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### The Irish Plumber and Heating Contractor, November 1961 (complete issue)

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# THE IRISH PLUMBER & HEATING CONTRACTOR

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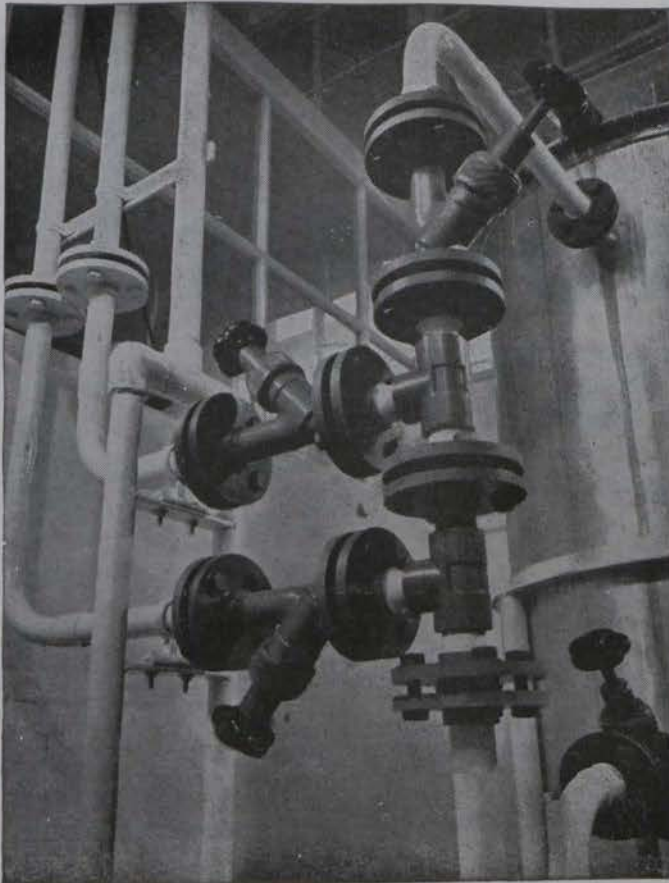
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# THE IRISH PLUMBER & HEATING CONTRACTOR

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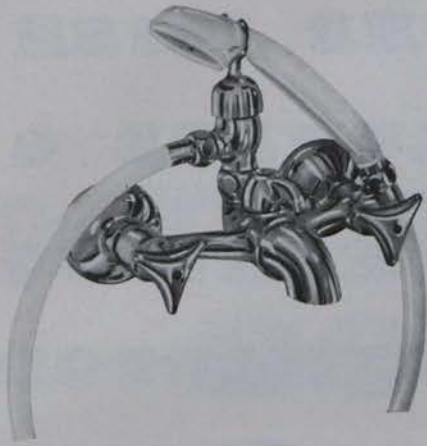
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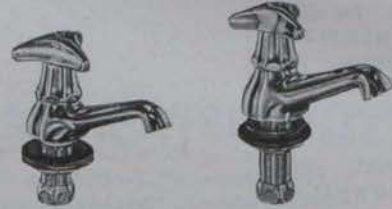


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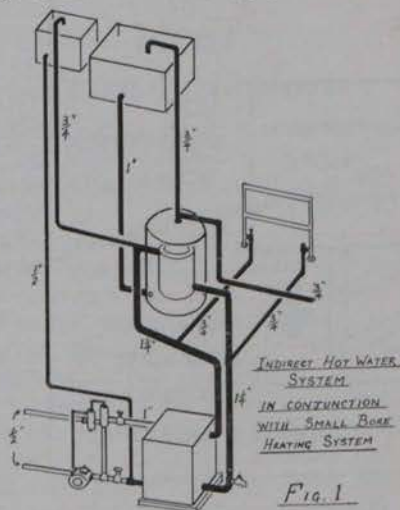


**JOHN G. BOLTON, Lecturer in Plumbing and Heating at the College of Technology, Bolton Street, Dublin.**

# THE DESIGN AND INSTALLATION OF INDIRECT HOT WATER SUPPLY SYSTEMS

**I**n this series of articles we have considered the design of domestic hot water systems in so far as the direct method of heating the water was involved, e.g., where the water, when heated in the boiler, passed into the cylinder, and thence to the hot taps, being, in turn, replaced by cold water.

This is the principle of the ordinary domestic system, but in certain circumstances, for instance, where there exists a temporary hard water supply which would, when heated, produce scale formation in the boiler and pipes, or again, where circumstances require that the domestic supply system and central heating system be worked from the same boiler—a variation involving the indirect heating of the domestic supply is used.



