importance to heating engineers. Many different types of drier are used, often for a single material, and the selection of the best one is often very difficult. The main object of a drier is the removal of water from wet materials, but a number of other considerations must be taken into account, such as the efficiency of the dryer, the uniformity and accuracy of final moisture content of the dried material, the avoidance of damage to the material by overheating at mechanical abrasion, the risk of fire, and the controllability of the drier.

**Mechanics of Drying:** The drying of porous materials is by far the commonest operation. Whilst drying can be considered as essentially a surface phenomenon, the conditions and period of drying of such materials are governed by the rate of moisture migration through the material to the surface. This rate is a function of temperature and resistance of the material and cannot be accelerated above a certain point without damaging the material.

**I**NITIALY when the wet material is introduced into the dryer the temperature of the material rises and the rate of evaporation of the surface moisture increases. The second stage of drying occurs when the surface moisture is evaporated and a state of equilibrium is reached between the rate of diffusion of the moisture through the material to the surface and the evaporation from the surface. The rate of drying in this phase is more or less constant.

face dries out and the rate of drying decreases. The moisture content at which this occurs is termed the critical moisture content. This and other characteristics of a material may be determined in a laboratory by obtaining a drying curve, which is a plot of the moisture content against time during the process of drying under controlled conditions.

**DRYING Efficiency:** The efficiency of a dryer is usually expressed in B.t.u.'s or lbs. steam per lb. of water evaporated. In industries where the quantity of water evaporated is high, efficiency is of paramount importance. For instance, Bord na Mona in their three briquette factories require to evaporate 250,000 tons of water per annum. They use a five-stage drying sequence and achieve an efficiency of 0.84 lb./steam per lb. water evaporated. The water evaporated in the first effect dryer is condensed and heats water for the second effect dryers. Messrs. Chipboard, Ltd., Scariff, evaporate 300-400 tons of water per week from timber and use air, superheated steam and contact dryers. The achievement of high efficiencies entails high capital cost and this must be balanced against the saving in running costs. The latter, in turn, depends considerably on the fuel costs. Both of the firms mentioned above use waste from the process to fire their boilers.

For high thermal efficiency, as high as possible an inlet temperature should be used, and the leaving air should be of as low a temperature and

as high a relative humidity as possible. A considerable amount can often be done to increase the efficiency of a drier by recirculating a proportion of the exhaust gases and so building up the relative humidity. In the seasoning of timber and the curing of enamelled furniture, high relative humidities are essential to safeguard the wood and this is achieved by the injection of steam.

**Psychometrics:** The psychometrics of drying are best illustrated by an example. In an air drier, fresh air at 60°F. D.B. and 70% R.H. is first heated to 118°F. The initial moisture content is 54 grains/lb. The heated air comes into contact with wet material and evaporation takes place adiabatically along the 74°F. wet bulb line psychometric chart until the point of 60% saturation is reached. The exhaust condition is then 85°F. D.B. and 74°F. W.B., the moisture content being 110 grains/lb. Thus each lb. of air picks up  $110 - 54 = 56$  grains. To remove 100 lbs./hr. of moisture the total quantity of fresh air required is:  $100 \times 7000 = 12,500$  lb./hr. or 2820 c.f.m.

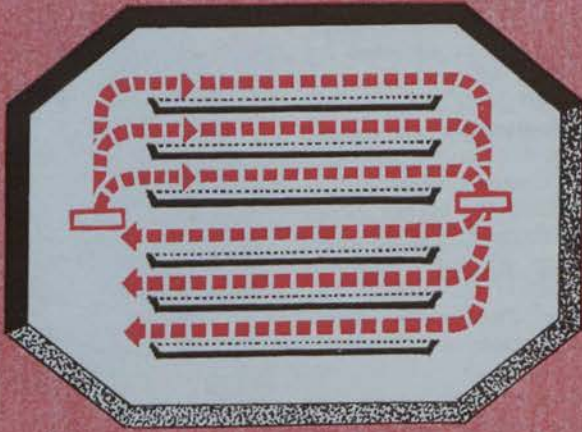
56

**T**HE drying capacity of air is the difference between its dry bulb and wet bulb temperatures, i.e., the wet-bulb depression. If it were possible in the example given above to exhaust at 100% relative humidity, the moisture pick up would be 75 grains/lb. instead of 56. The fresh air quantity could be reduced to 9,350 lb./hr. and the heat required to heat the air from 60°F. to 118°F. would be reduced from 174,000 B.t.u./hr. or 1,740 B.t.u./lb. of water evaporated to 130,000 B.t.u., or 1,300 B.t.u./lb. of water evaporated. This illustrates the



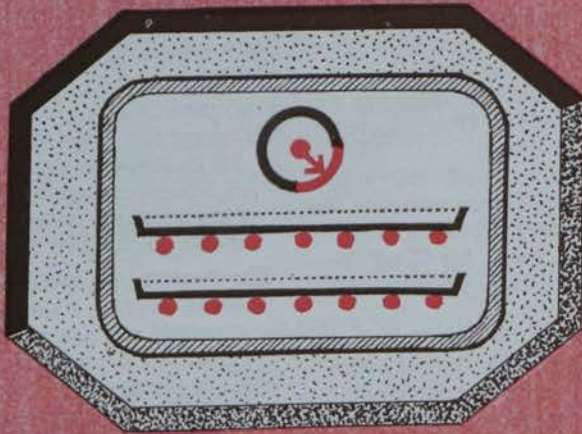
This Special Review  
article is compiled  
by technical expert  
Mr. R. Keating.

Continued page fourteen



## CONVECTION DRYING

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## VACUUM DRYING

high grade engineering and optimum drying performance



## SPRAY DRYING

McDowell, leaders in industrial drying and producers of the D4 Tray Dryer, have exclusive rights to manufacture convection and vacuum dryers developed by CIBA, and liquid-powder spray dryers under licence from Lurgi. All McDowell batch dryers have increased thermal efficiency, ease of operation and high performance. The Lurgi dryers are very advanced machines with the widest adaptability. McDowell convection and vacuum systems are widely used in almost every important industry—chemicals, dye stuffs, pharmaceuticals, food, confectionery, plastics, paper and many others. McDowell-Lurgi Spray dryers produce thousands of tons of granular or powdered products such as milk, coffee, detergents, scores of chemical and process powders including those for plastics, ceramics and pharmaceutical industries.

# McDOWELL

THOMAS McDOWELL LTD., RCM WORKS, SOUTH WAY, WEMBLEY HILL ESTATE, WEMBLEY, MIDDX.



**IN this equipment review  
we take a look at new  
developments in the fields  
covered by the foregoing  
special review. (All claims are  
those of the manufacturers).**

THE AIRWOODS air heater, an oil-fired heat exchanger, is one of the simplest and most economical means of supplying warmed air for space heating or drying processes.

Connected directly to ducting, the Airwoods air heater can be installed almost anywhere, horizontally or vertically on the floor, on a simple platform or in the roof space. A cylindrical unit, it heats air moved through it by a Woods Aerofoil fan connected to one end. It can be installed either at the supply end of the system or within a duct run, becoming an integral part of the system.

The heater is made in five sizes, coinciding with the diameters of Woods Aerofoil fans. Heat outputs range from 65,000 to 1,840,000 B.t.u./hr.

The Airwoods heater is not a single performance unit. Any of the air volume/pressure combinations provided by Woods Aerofoil fan can be

obtained by selecting a suitable fan for the duty.

For large volumes of warmed air, two heaters can be used parallel. High temperature rises can be obtained by using two heaters in series or by using a relatively small fan. Multi-stage fans can be used for high system resistance.

The smaller sizes are fitted with a fluestat to switch off the burner motor in the event of flame failure so as to prevent unignited oil being pumped into the combustion chamber. The larger sizes are fitted with photoelectric cell controller to ensure instantaneous cut-off.

The Airwood heater range is handled by the General Electric Co. of Ireland, Dunleer House, Store St., Dublin.

\* \* \*

CTC HEAT exchangers and calorifiers, used extensively in Scandinavia and on the Continent generally for a great many years, are now proving successful in Britain. They are obtainable from CTC Heat (London) Ltd., 17 Sloane Street.

The manufacturing of this equipment is backed by considerable experience, as district heating schemes in Scandinavia have for long been based on what is known as the CTC System.

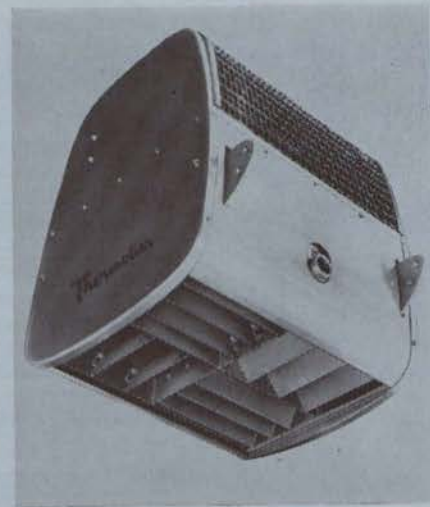
In Sweden many of the district heating schemes are linked with a system of refuse disposal. Until this method was introduced the collection of refuse from such district schemes was estimated to cost in the region of £9 per head per annum. With refuse used and disposed of in the heating system, the cost of refuse collection can be reduced by as much as £7 5s. per dwelling each year.

\* \* \*

DANIELS (B.B.A.) Ltd. has a team of engineers engaged on the design, application and installation of heat exchangers and steam accumulators. The Company designs and installs heating systems and waste heat recovery plant.

The Company is in a position to give specialised attention to the design work involving single installations with unusual problems. Daniels (B.B.A.) Ltd. are suppliers of the Rosenblads plate type heat exchanger and the compact Helical tube heat exchanger.

The Daniels' Elstac electric boilers are in use where fluctuating steam demands, low electrical loading, and fully automatic operations are necessary, such as hospital sterilisers, rubber and plastic moulding machinery, etc. Daniels are at Stroud, Gloucestershire, England.



## Down-flow Thermolier

**M**ATHER & PLATT Ltd. have introduced a "down-flow" version of the well-known Thermolier Unit Heater, for industrial and commercial space heating. Designed for high performance in compact form, these heaters have outputs from 35,000 to 350,000 B.t.u. per hour.

The heaters are suitable for use with steam or hot water (high or low pressure) and can be fitted with duct connections when required. Models with flameproof motors can be supplied for use in explosive atmospheres.

The heat exchanger is designed to give maximum heat conductivity between primary and secondary heating services; the copper tubes are expanded into aluminium grills, and belled and ferruled into the header plates, which are of 3/8" thick mild steel plate.

ATLAS Preservative Company Limited, of Fraser Road, Erith, Kent, have issued a new

### LEAFLET ON COATINGS RANGE

leaflet giving information on the Foster range of coatings, adhesives and sealers of insulation in heating, ventilating and air conditioning applications. The leaflet covers twelve products in the Foster range, describing their properties and methods of application in detail.