This indirect system of hot water supply consists, strictly speaking, of two separate and distinct units. In one—the primary unit—the water is heated in the boiler and then circulates through an inner cylinder or pipe coil which in turn is enclosed by an outside cylinder. This combined cylinder is sometimes called a calorifier, but for domestic systems the term “indirect cylinder” is a better description.

## Likened to radiator

**T**HE inner cylinder or coil may be likened to a radiator giving heat not to the air but to water surrounding it in the outer cylinder. It will be seen, therefore, that the hot water drawn from the taps has not passed through the boiler, but is heated from contact with the inner cylinder or coil, hence the name “indirect system.”

There are several reasons for using this method. In the case already mentioned, of the combined heating and hot water system, it is obvious that the water, especially if soft, will become discoloured by rust from contact with the steel or cast-iron radiators and piping of the heating circuit.

As this water would, in the absence of an indirect cylinder, be also circulating in the domestic circuit, rust coloured water would flow from the hot taps when opened. Another serious side-effect would be the chilling of the radiator system and erratic working, every time a large hot water draw-off took place from the domestic side.

Again, if the direct system was used with a temporary hard water supply, it would mean that each time the water in the boiler became very hot—anything over 130°F—lime would be deposited in the boiler and circulating pipes, possibly leading to a general choke and eventual explosion! In the indirect system, however, the boiler water is circulated over and over again in the primary unit so that once the small initial deposit of lime has taken place, the water becomes soft and no further trouble is caused.

## Indirect cylinders

**T**HESE are generally made of copper, and have either a coil or annular cylinder as the heat exchangers. The coil type, however, is not too often used for domestic hot water systems as the heating surface is usually less than would be the case with the inner cylinder, and, in addition, air lock would occur if it should be necessary to install the cylinder horizontally. (Fig. 2).

For the average house, the cylinder is usually of 30 gallons capacity, and 40 to 60 gallon cylinders will give ample storage for the larger dwelling. In this connection it is sometimes recommended that 7 to 10 gallons storage capacity be allowed for each person in domestic buildings, but for flats or similar communal dwellings a satisfactory allowance might be as low as five gallons per person. However, the minimum indirect cylinder capacity should never be less than 30 gallons.

*continued page thirty-seven*





# HEAT AND ITS EFFECT ON AIR AND WATER

FACULTY OF PLUMBING . . . A. L. Townsend, M.R.P., M.R.S.H., a Lecturer at the Oxford College of Technology continues here the first part of a four stage course in plumbing.

WE have seen earlier that whereas solids expand and contract at a regular rate for each degree of temperature difference, gases and liquids do not.

Moreover, a solid material is rigid and self supporting. Its change in size can therefore be directly measured by comparing dimensions before and after any temperature change in the material.

Liquid expansion and contraction cannot be so easily measured. Since they are fluid, liquids must be held in a container of some kind. When heated, measurement of their rate of expansion is upset by the fact that the container expands at the same time, and therefore increases its capacity. By using containers whose increase in capacity is known, allowances can be made and the actual amount by which the liquid expands can be calculated. The result will, of course, be greater than the amount by which the liquid appears to have expanded and so, when dealing with thermal expansion of liquids, we refer to their "actual" and their "apparent" expansions.

By this means a coefficient of expansion for water could be found for a temperature difference of one degree; but as the expansion of water varies for each degree rise in temperature, there is no useful constant coefficient of expansion for water.

It is useful to understand the following points:—

- Water expands on heating and its volume or bulk increases.
- This being so, one pound of water at high temperature will occupy more space than one pound of water at a lower temperature.
- To make the volumes of the hotter and cooler waters the same, a small amount of water must be taken away from the hotter and bigger volume.