The products are backed by some twenty years' experience and development and are solely designed for the insulation trade, offering an effective and economical method of fixing and protecting insulation on hot or cold installations.

## SPECIAL REVIEW

*from page twelve*

increase in efficiency obtainable by using higher exhaust relative humidities.

**Types of Dryer:** The following are the main classifications of driers: Pneumatic Driers; Contact Driers; Spray Driers; Fluidised Bed Driers; and Accelerated Freeze Driers.

Spray driers and A.F. driers are used mainly for the drying of foods. Fluidised bed driers are applicable to most light granular materials. Pneumatic and contact driers have the widest range of application of all. The selection of drier must follow a very close study of all the factors outlined above.

Controllability is one of the most important features. Most modern applications require some degree of automatic control and facilities for this should be provided. Also the drier must be adequately instrumented, otherwise a drift from the design conditions may occur and a significant deterioration in results.



## Blow by blow

Blow hot, blow cold, blow high and low . . .  
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 in industry (especially if it's air that needs  
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 AIR PRE-HEATERS.

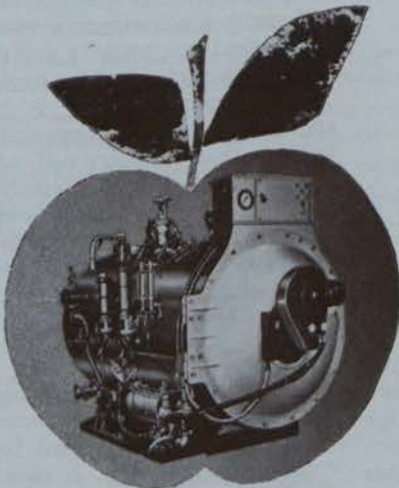


**DAVIDSON & CO. LTD.**

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Eire Representative:  
 E. C. Hancock Ltd., Hancock House, 17 Fleet St., Dublin 2.

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**A BOILER A DAY . . .** leaves John Thompson Glasgow Works for installation somewhere in the British Isles. There are more Thompson package boilers currently being commissioned than any other type or make. These are the facts behind Britain's most successful range of oil-fired package boilers—the best-selling 'Multipac' and 'Demipac' Ever since their arrival on the steam raising scene, these fully-automatic oil-fired units have consistently proved first choice for many thousands of consulting, heating and maintenance engineers. The 'Demipac'—supplying from 500 to 3,500 lb/hr of steam—is designed for the manufacturer who wants a relatively small amount of steampower but who still requires the benefits of completely automatic control. Ideal for garages, greenhouses, laundries, hotels and all types of small process and heating duties. For complete facts and figures of the highly successful 'Demipac' Package Boiler, write JOHN THOMPSON PACKAGE BOILER DIVISION, LILYBANK WORKS, LONDON ROAD, GLASGOW, E.1.

*Demipac*



**I**N last month's article I described briefly the compressors and condensers used in refrigerating plants. These two items, together with the pressure vessel to contain the condensed refrigerant, the high pressure liquid receiver, and the interconnecting pipes between these components up to the inlet side of the expansion valve, are collectively known as the "high side" of a system. The expansion controller or valve, the evaporator or cooling unit, and the pipes between these items and the compressor suction are called the "low side." In this article I will deal briefly with some of the more commonly used "low sides" and their advantages for various applications.

For small cold stores, i.e., butchers, and hotel type, etc., small Freon plants using simple direct expansion coolers are employed. These coolers usually consist of a bundle of copper tubes of  $\frac{1}{2}$ " to  $\frac{3}{4}$ " O.D. with aluminium or copper, block fins similar to hot water unit heaters. The air of the store is circulated through the cooler by a fan mounted on the casing of the unit.

**T**HE direct expansion Freon coolers can be satisfactorily employed on larger cold stores, i.e., public cold stores, meat factories, ice cream storage rooms, etc., when a number of them are mounted so as to provide good air movement in the chamber. This would often prove less expensive and easier to install than a large single ammonia cooler with air distribution through a duct system.

Although the direct expansion cooler is most widely employed with the Freon refrigerants, there are many applications where its use with ammonia plants is acceptable. However, due to the fact that ammonia systems are most efficient when the vapour

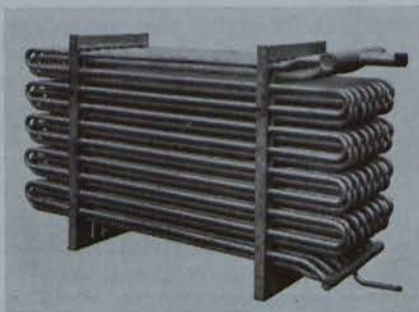


Fig. 1

returning to the compressor is nearly saturated, and this condition is not as easily achieved with direct expansion coolers, controlled by a thermostatic valve (the action of this valve is described below), as with the semi-flooded coolers, these latter types are usually favoured for ammonia plant.

The semi-flooded cooler (Fig. 1) for the direct cooling of air as in a typical cold store, usually consists of a nest of plain or finned steel pipes of up to 2" diameter. The liquid refrigerant is admitted to the coil from the high pressure receiver by means of a float valve or float switch, these being simple controls which work to admit more liquid as the level drops below a fixed point, and closes as the level

**By**

**DANIEL HEENEY**

An Applications Engineer with  
a leading Dublin specialist firm.

rises. The temperature is kept at a low figure by the boiling off of part of the refrigerant at the low pressure maintained by the pumping action of the compressor. As the cold surface of the cooler picks up heat from the circulating air, this heat gain causes the boiling of more refrigerant which is sucked away by the compressor. As it boils off, of course, the level in the cooler drops and this will cause the float valve to open, admitting more liquid or, in the case of a float switch, it will open a magnetic valve on the liquid inlet pipe and close it again when sufficient liquid has been admitted. Thus the level in the cooler is affected by two factors: the pumping capacity of the compressor, and the heat gain from the circulating air.

If the compressor capacity remains constant, as it normally will, then the

level of liquid in the cooler will depend on the heat gain from the medium to be cooled. If there is a large quantity of heat to be removed from the air, then there will be a more rapid boiling, and the valve will admit more refrigerant. If this boiling should take place at a higher rate than the compressor can pump away the vapour formed, then this will increase the pressure in the cooler and at the compressor suction and will tend to inhibit the boiling of more liquid and will thus prevent an excessive drop in the level.

This condition will last until sufficient refrigeration has been provided to reduce the air temperature in the chamber and hence the temperature of the stored product and the cooler air will enable the compressor to maintain the original low pressure and temperature at the surface of the cooling coil. Thus automatic control is provided and when a desired temperature has been reached the plant will cut out on thermostat or a low pressure switch which breaks the compressor motor circuit when the pressure in the cooler has been reduced to a figure which is associated with a refrigerant temperature low enough to maintain the desired cold store temperature.

To understand the working of the thermostatic expansion valve, which is the form of control used for direct expansion coolers, it is necessary to recall the pressure/enthalpy diagram of the first of these articles. A refrigerant is in saturated vapour form when the removal of heat at constant pressure will cause condensation to begin, and the application of heat will not increase the pressure but will cause the drying out of the vapour.

Fig. 2 shows a thermostatic expansion valve. Liquid from the condenser is admitted through the needle type valve. At "A" the refrigerant admitted consists mainly of droplets of liquid and some vapour, which was

# MECHANICAL REFRIGERATION TO-DAY

PART 4

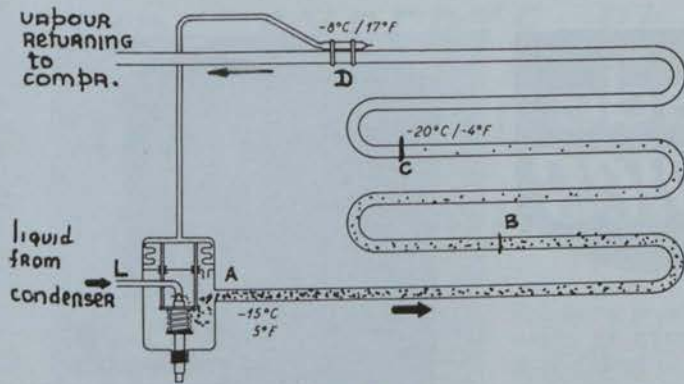


Fig. 2

# MECHANICAL REFRIGERATION

flashed off to reduce the temperature of the refrigerant when it passed from the high pressure to the low pressure part of the system. As it passes through the coils it gains heat from the medium being cooled, and evaporation continues until at B, it is present as approximately 50% liquid and 50% vapour. This continues until, at E, the refrigerant is a fully saturated vapour at the same pressure as when it was admitted at the valve. In its passage from C to D the vapour becomes superheated and it may be 12°/30°F. above its temperature at A, depending on the size of the cooler and the loading on it.

The small phial clipped to the suction pipe at the outlet of the cooler senses this temperature, and since this phial and its attached capillary line are gas charged, an increase in temperature causes a pressure increase which will exert a downward pressure on the bellows in the expansion valve. The pressure in the cooler also exerts a pressure on the underneath side of the bellows, in the opposite direction to the phial pressure. Valves are adjusted so that the excess pressure exerted on the top of the bellows, by about 12°F. superheat of the refrigerant at point D, is sufficient to overcome the fixed spring pressure which assists the evaporation pressure, and the needle valve, which is attached to the top of the bellows by the two push rods is moved off its seat and admits more refrigerant.

If the heat extraction required from the evaporator increases, the degree of superheat will increase at D and the phial pressure will cause a larger opening of the valve, admitting much more refrigerant for evaporation which will tend to reduce the temperature at D and allow the valve to close slightly. Thus automatic control of the rate of expansion, proportional to the actual load on the cooler is assured, once the valve is correctly sized and adjusted.

Though so far I have described simple air coolers, which are the most common type, the principles of control involved apply to all types of cooling applications, e.g., direct expansion air conditioning cooling, chilled water plants with semi-flooded or direct coolers, brine, and milk cooling, etc.

## WHY LINCOLN WARM AIR?

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- ★ **Lincoln give 100% support to Authorised Installers**—selling equipment **only** through Authorised Installers and providing full information, instruction and training of staff.
- ★ **Lincoln advertise Nationally** in the home-making magazines—Ideal Home; Homes & Gardens; House Beautiful; House & Garden, etc. **All enquiries are passed to the local Authorised Installer.**
- ★ **Lincoln supply** an individual 'Plenum Plan' for each installation.
- ★ **Lincoln Warm Air System is the modern system.** Warm Air Central heating is **proved** in over 80% of Canadian homes.
- ★ **Lincoln provide a full range** of sales promotion material and arrange approved local co-operative advertising.
- ★ **Lincoln Authorised Installers are completely independent**—not owned, operated or controlled by Lincoln.

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Seventeen

*The Irish Plumbing and Heating Engineer.*

THE Building Advisory Council set up by the Government in May last

**BUILDING ADVISORY COUNCIL IS TO SURVEY BUILDING WORK**

to survey and to advise on the building industry is about to

launch its first series of questionnaires in the setting of the comprehensive survey of building work, which is one of its principal tasks. The questionnaires have been carefully drawn up by a team of experts and seek information on building work in progress, in near prospect, and in distant prospect together with information on manpower availabilities.

They will be issued to all building contractors, sub-contractors, architects, engineers, quantity surveyors, Government Departments, public bodies and local authorities. It is hoped that this preliminary survey will be completed and the results analysed within the next few months.

The survey, which will be conducted by the Central Statistics Office in strict confidence, will ask for, among other things, the value of certain specialist works, most of which normally form sub-contracts.

Included among these specialist works are the aspects of heating, ventilating and pipework and plumbing and water supply. For the purpose of the survey heating, ventilating and pipework is to include all process pipework systems and associated equipment such as steam, condense, gas, compressed air, oil, sprinkler systems, etc., including boilers, controls, laundry and cooking equipment, together with ventilation and air conditioning ductwork, fans, heat exchangers, washers, diffusers, etc.

Plumbing and water supply is to include all hot and cold water pipework, soils, wastes and sanitary fittings. External plumbing, such as roofing, flashing, gutters, etc., and drain laying are to be excluded.

It is expected that the survey will



throw light on the rate of expansion of the industry and enable an assessment to be made as to how best to secure an even rate of growth having regard to the availabilities in manpower, materials, and finance and to the need for orderly development in the interest of social and economic progress.

Details of the survey were given at a Dublin Press conference last month attended by Mr. Donogh O'Malley, chairman of the National Building Advisory Council.

\* \* \*

THE Institute for Industrial Research and Standards has recently declared a new specification

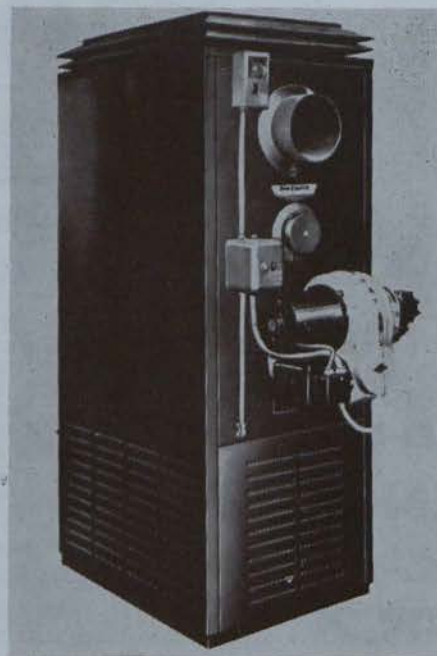
**NEW PIPES AND FITTINGS SPECIFICATION**

entitled Asbestos Cement Soil, Waste and Ventilating Pipes and Fittings (Irish Standard 120:1963) which applies to these pipes and fittings of diameters from 2 in. to 6 in. inclusive.

The specification deals with materials, workmanship, curing, maturing, dimensions, special types, finish, access doors, straightness, hydraulic soundness, bursting strength, water absorption, selection of test samples, testing by manufacturer, and marking.

\* \* \*

● **Russia is planning to use the heat of the earth's centre to provide hot water and heating in cities, according to Tass. A five-day scientific conference in Moscow discussed the technical features of a 8,200-foot deep borehole near Omsk which would supply water at a temperature of 70 to 80 degrees centigrade.**



The new PowRmatic fully automatic oil-fired air heater.

**New oil fired air heater**

SHOWN here is the new PowRmatic fully automatic oil fired air heater, type Commercial Aire 100. This unit is available with either a duct spigot, four-way distribution head as shown on the photograph, or two-way split distribution head.

The unit measures overall 66" high x 27" wide x 28" deep, and the oil burner projects a further 14". The unit is fitted as standard with the PowRmatic Model "J" pressure jet oil burner, Danfoss 57F control box and Honeywell combination fan and limit control. The Ca-100 has a fuel consumption of .82 imp. gall/hr. and delivers 1100 cfm, with a temperature rise of 85°F. Irish agents are H. Nolan & Son.



## GAS OR ELECTRIC?

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# FIRE EXPERTS BLAME AIR CONDITIONING FOR BIG OUTBREAK



**T**HE air conditioning system of a new London bank building has been openly blamed for a disastrous fire there estimated to have caused £250,000 worth of damage. The Journal of the Fire Protection Association states: "The unusually severe and extensive damage in a very modern building, designed to be fire resisting, could be largely attributed to the arrangements for carrying the ventilation trunking and service piping through the building."

After the fire a Work Party of experts was set up to investigate the blaze and to study the fire problems arising from air conditioning and ventilating plant. They have just brought in their report.

The fire is believed to have been caused by oxy-acetylene cutting. The first sign was discovered between 5.45 and 6 p.m. This involved cork insulation in the service tunnel and was quickly smothered. Soon afterwards a severe fire was found in the tunnel near the air shaft. Three engineers tried to put it out but failed. They called the fire brigade.

The F.P.A. report goes on: "This report was received at 6.29 p.m. When the fire brigade arrived, flames could be seen through the dense smoke in the service tunnel."

The combustible insulation material on the trunking and piping is described as "the main factor." The destruction of the flexible canvas joints in the trunking and the conduction of heat along the metal from the burning outer surface also helped the fire to spread.

The fire brigade report makes several recommendations to "enable an outbreak of fire to be localised by structural means and allow firemen to extinguish it without undue difficulty. They are:—

- Insulating material—internal and external—should be non-combustible.
- Flexible joints with a lower fire resistance than the metal trunking should be eliminated, especially in service shafts and main ducts.
- Fire resisting floors should be

carried through service shafts and holes for trunking and piping be properly sealed and sleeved. Shafts should be enclosed by walls whose fire resistance equals that of the floors through which they pass.

- Metal fire dampers with fusible links or other fire-sensitive devices should be incorporated in trunking where it goes through fire resisting walls or floors.

## Competition For An Architectural Design For A Town Social Centre

G. H. C. Crampton, B.A.I., M.I.C.E.I., invites teams of three, a qualified Architect, a qualified Civil or Mechanical Engineer and a qualified Quantity Surveyor, or Students of recognised schools of these professions, to submit designs in competition for a Town Social Centre on a site anywhere in the Republic of Ireland as selected by the team, in accordance with conditions and instructions which will be available on request from the Honorary Secretary, 20, Whitebeam Road, Dublin, 14, on or after 1st May, 1964. The purpose of the competition is to promote the idea of a Town Social Centre.

**Team 1st prize, £300. Team 2nd prize, £200. Team 3rd prize, £100.**

The design should show a Swimming Pool, a Recreation Hall adjacent to the Pool, and ancillary buildings built around the Pool and Hall.

**N.B.**—This arrangement supersedes that made in previous announcements.

The project should be designed so that it can be built in three stages:—

Stage 1—Recreation Hall, suitable for dramatic performances and other purposes, which can be used as an auditorium, and stage. Open-air Swimming Pool, ready for filtered and unheated water. Requisite car-parking facilities and necessary site works.

Stage 2—Meeting Rooms, Refreshment Room, and additional car parking.

Stage 3—Roof the Pool and heat it. Requisite site works. Landscaping to include children's playground and amenities for older people.

The estimated cost of the project should not exceed £150,000. **N.B.**—Previous announcements mentioned a possible cost of £250,000.

It is hoped that Local Authorities, Chambers of Commerce, Muintir na Tire, or other similar organisations will interest themselves in this idea, and will help the competitors in selecting a site and with other information asked for.

The Promoter has appointed Mr. Dermot O'Toole, F.R.I.A.I., M.T.P.I., F.I.L.A., Architect, as the Honorary Assessor, and Mr. T. M. O'Connor, County Manager, Limerick County Council, and Mr. R. E. Jacob, M.I.H.V.E., M.A.S.H.R.A.E., Consulting Engineer, as the Honorary Advisors, on the conduct of the competition, and in making the awards any two to have the power to appoint superseders if necessary. Mr. G. H. C. Crampton, B.A.I., M.I.C.E.I., the Promoter, will act as the third Honorary Advisor, and will help to decide the correctness of the estimates of cost.

Hon Secretary, Town Social Centre Design Competition.



# MONTHLY SPECIAL REVIEW

CALORIFIERS,  
CYLINDERS, PRESSURE  
VESSELS, TANKS

## WIDE RANGE COVERED IN SPECIAL REVIEW

**B**ASICALLY a calorifier is a heat exchanger, consisting of an outer shell containing water in which a steam or water coil is immersed. Broadly speaking there are two kinds of calorifiers—storage type, which serve as a heating and storage cylinder for domestic hot water supplies and non-storage in which heat energy in a steam or high temperature hot water supply is transferred to a water heating system at a pressure and temperature more suited to a desired purpose. In both cases, the primary supply must obviously be at a higher temperature than the desired temperature of the water in the outer shell, and no mixing take place between the two.

**Hot Water Calorifier:** Storage or hot water calorifiers are invariably cylindrical in shape, with domed ends and can be mounted either horizontally or vertically. In sizing the battery it is generally found that the required heating surface is more easily obtained, due to the longer tube length in a horizontal calorifier. In either case the battery is better sited towards the bottom of the calorifier to facilitate the upward circulation of water by convection.

**T**HE outer shell of a storage calorifier is subjected to a constant flow of fresh water, and as such must be built of, or coated with a corrosive resisting material. For most purposes, copper is found to be suitable. The recommended thicknesses are given in B.S. 853. Where excessive static head demands, the calorifiers can be made of steel plate and coated with a non-corrosive paint, such as epicoat, but such circumstances would generally provide too much pressure at the outlet, and break tanks or pressure reducing is to be advocated where applicable.

The primary steam or water chest is generally of steel or iron casting, while the tubes are from solid drawn copper tubing, graded in the direction of flow. The plates into which the tubes are secured can be made of brass or steel, but where steel is used it should be protected against corrosion on the secondary water supply side. As internal inspections of the calorifier shell for most cases is carried out by the removal of the tube battery, independent bolting of the chest is generally unnecessary.

**I**T will be seen from Table A that the heat transmission from the battery in the case of water to water calorifier is not only dependent on the difference in temperature between the primary and secondary water, but also on the velocity of the primary water within the tubes. This is due to the increased turbulence at higher velocities, thus reducing the heat resisting film of water on the inside of the tube. In this respect, some calorifier manufacturers claim that the increase in turbulence when indented tubes are installed can mean upwards to 100 per cent. increase in transmission per unit area. Indenting the tubes, of course, in no way alters the surface area of tube per unit length.

(See Table A).

For an example, in the sizing of a heating battery for a hot water calorifier we might consider the requirements of a 30" diameter vertical calorifier, capable of heating 150 gallons



This Special Review article is compiled by technical expert Michael Walsh.

of water from 50°F. to 150°F. in one hour, when supplied with primary water at a flow temperature of 180°F. Heat requirement of battery . . . . . 150,000 Btu/hr.  
Mean secondary water temperature . . . . . 100°F.  
Estimate of mean primary water temperature . . . . . 170°F.  
Temperature difference . . . . . 70°F.

The mean primary water temperature can only be estimated at this stage, as we do not, as yet, know what quantity of water we will require to flow through the battery per hour.

Designing on a tube velocity of 12 inches per sec. tube area:  
= 150,000 = 37.6 sq. ft.  
70 x 57

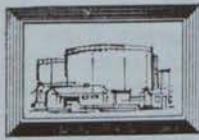
The average length of the tube is limited to approximately twice the diameter of the calorifier=5' 0".

The most suitable tube arrangement can be selected for a table made out as follows:—

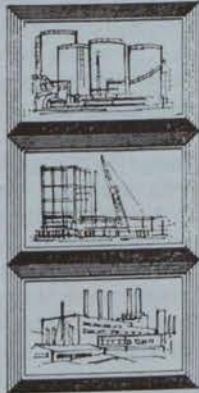
*Continued page twenty-two*

**TABLE A—HEAT TRANSMISSION FOR STORAGE CALORIFIER:**

Water to Water		Btu./sq.ft. °F. diff./hr.
Pipe coil	Velocity 1½"/sec.	29
	Velocity 6"/sec.	50
	Velocity 12"/sec	57
Steam to Water	Steam temp. 250°F.	112
	300°F.	124



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*Twenty-one*



- Column 1.** Tube dia.  
**Column 2.** Length of tube to give 1 sq. ft. heating surface.  
**Column 3.** Heating surface per tube.  
**Column 4.** No. of tubes.  
**Column 5.** Approximate diameter of tube plate (inches).  
**Column 6.** Weight of water to give 12" per sec. in tube.  
**Column 7.** Total weight of water through battery.  
**Column 8.** Temperature drop across battery.

Col. 1.	Col. 2.	Col. 3.	Col. 4.	Col. 5	Col. 6.	Col. 7.	Col. 8.
$\frac{3}{4}$ "	6.1	0.82	45	24"	830lbs./hr	37,400lbs./hr.	4.0°F.
1"	4.4	1.14	33	21 $\frac{1}{2}$ "	1,400lbs./hr.	46,100lbs./hr.	3.25"
1 $\frac{1}{4}$ "	3.4	1.47	26	20"	2,310lbs./hr.	60,000lbs./hr.	2.5"
1 $\frac{1}{2}$ "	2.8	1.79	21	18 $\frac{1}{2}$ "	3,020lbs./hr.	63,200lbs./hr.	2.27"

## SPECIAL REVIEW

*Continued from page twenty*

**T**O keep the primary pump and pipework sizes to a minimum it is desirable to select the arrangement with the largest temperature drop, against which the extra battery cost due to the larger numbers of tubes must be weighed. From the example it will be seen that short tube length in a vertical calorifier involves considerable difficulties in the selection of a suitable battery.

**Heating Calorifiers:** Heating calorifiers are mostly of cast iron, but should be cast in steel where the pressure and temperature exceeds 150 p.s.i.g. and 405°F, respectively. Tubes can be of steel, brass or copper, but whichever material is used, they should be solid drawn. To allow free circulation of the secondary water around the outside of tubes,  $\frac{3}{4}$ " is found to be a suitable minimum distance between the outer wall of any two tubes. The more common ways of securing the tubes to the tube plates are: (1) by expanding the tube into holes bored in the tube plate; (2) by brazing or welding the tube directly to the plate; (3) by brazing or welding the tube to a flanged collar and securing to the plate by means of a lock nut on the outer side. In the case of the latter, tubes are more easily removed and replaced if necessary.

**T**HE removable batteries are either of the hair-pin or floating header type. With both of these type of batteries, a mid-feather can be fitted to ensure that the secondary water traverses the full length of the battery. The highest battery efficiency is obtained when the secondary water traverses the tubes in the opposite direction to the prim-

ary flow. This system is called the contra-flow.

More uncommon type batteries are those with a separate inlet and outlet chest at either end of the calorifier. These are non-removable and calorifiers of this nature should be provided with adequate access through the outer shell. Access to the removable battery type calorifier is usually obtained by removing the battery.

**A** GAIN, as in the case of hot water calorifier, the heat emission from the battery tubes depends upon the water velocity along with the temperature gradient.

**Oil Storage Tanks:** Oil storage tanks are generally of welded construction in mild steel plate, either pre-fabricated or welded on site where access to the tank room is too small to allow free passage of the finished tank. For capacities up to about 4,000 gallons, there is little to choose between rectangular and cylindrical tanks. The cylindrical tanks have the slight edge in price over rectangular, because of the smaller quantity of steel and lighter gauge required. Beyond 4,000 gallons capacity excessive stress on the plates generally calls for the use of cylindrical tanks only.

It is essential that all oil tanks be fitted with a manhole and they are generally flanged and raised from the surface of the tank. They should also be fitted with a vent pipe and drain cock. Where the vent pipe rises to any appreciable height, any excess oil on drain filling will rise in the vent pipe and create a static pressure on the tank exceeding that of the designed static head. To relieve this pressure,

a branch containing a goose neck, and discharging within the catch pit area, should be fitted.

**C**old Water Tanks: Large capacity cold water storage tanks are generally sectional, of cast iron or pressed steel. Steel sections must be galvanised or coated with an anti-corrosion paint, such as epicoat, and may be hot or cold pressed. They are obtainable in 4 feet squares and can be flanged either internally or externally. Connections can be made by means of machined pads, welded to sections and provided with studs to suit a flanged pipe, or by directly welding a screwed boss or flange to the plate. Sections for cast iron sectional tanks are available in 2, 3 and 4 foot squares and should be jointed with an insoluble jointing compound. Connections should preferably have a boss cast in the section, but where necessary, can be made by drilling and tapping. There is, of course, no need to galvanise cast iron water tanks.

Galvanised mild steel tanks are available from 10 to 1,000 gallons capacity, the material thickness ranging from 18 gauge at 10 gallons to  $\frac{1}{4}$ " thick at 1,000 gallons. Galvanised mild steel tanks are suitable for expansion tanks for low pressure hot water heating. Normally they are not supplied with holes for tappings and it is up to the purchaser to cut these where required.

**C**ondense Tanks: There is relatively little to be said about condense, except that they are subject to severe corrosion, unless properly maintained. This is chiefly due to dissolved oxygen and carbon dioxide. Hence condense tanks are usually made of cast iron sections. Galvanised steel tanks are not always successful, as a small amount of chlorine in the steam dissolves on the condense and attacks the zinc.

**Pressure Vessels:** The two forms of pressure vessels normally encountered in the heating and plumbing trade are used for pressuring hot water heating systems or for boosting static pressure for the supply of domestic water services.

Pressure vessels for heating systems should be capable of accommodating the full volumes of expansion of the water in the heating system with an air space above.

*Continued opposite*

## Interesting comparison between old and new

AFTER the installation of five Thermobloc oil-fired air heaters in the cross-channel depot of a big British road services firm an interesting comparison with the cost of running the old hot water system (three boilers fired on solid fuel) came to light.

The Thermoblocs were supplied and installed by the Boramwood, Herts, concern, Wanson Company Limited, and the comparison is particularly significant when it is considered that the buildings, according to its owners, are now far better heated.

Costs of the boiler system over a typical period of one year were: Fuel, £3,850 plus labour, £1,375, giving a £5,225 total.

The cost of running the present system for seven days per week, 24 hours per day, over a reasonably cold period from early November to the end of December, 1963, worked out at a rate equivalent to approximately £2,000 p.a. A saving of more than £3,000 p.a. Since the total cost of heaters, plus installation, was approx. £8,000, the capital expenditure will be recovered in just over 2½ years.

## SPECIAL REVIEW

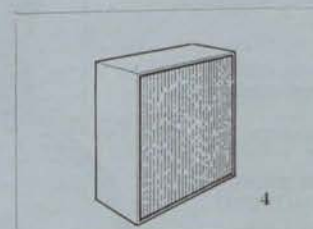
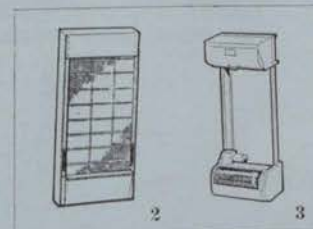
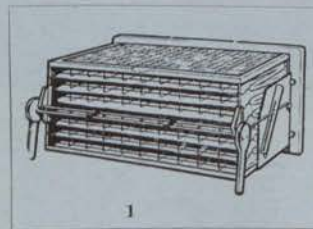
from previous page

For domestic water supplies the pressure vessel should have sufficient storage of water for a peak demand less the delivery of the pump for the duration of the peak, and also have an air space above sufficient to maintain a pre-set minimum pressure at the point of minimum storage.

Pressure vessels, both for heating and water supply, are generally of welded steel construction. Vessels for water supply should be zinc galvanised or painted with an anti corrosive paint. Air cushions have to be supplemented from time to time in pressure vessels for both heating and water boosting, and hence tappings should be provided at the top of the vessel for an air supply. Access doors should be provided in all pressure vessels with the sealing surface on the inside of the vessel, so that increase in pressure tends to close the door, rather than open it.



The anonymous critic who traced this comment obviously knows that all Vokes air filters, having been tested in accordance with BSS.2831, are of guaranteed high efficiency. Research into new filter media is constantly being carried out in our large, well-equipped laboratories and, as fast as industry makes the use of entirely new filtration techniques necessary, Vokes are providing solutions to their problems. In addition, we have a staff of specialist technicians who are always available to help with any air filtration queries. Take advantage of our years of experience in filter manufacture, and if you accept our proposals on any specific installation we will unreservedly guarantee the performance in all respects.



1. The K.600 'Kompak' is the most widely used air conditioning filter in the world. With a normal rating of 600 c.f.m. and an initial resistance of 0.15" w.g., it has a consistent and guaranteed efficiency rating of 95% against Aloxite 50 dust (BSS.2831). Vokes K.600 is extensively used in air conditioning and air intake installations of factories, offices, laboratories, stores, test houses, etc.

2. The Vokes S.C. (self cleaning) Rotary Viscous Air Filter for cleaning large quantities of air with minimum pressure drop where efficiency in the region of 98% is adequate. Special filter panels constantly circulate in a trough of oil and the only servicing required is the periodic removal of sludge and maintenance of the correct oil level. Capacities from 3,000 c.f.m. Initial resistance 0.35" w.g.

3. Vokes 'Autoroll' in automatic or hand-operated forms, combines high efficiency and large dust holding capacity with low operating and servicing costs. The filter medium is fed from the top spool across the air flow aperture on to the lower spool, this and replacement signals being automatic in the electric model. Capacities from 6,150 c.f.m. Initial resistance 0.2" - 0.45" w.g.

4. Vokes 'Absolute' Filters give such an exceptionally high standard of filtration that they are widely used by the U.K. and A.E.A. and industrial research units, providing protection against radio-active dust, bacteria and other sub-micronic particles. Each filter is rigorously tested by the methylene blue dust cloud method, and rejected if its efficiency is less than 99.95%. Efficiencies of 99.99% are attained by some models. Capacity from 35-1,000 c.f.m.



VOKES make the world a cleaner place to live in!  
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*The Irish Plumbing and Heating Engineer.*

ROTOTHERM Precision and Instrument Co. have been appointed distributors here for **CEPI PROCESS AVAILABLE HERE NOW** S.A. Epuro of Belgium, the originators of the CEPI process, which has been designed to treat magnetically water and other liquids for the prevention of scale formation and corrosion. Since 1954 over 50,000 Capi units have been installed in fifty countries.

The Capi device has four major features—it involves no running costs; needs no maintenance; no electricity, and no chemicals.

The units have been installed all over the world to prevent scale formation in boilers, refrigerators, cooling installations and evaporators and to treat various solutions against scale. Capi units with capacities up to 4,000 cubic metres per hour (2,355 cubic feet per minute) are mass produced.

In a Capi unit liquid flows through powerful magnetic fields so that the dipolar moment of the ions and the molecules in the water change in such a way that, at the moment of crystal formation of the salts in solution, the polarization between the powerful ionic zones and the altered electrostatic process is reduced. The result is the division of the crystal into extremely thin layers and the alignment of the ions according to a single magnetic axis, which is clearly shown by microscopic examination.

- The Capi device is pictured at right.



Watch for our HEVAC report next month.

FROM THE range of H.V.E. (Boilers) Limited, Sanderson House, Station Road, Horsforth, we note the Type "BW" Heavy Duty immersion heated circulator, which is a dependable boiler with many applications for LPHW heating at static pressures up to 30 p.s.i.

It is ideal for use in churches, chapels, small office blocks, private swimming pools, etc. Withdrawable elements are used throughout the range, 122,000 B.t.u./hr. — 510,000 B.t.u./hr. All boilers are lagged and sheeted and constructed to the required insurance standards.

\* \* \*

ISOPAD Limited of Boreham Wood, Herts, who are already well-known for their electric heating tapes, have developed a new type of heating tape using metal sheathed heating elements mounted on stainless steel mesh suitable for operating temperatures up to 650°C. and thus very suitable for stress relieving of welds and similar purposes.

In addition to the Isotapes for frost protection and for tracing of fuel oil lines, a new type was shown at the Earls Court Pipe and Pipeline Exhibition this month—the heating elements moisture-proofed by silicone extrusion are fitted into neoprene covered glass cloth. There was also a display of large bore pipes fitted with flameproof Isotapes as installed for refinery work and similar applications.

\* \* \*

AT A successful function in the Shelbourne Hotel, Dublin, last month, consulting engineers, architects and heating engineers attended an informal talk and discussion on automatic packaged boilers. It was given in conjunction with a reception to announce the appointment of Thermal (Ireland) Ltd. as Irish agents for Marshall Packaged Boilers.

Those present received presentation folders containing data on the Marshall boiler range, together with a convection factors booklet and handy steam cost calculator device.

Thermal (Ireland) Limited, who were formerly Brightside Engineering Co. (Ireland) Limited, are now in a position to supply the full range of Marshall packaged boilers.

## Instantaneous HOT WATER from steam—without storage

Cox Steam and Water Mixers deliver from 50 to 24,000 gallons per hour.

They operate with the highest efficiency at all pressures. Silent, efficient, compact and easy to install, replacing bulky and costly calorifiers.

**MODELS:**

- ★ (1) BABY COX (½") for wash-basins, sinks, etc.
- ★ (2) JUNIOR COX 1—5 (¾"—2") for process work, vats and general purposes.
- ★ (3) SENIOR COX (2½"—8") for large volumes of hot water for process hot water supplies.

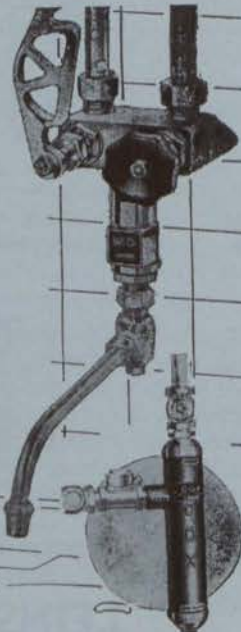
**NO TIME LAG - NO STORAGE - NO STEAM TRAPS  
NO LOSS OF CONDENSATION - NO MOVING PARTS TO GO WRONG**

## COX WATER HEATERS

Manufactured by COX ENGINEERING CO. LTD.  
Dept. IP.15, 14 Park Lane, Sheffield 10.  
Tel.: 62483. Telegrams: "Heaters Sheffield"

**Agents:**

Healpn & Hayward Ltd. Unity Buildings, 16-17 Lower O'Connell St., DUBLIN. Tel. 43270.  
Bedford Buildings, Bedford St., BELFAST. Tel. 26343.



## AT MARSHALL-THERMAL RECEPTION

● Pictured at the reception last month in the Shelbourne Hotel to announce the appointment of Thermal (Ireland) Ltd. (formerly Brightside Engineering Co. (Ireland) Ltd.) as Irish Agents for Marshall Packaged Boilers. Left to right: Mr. C. Whelan, Thermal (Ireland) Ltd.; Mr. A. G. Nuttall, Technical Sales Manager, Marshall Sons & Co. Ltd.; and Mr. J. P. Moore, Chief Engineer, Marshall Sons & Co., Ltd.



### ATTENTION MANUFACTURERS, SUPPLIERS!

Each month The Irish Plumbing and Heating Engineer will contain a comprehensive survey of the month's trade news under the "Trade Topics" heading.

We invite contributions to this column by way of news of new product introductions, of product promotions, of developments within your organisations and of appointments, to list a few.

## Worthington at HEVAC exhibition

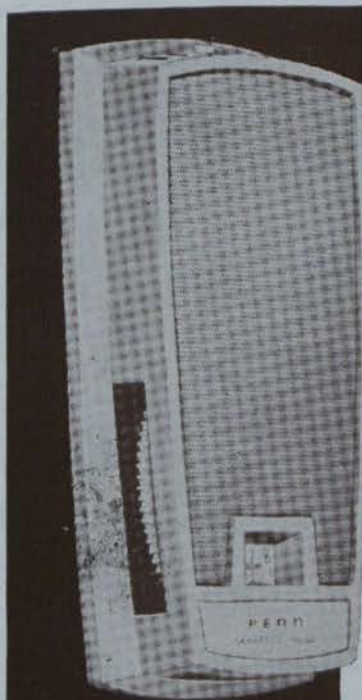
**WORTHINGTON-SIMPSON** Ltd., Lowfield Works, Newark, Notts., featured a representative selection of pumps, compressors and heat exchange equipment covering many aspects of heating, ventilating and air conditioning, at the International HEVAC Exhibition.

Of special interest was a new range of in-line accelerators covering capacities up to 150 g.p.m. and heads up to 15 feet. Illustrated is the Type DA-In-Line Accelerator.

A recently introduced range of hot water circulators was also on view, including new additions to the range. Capacities up to 750 g.m.p. and the heads are up to 80 ft. The temperatures are up to 300 degrees F. These pumps are available in "Monobloc" or driving head construction.

For larger heating systems, a horizontal split-casing centrifugal pump for circulating duties was on view from a range covering capacities up to 1250 g.m.p., a system pressure up to 125 p.s.i., and temperatures to 300 degrees F.

Representative models from an important new range of rotary gear pumps was exhibited. These pumps are eminently suited for fuel oil transfer duties and are capable of handling liquids in the viscosity range 20 to 8460 seconds Redwood No. 1. Capacities in the range are up to 46 g.m.p., the maximum pressure is 150 p.s.i.



## Here's the first really NEW IDEA in electric heat thermostats

There's no other room thermostat like it. Its large dial actually "meters" desired temperature changes. Each "click" is a change of 1°... reduces tendency to over-, or under-adjust. And, it gives faster response to both convective and radiant heat. You'll also like the faster installation and easier wiring. Write for Bulletin 3205... it's free!

**PENN CONTROLS, INC.** Goshen, Indiana

● Easier to wire. There's no more looping of wires... simply insert straight wire end under the new "quick-connect" large terminals and tighten.

● Decorator Panel Click Dial Thermostat blends perfectly with any room decor. Snap-in front panel is easily removed for painting to match any colour scheme.

# MANOTHERM LTD.

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# AN AUTOMATIC COMBUSTION CONTROL SCHEME FOR SMALL

## OIL-FIRED



## BOILERS

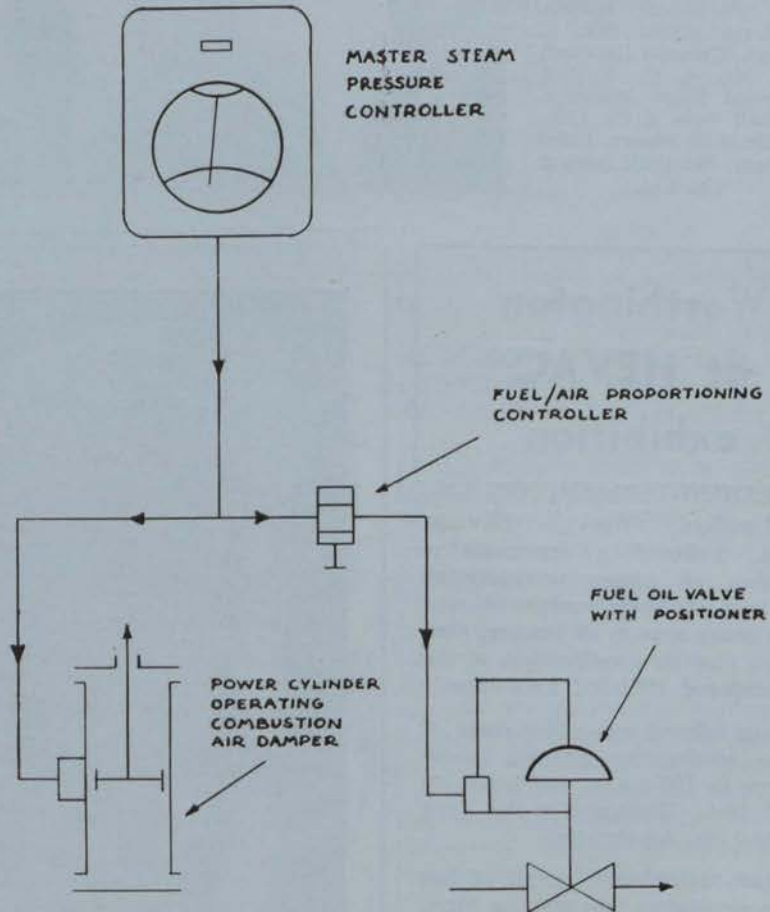
**A**UTOMATIC combustion control can result in a reduction in labour costs—one operator can control more boilers or can devote more time to other duties; a reduction in the fuel bill, brought about by more efficient combustion; a reduction in boiler maintenance cost, as some of these costs are incurred as a result of poor combustion causing excessive combustion-chamber temperatures and also the elimination of black-smoke emission from the boiler stack.

An economically priced system designed and manufactured by George Kent Limited is shown in our drawings. The main components—single-unit instrument cubicle, master pressure controller, etc.—are assembled as standard items. The remainder of the scheme is then tailored to suit the individual application comparatively quickly, affording a much faster service to customers. The system operates as follows:—

Steam pressure changes at the boiler outlet are indicative of variations in boiler load. These changes are detected by a master pressure controller which causes both the combustion-air damper and the fuel-oil control valve to be automatically and suitably repositioned. Thus the desired steam pressure is maintained and the new demand satisfied.

method which enables the required fuel/air ratio to be maintained. This requirement is met by the

fuel/air ratio controller, and by fitting a suitable standard cam to the combustion-air-damper operator.



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- Furnace Builders and Refractory Specialists.
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**Enquiries to:**

89 Blarney Park, Kimmage, Dublin, 12. Tel. 976360.  
Works: 126 James' Street, Dublin.

**SPECIAL REVIEW****THIS MONTH**  
TAP FITTINGS, CONTROLS**MY, HOW THOSE PUMPS  
HAVE CHANGED**PUMPS +  
CIRCUL

**U**NTIL comparatively recent times, pumps for raising domestic water supplies from wells were noisy, ugly, and space consuming. They also provided a back-aching chore for whoever had the job of filling the high-level storage cisterns by pumping the handle.

Nowadays, domestic well water can be raised so much more quietly, and without effort, simply by using a suitable electrically driven centrifugal pump. These are small, neat, efficient, cheap to run, automatic in control, and not expensive to buy.

Where an existing high-level store cistern and a suitable set of distribution pipework exists, the replacement of the old manually operated lift and raise pump by a modern electrically powered centrifugal one will do much to modernise the service and banish fatigue from pump noise, and pumping effort.

In new jobs which are to be supplied by well water, perhaps the installation of a pneumatic pump set might be considered.

These useful sets comprise centrifugal pump, pressure vessel, and pneumatically operated "stop" and "start" switchgear for the fractional H.P. motor which drives the pump.

**F**OR small jobs, the pressure vessel might be of no more than about 35-gallon capacity—a galvanized u.s. cylinder about 36in. high by 18in. diameter.

These pneumatic sets offer the well water user domestic cold water services akin to those found in a town—entirely automatic, and at pressure all the time. When first installed, there is no pressure in the pneumatic vessel and the pump runs to fill water into it. Since the vessel is closed, save for the low level outlet delivering

water to the house supply, its air content becomes compressed as water is pumped in. When the air pressure reaches a pre-set maximum, say, 30 p.s.i., the pneumatic switch cuts out the pump.

The pressurised water supply in the vessel now exerts a like pressure in the supply pipework to the house, which, from now on, can be regarded as a town's service pipe might be. As soon as any cold water using fitting is opened, the pressure in the pneumatic vessel pushes stored water out of it. When the pneumatic pressure drops, the pneumatic switch brings the pump into action to maintain a substantial draw-off, and to run sufficiently long to re-charge the pressure and so cut off again.

**A**GAIN, its not so long ago that domestic L.P.H.W. heating systems were invariably of the gravity circulation kind. Gravity circulated systems still have their place, but small circulating pipes are definitely cheaper, easier to install, and may be put into existing and new homes with absolutely no damage to fabric at all. Small bore pipes offer frictional resistance too great for effective gravity circulations and so extra circulating pressure is necessary when these are used.

A small pump of the canned rotor, centrifugal type, will do this easily, effectively, and at relatively small cost.



This Special Survey  
was compiled by  
technical expert  
A. L. Townsend,  
M.R.S.H.

Small bore circulators or pumps are now made by so many manufacturers that only personal preference can really affect a choice, so long as factors such as head and quantity duties of the pump are considered.

Even so, variable head pumps are now available in a wide range and many engineers and plumbers find these a useful "shelf" stock since they can be adjusted, within reasonable limits, to suit quite different installation friction losses, and G.P.M. heat loads.

Canned rotor pumps of this kind have been used to boost domestic water supplies. They have been used to give sufficient head, where gravity head just did not exist, for the proper operation of shower sprays. This is not a general application and one would always prefer to get sufficient static head, but it does indicate one ingenious way in which the pump is being used in plumbing work.

**C**ELLAR drainers are very useful, automatically operated pumps for keeping surface water out of basements and the like. These are mostly of the packaged type with a submersible centrifugal pump mounted horizontally. The vertical pump shaft rises to a small electric motor which is float switch operated. The whole assembly stands in a sump and requires nothing more than an electrical supply and a delivery connection to discharge to some high level gully, to complete its installation.

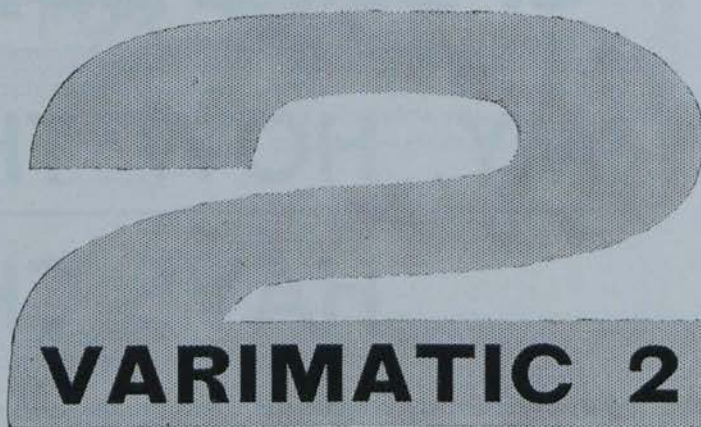
The up-to-date plumber-engineer recognises the value of pumps of all kinds, and readily uses them as a "tool" of the trade whenever water has to be moved.

SEE PRODUCT REVIEW  
on the following pages.

Twenty-seven

**STOP PRESS**  
**Increased Trade**  
**Discounts & 2 YRS.**  
**Guarantee—**  
**EFFECTIVE NOW!**

# Rotherhams



## VARIMATIC 2

THE CIRCULATING PUMP FOR MODERN HEATING SYSTEMS

- ★ Precision made to exacting standards for quality performance and attractively styled for modern homes.
- ★ Variable dial controlled output giving adjustment to meet the individual requirements of all domestic installations from the smallest to over 150,000 B.T.U.
- ★ Suitable for mounting in any position.
- ★ Flat base, simple wiring (no capacitor required) and direct to copper compression couplings for ease of installation.

Send today for further details and specify ROTHERHAMS VARIMATIC 2 pumps on your heating systems for guaranteed reliable performance with reduced installation costs.



... and for programmed time control—

### Rotherhams **MINIMATIC** Time Controller

- ★ Finger tip adjustment of daily programme.
- ★ Exclusive appearance for surface or panel mounting.
- ★ Unique flexibility from special delay mechanism, enabling programme to be pre-set to operate from 1—14 days ahead.
- ★ Neon indication when appliance is on.

ROtherhams HAVE BEEN MAKING FINE TIME PIECES AND MECHANISMS FOR OVER 200 YEARS.

Install MINIMATIC Time Controllers for comfort with maximum economy from your installations. Further details and prices gladly supplied on request.



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SALES AND SERVICE IN IRELAND by George A. Reid,  
15, Fife Street, Dublin, 2. Telephone 76009.

**IN this equipment review  
we take a look at new  
developments in the fields  
covered by the foregoing  
special review. (All claims are  
those of the manufacturers).**

**T**HE MINI PUMP is an entirely new addition to the previous range of Aquadare Pumps from Unidare Ltd., Unidare Works, Finglas, Dublin.

The Mini has been produced to meet the requirements of users whose demands are less than those met by the 1½ h.p. Aquadare Pump. It is robust, capable of handling both cold and hot water (up to 100 degrees C.), as well as a large range of other liquids, including certain chemicals.

The pump is mounted direct onto the electric motor with the impeller carried on the motor spindle. Suction and delivery ports are designed to take 1" hose connections. Outlet tapping may be horizontal, or vertical to choice.

A mechanical shaft seal is fitted, operating against a ceramic counter-face. All parts in contact with the liquid are of non-ferrous material. Electric motors, ¼ h.p., suitable for 200/220 volts, 1 phase, 50 cycle A.C./D.C. supply, are fitted as standard. The maximum watts consumed is 180. Other voltages may be supplied on request. The motor is series wound, ball bearing type, operating at a speed of 5,500 r.p.m.

The Unidare range of petrol engine driven Aquadare Pump models have been completely re-designed in such a way as to make them more portable and compact. They are manufactured to meet the requirements of those who do not have the facility of electricity. An American Clinton 2½ h.p. 4-stroke petrol engine is fitted as standard.

\* \* \*

IDEAL-STANDARD Ltd.: Pictured in the next column is the latest "Ideal" Rad 66 accelerator, an important new feature of which is the "Hydramatic" electrical gap which, while starting, is very small to give high torque, and then automatically increases to give smooth, quiet running.

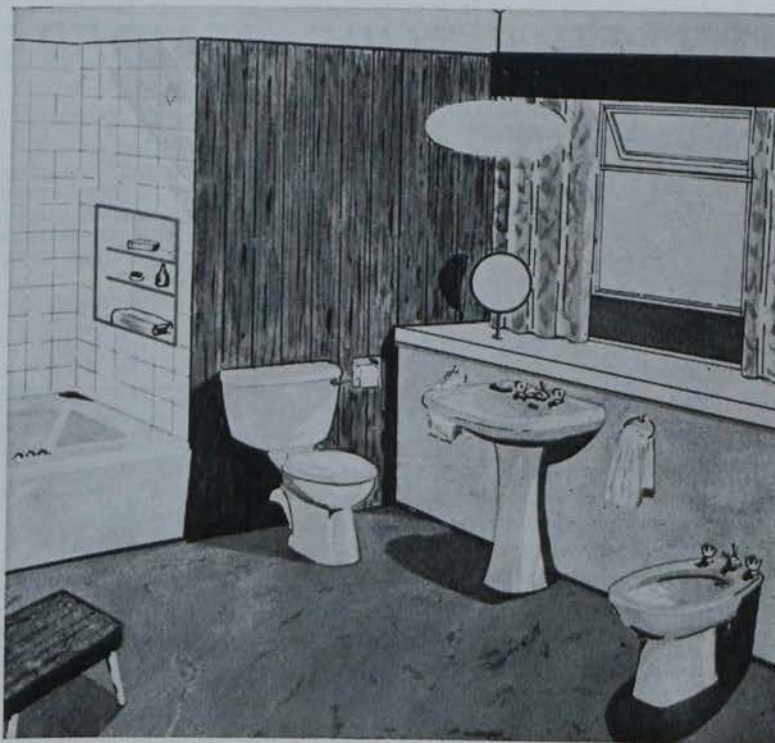
The movement of the rotar created



by this "Hydramatic" actions gives the added advantage of a self-cleaning effect between bearing and shaft, preventing a build-up of dirt which might cause the pump to stall.

This self-cleaning action is also assisted by reverse flow lubrication ensuring a steady flow of clean water through the bearing. The shape and size of the "Ideal" Rad 66 enable it to be installed in confined spaces. The output regulator is easily adjusted to give a wide range of ratings.

*Continued overleaf*



## Sanitary Ware In White And Colour

(Colours to match Irish Foundries Ltd.)

Agent: C. B. SHERIDAN, 10 HERBERT PLACE, DUBLIN. Ph. 66283

### Illustrating 'THE WALDORF RANGE'

## JOHNSON & SLATER LTD.

(VITREOUS CHINA)

(SANITARY FIRECLAY)

Alfred Johnson & Son Ltd.,  
Queenborough, Kent.

John Slater (Stoke) Ltd.,  
Berry Hill, Stoke-on-Trent.

*Twenty-nine*



**PRODUCT REVIEW**

from previous page

The pump casing is constructed of close grain cast-iron to BS 1452, and all internal surfaces are double coated with a high temperature enamel. Externally the unit is finished in high gloss cream. It is also available in bronze to suit direct systems.

The maximum working temperature is 230 degrees F. and standard units are suitable for 210-250 volts A.C. cycle, single phase, having a consumption of 75/85 Watts. Other voltages and periodicities can be supplied to order.

\* \* \*

A NEW range of centrifugal pumps was introduced recently in Dublin by

Dunham-Bush Limited, Farlington, Portsmouth, Hampshire. The Irish agent is Henry R. Ayton, 20 Harcourt Street, Dublin.

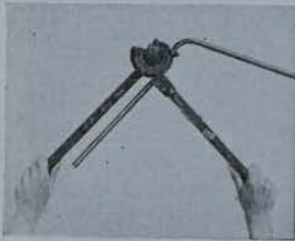
We illustrate here the Dunham-Bush A5 centrifugal pump, which is of close coupled volute pattern, and is designed for use in such applications as circulators in air conditioning systems, cooling tower pumps, circulators in evaporative condensers, boiler feed and booster services.

Particular features include close grained head and case castings, powerful electrical commission, one piece of brass cast impeller, and easy maintenance.

The A5 has a cast iron case construction, with suction and discharge connections tapped B.S.P. taper thread. The case is attached to the pump head with eight bolts for strength. This also permits the case to be rotated, so that the discharge can be located in any one of eight positions, 45 degrees apart.

The A5 pumps are fitted with either 200/250 volt single phase or 380/440 three phase motors from 1-3 to 1½ h.p. inclusive. The pump is also furnished with a neoprene slinger ring as a pre-

**PORTABLE TUBE BENDERS**



**LIGHTWEIGHT BENDING TOOLS**

Types GL.O and GL. Minor

Compact machines to produce good quality sets, compound bends, etc., in non-ferrous tube. Robustly built, they can be carried in tool bag and are particularly suitable for small bore heating and similar types of installation.

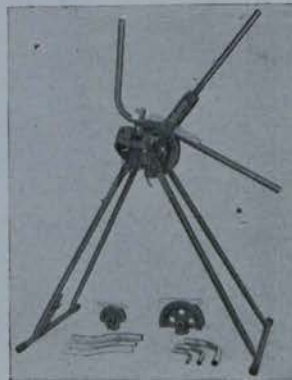
**CAPACITY:** GL. O — ¼", ½" and ¾" dia. copper tube.  
GL. Minor — ½" and ¾" dia. copper tube.

**FOLDING STAND MODELS**

Types GL. 2B and GL. 3B

The original and most efficient portable benders made for bending light gauge copper tube. Require no fixing or bolting down and produce good quality bends, cold and unfilled, to exact measurement on standard radii.

**CAPACITY:** GL. 2B — ½", ¾" and 1" dia. copper tube.  
GL. 3B — ½", ¾", 1", 1½" and 1½" dia. copper tube.



**EASY-WORK RATCHET BENDER**

Type RP. 5B

A machine of new design with a rotary bending action through a powerful ratchet operated screw. Completely portable, produces good quality bends speedily, accurately and with minimum of manual effort.

**CAPACITY:** ½" to 2" dia. copper tube.  
½" to 1½" o.d. conduit.  
½" to 1" nom. bore gas and steam.



SEE OUR PERMANENT EXHIBITION AT THE BUILDING CENTRE OF IRELAND, DUBLIN.

FIRST MADE



FINEST MADE

For details of range of hand-operated, hydraulic and motorised machines handling up to 8" dia. tube, apply to local stockist or write to:— Dept. F, HILMOR LTD. (Sales and Service), CAXTON WAY, STEVENAGE, HERTS.



● The A5 centrifugal pump.

caution to protect motor bearings, in the event of seal wear allowing leakage.

Another pump on the Dunham-Bush range is the model A9. The pump case is of cast iron construction with suction and discharge flanged B.S. Table "F." The case is attached to the pump with twelve bolts for strength and this permits the discharge to be located in any one twelve positions 30 degrees apart.

\* \* \*

WALLWIN (Pumps) Ltd., Saltisford Ironworks, Warwick, have available the Wallwin non-chokeable sump pump which is fitted with the Wallwin non-chokeable impeller. It has been designed to meet the growing demand for an easily installed unit, which will pass solid spheres.

The pump is robust, simple in construction, wearing parts have been kept down to a minimum and it is extremely easy to install, requiring only a sump approximately 1" square by 12" deep.

The Wallwin sump pump will handle liquid borne solids up to ¾" in diameter, sludge, slurries, etc., and is ideally suited to cellar drainage,

Continued page thirty-two

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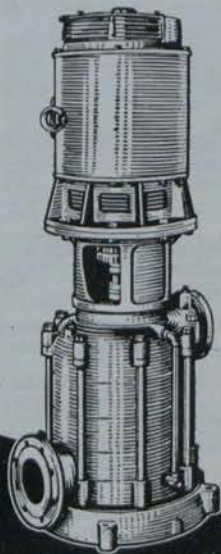
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**PRODUCT REVIEW**



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Faulty fittings, bad threads, sand holes, any leak through any cause is sealed economically and quickly. No dismantling needed; no patches or welding; no need to even **find** the leak; no trouble at all! \*Oxypic prevents rust and scale. It can also be used as an active leak preventive.

N.B.—Unsuitable for domestic or draw off systems. Retail Price £1 per tin C.O.D., money refunded if not satisfied.

Full details from:

**H. Pickup Ltd.**

Dept. I.P.C.3, Roscoe Works, Scarborough. Tel. 4997/8/9. 6 Charlton St., York. Tel. 24611

Established 1892.

Supplies obtainable from:

**K. W. Talbot**

Builders' Merchant, 43 Charlemont Street, Dublin, 2.

from page thirty

where it eliminates the necessity for the constant cleaning and replacement of filters.

The motor is  $\frac{1}{2}$  h.p. at 930 or 1,440 r.p.m., and can be either 3 phase or single phase.

The representative in Ireland is C. G. Williamson, 21 Mayfair, Arthur Square, Belfast.

\* \* \*

THREE PACE-SETTING accelerators are produced by International Boilers and Radiators Ltd.—the Silentflo, Multiflo, and Thermoflo.



The new Silentflo.

The New Silentflo is particularly suitable for small packaged central heating schemes of up to 40,000 B.Th.U.'s or housing estates where heating layouts are similar. The New Silentflo runs in any position, on any voltage between 200 and 250 volts.

The Multiflo variable head accelerator has all the advanced design features of the New Silentflo plus variable quantity control, and is suitable for virtually every domestic heating installation.

The Thermoflo has a variable head and a mixing valve for instant control of volume and temperature. It is the same size as the Multiflo but possesses an extra facility offered by a built-in mixing valve and, therefore, saves installation costs.

All International pumps are fully guaranteed for two years with a maintenance agreement available beyond that period.

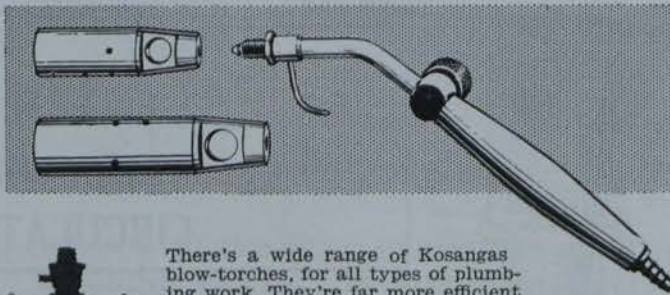
\* \* \*

**NEXT MONTH**

Next month's issue will carry further equipment reviews in connection with this special survey.

# Kosangas Blow-Torches

for every plumbing job!



There's a wide range of Kosangas blow-torches, for all types of plumbing work. They're far more efficient than the conventional types.

The Kosangas TH3 and TH4 high pressure blow-torches are specially designed for *paint-burning, pre-heating and soldering.*

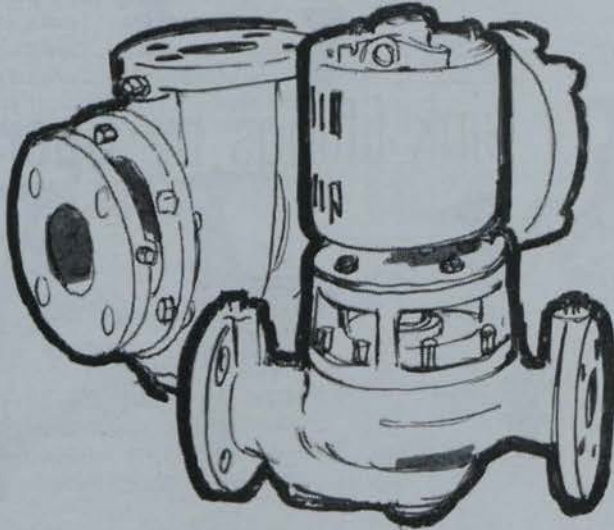
The Bullfinch Mark II has a full range of heads, including soldering attachment. Use Kosangas blow-torches, with the small Kosangas portable cylinder, also for *roof-felting, jointing of plastic pipes, and other heating needs.*

A plumber's portable furnace with wind protected burner is available.

Write to: McMullans Kosangas Ltd., 1 Upper O'Connell St., Dublin. Tel: Dublin 40761-4.



"Better heating pumps?"  
they said—



"Worthington-Simpson" they said



Our hot water circulators and in-line accelerators promote efficiency in large heating systems. Economic operation is ensured by low running costs, simple installation and minimum maintenance. The range of circulators extends to capacities of 750 g.p.m. and heads up to 80 feet. The range of accelerators covers capacities up to 150 g.p.m. and heads up to 15 feet.

We invite you to write for leaflet WS-5179 which gives details of our heating pump range and also a guide to pump selection.

**Worthington - Simpson Ltd**

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Pumps • Compressors • Heat Exchange Equipment

P0315

When a plumber is looking for a pump...



...for CENTAL HEATING

he cannot buy better  
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and the prices are very competitive. Why not buy the best at practically no extra cost?

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# "THE DUBOIS PLASTIC TRAP" (Regd.)

A NEW PRODUCT

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Orthodox Shape!  
Smooth Bore Tubular construction.  
Outlets can be turned through 220°.  
A two-piece trap at a one-piece price.  
Outlet on 'S' trap turned to inlet forms a through-bore bottle trap.  
Frost and damage resisting.  
Light weight = lower transportation costs.



Manufactured by:—

**THE DU BOIS COMPANY LIMITED**  
**15 Britannia Street, London, W.C.1**

Telephone No.: TERminus 6624-5.

Telegraphic Address: "Bleitrap, London."

# domestic installation

# The heat loss sheet will look like this

Continued

most common values under average conditions of exposure is as follows:

- Walls:**  
 4½" brickwork, plastered .. 0.57  
 4½" brickwork, unplastered .. 0.64  
 9" brickwork, plastered .. 0.43  
 9" brickwork, unplastered .. 0.47  
 11" cavity brickwork, plastered (ventilated cavity) 0.34

- Floors:**  
 Linoleum on wood floor, with ventilated space below .. 0.35  
 Concrete .. .. . 0.20  
 Timber floor with plaster ceiling below .. .. . 0.22  
 Upwards loss through above .. 0.29

- Ceilings:**  
 Plaster with roof space above, tiled and battened roof .. 0.56  
 Above construction with structural insulation over ceiling .. 0.15 to 0.3 depending on insulation.

- Glass:**  
 Single glazing .. .. . 1.0  
 Double glazing .. .. . 0.5



It is also necessary, of course, to measure the rate of heat loss due to ventilation. Under average conditions one Btu. will raise the temperature of 50 cubic feet of air by one degree F. Thus, one fiftyeth or 0.02 of a Btu. will raise one cubic foot of air by one degree F. To establish the heat loss per hour by ventilation, therefore, it is merely necessary to multiply the cubic content, or volume, of the room by 0.02 and by the temperature difference between inside and outside, and by the anticipated number of air changes per hour in the room under consideration. Excessive air changes are very wasteful, the biggest culprit being the open fire. These should always be fitted with throat restrictors which are easily fitted, cost very little and reduce the air change while actually increasing the efficiency of the fire.

Typical air change rates for reasonably well constructed rooms may be taken as:—

Changes per hour.

- Bedrooms .. .. . 1½
- Living rooms .. .. . 2
- Halls and corridors .. .. . 2

Temperature requirements vary with the individual, but most people regard full central heating temperatures as 55-60 degrees F. for bedrooms and 65-70 degrees F. for living rooms,

Job No. 1. Sheet No. 1. Lounge Temp. 70.

Volume = 1656 x .02 x 2 x 40 = 2650

Structure	Area	"U" Value	Loss per 1° F.	Notes
W. wall 11" cavity	16 x 8 = 128	0.34	45	
S. wall 11" cavity	12 x 8 — glass 8 x 5 = 56	0.34	19	
S. window	8 x 5 = 40	1.0	40	
Floor, lino on wood	Total 207	0.35	72	
Ceiling, insulated under tiles	Total 207	0.2	41	
Kitchen party wall. 4½" brick.	15 x 8 = 120	0.57	68	(Total of outside Losses).
E. party wall. Treat as straight 4½" wall.	16 x 8 = 128	0.57	72	Kitchen, hall and bedroom taken at 60°F. Therefore only 10°F. difference
			217 x 40 = 8680	
			140 x 10 = 1400	Total of inside Losses).

Totals Ventilation ..	2650
Outside losses ..	8680
Inside losses ..	1400
Room heat requirements ..	12,730 Btu/h

against 30 degrees F. outside. Small kitchens with a boiler fitted are often left unheated, otherwise heat to, say, 60 degrees F.

For technical reasons our example is unscaled, but we may assume that the lounge measures sixteen feet by twelve feet along the outside walls, and fifteen feet along the kitchen partition wall. The window is eight feet by five feet. A heat loss sheet for this room would look like the one shown above.



Many heating engineers use duplicated forms for heat losses; drawing all those lines can get a bit tedious!

We have now established the losses

for one room. The same process is used throughout and, for our working example, we can take the additional, arbitrary, figures:—

Bedroom 1 ..	8,350	} All at 60 degrees F.
Bedroom 2 ..	6,200	
Bathroom ..	4,360	
Kitchen ..	6,950	
Hall ..	2,850	
Total ..	28,710	

Plus Lounge losses .. 12,730  
 Total of heat

requirements .. 41,440 Btu./h.

From now on we are concerned with designing a system that will be capable of supplying this amount of heat, in the right proportions and as efficiently and economically as we can.

Another article next month.

Thirty-five

# trade Topics

A STANDARD reference work for nearly fifteen years, the Plumber's Handbook has now **NEW EDITION** been published by **OF PLUMBER'S HANDBOOK** the Lead Development Association in a new edition for 1964.

Primarily intended for plumbers and plumbing students, the Handbook is an invaluable guide to the specification and everyday use of lead sheet and pipe in building, and provides detailed notes on all main applications and working techniques. Extra material has been incorporated in the new edition to bring it completely in line with current plumbing practice, and the book is fully indexed and illustrated with photographs and nearly a hundred technical drawings.

Bold section headings and a wide central margin make for easy reading, and the convenient pocket size has been retained. Copies of the new edition of the Plumber's Handbook are available free on request to the LDA, 34 Berkeley Square, London, W.1.



A fine example of good styling is instanced here in the new Electrolux 2½ Kw. unit-plan heater—measuring 26" in height, 40" wide and 10" deep. It weighs 340 lbs. when assembled. To enable users to regulate the heat input of each unit to suit their comfort requirements, the heater incorporates a charge controller built into a compartment in the casing.

● Bathtubs Ltd., of Ilkley, Yorkshire, suppliers of the Viking plastics bath, announce their acquisition of the Plastics Division of Messrs. Leeds Fireclay Ltd. The full range of products hitherto supplied by Leeds Fireclay Ltd. will continue to be

# 1964 DIRECTORY of MANUFACTURERS, AGENTS, REPRESENTATIVES and DISTRIBUTORS

★ The June 1964 Register of Manufacturers, Agents, Representatives and Distributors of Domestic and Industrial Plumbing, Heating, Air Conditioning, Ventilation and Insulation equipment and materials available in the Republic of Ireland and Northern Ireland is now being prepared. The Directory this year will again be enlarged to accommodate the many additional entries under the industrial heading.

If you come under the heading of any of the categories listed here and have not supplied information already, or wish to make amendments or alterations to last year's entries, we would ask you to do so without delay. Names and addresses of Agents and/or Representatives should be included with all entries. If you require an Agent, please indicate accordingly.

## Please Check This List Of Categories

— LIST NO. 4 —

- Tanks and Cylinders
- Taps, Mixers and Shower Units
- Thermometers, Temperature Indicators, etc.
- Thermostatic Controls
- Time Switches
- Toilet Seats
- Tools
- Unit Heaters
- Valves
- Valves, Reducing
- Ventilating Panels
- Ventilators
- Waste Disposal Units
- Water Treatment Equipment and Processes
- W.C.'s and Urinals
- Welding Plant and Equipment

### Please Note!

# CLOSING DATE

## Saturday, 2nd May, 1964

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TRIANCO, GRAHAM STEWART, and others**

## **Heating Controls & Devices Ltd.**

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Phones: 66480/89.

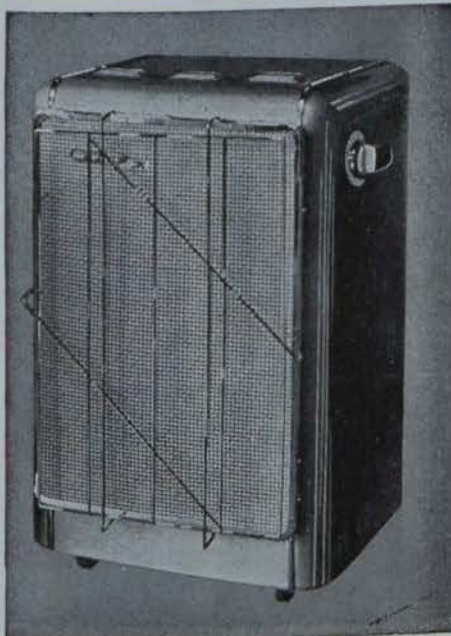
CARROWREAGH ROAD, DUNDONALD,  
BELFAST, N.I. Tel.: Dundonald 2683 (3 lines).

Stockists of Components by:—

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# **THIS IS FLAMELESS HEAT**

**CATALOR LIQUID-GAS thermo-reactor for domestic, office or industrial heating.**

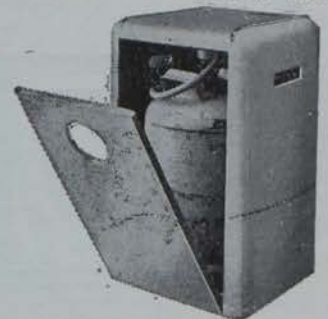


“Catalytic Heating”—What It Means And How It Works. When liquid propane or butane meet a pre-heated platinised “catalyst” they are oxydised into carbon dioxide and steam; heat is generated in the process, and the (patent) “CATALOR” heater gives off this heat as 46 per cent. radiation and 54 per cent. convection. The heating element does not ignite or glow; it simply pours out penetrating heat which is healthy, clean and SAFE. Even a naked flame held near the CATALOR element is extinguished. The larger models need only a few minutes of electric pre-heating; then an automatic cut-out switches off the current as the element grows hotter.

Left: Model 6035 CATALOR  
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