continued next page

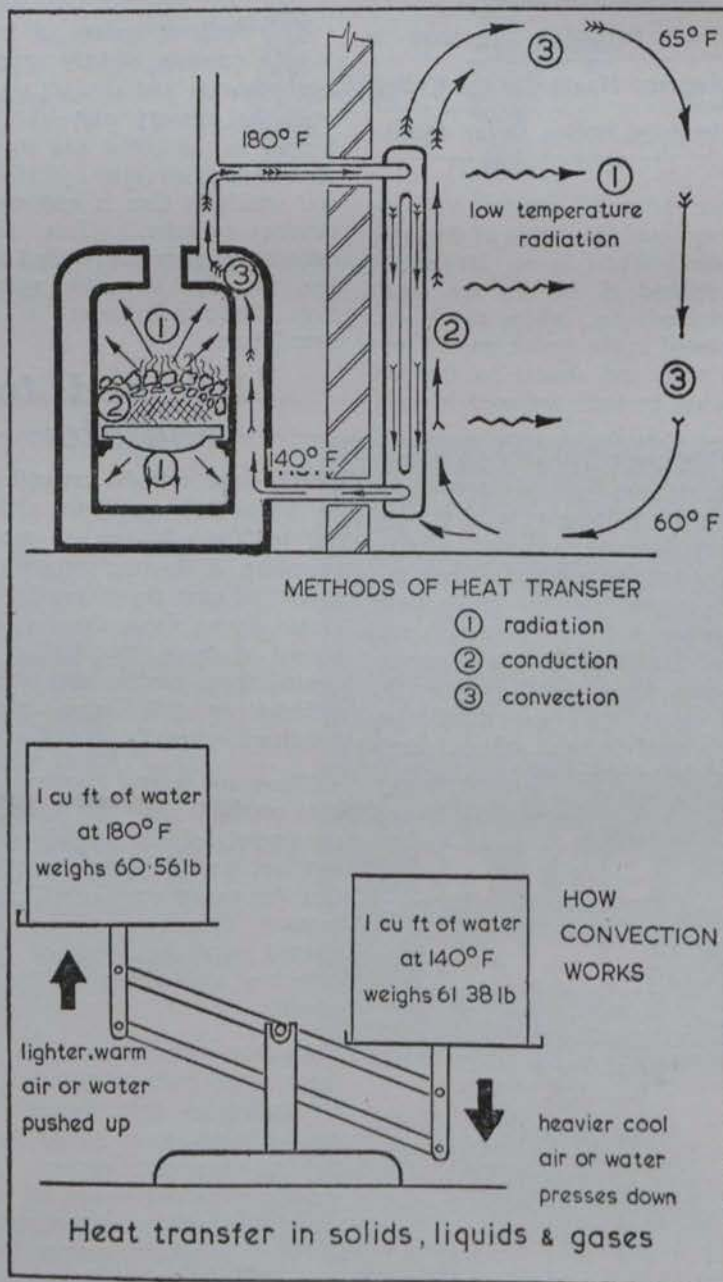


FIG. 18

from previous page

Having done this, the hot and cooler volumes of water would be the same. But clearly, the hotter volume will now weigh less than the equal but cooler volume.

### Summed up

**T**HIS can be summed up in one short statement: "Hot water is less dense, or weighs less bulk for bulk, than cooler water."

This explains why heated water circulates in hot water supply and central heating systems. The cooler, heavier water in the system falls by gravity to the lowest point, the boiler. In doing so it pushes the lighter, heated water out of the boiler, up and around the circulatory pipework.

The movement of warmed air in a room is explained in the same way. Cool air weighs more than warm air, and so it falls by gravity, pushing the lighter, warmed air up and around the room as it does so.

So long as there is a difference of temperature between the falling and rising liquid or gas streams, there will be a difference of weight in those streams, and circulatory movement will result.

When the temperatures become equal, there will be no such lack of balance in the weights.

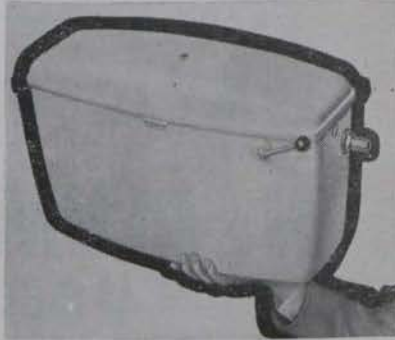
It follows, therefore, that the greater the temperature difference, the greater will be the unbalancing weight difference, and the more vigorous will be the circulation.

These important facts find good practical use in the installation and design of hot water supply systems and central heating systems.

### Heat Transmission

**A**T an earlier stage, it was shown that water will flow from a higher level to a lower level, and that it will continue to do so as long as there is a difference of "head."

It was also indicated that the greater the difference in "head," the greater will be the pressure, and therefore the rate of flow of water. In just the same way, if two materials at different temperatures are placed in contact with one another, heat will flow from the hotter to the cooler material, and will continue to do so until the difference in temperature disappears.



**FORDHAM PRESSINGS LIMITED**, of Wolverhampton—whose 'Cleanline' range of seamless pressed steel cisterns is already well known to the trade—report a very good reception in Ireland of the 'Volta' and 'Eterna' unbreakable white, coloured and black cisterns.

The "Volta" and "Eterna" are constructed of rigid high density polythene, are unbreakable and do not chip. Light, but extremely strong, the manufacturers claim that they are the lowest cost plastic cisterns available, taking into account the total absence of

## TWO GOOD LINES FROM FORDHAMS

damage during transit or installation, and the ease with which they can be fixed.

The narrow projection from wall face of the "Eterna" makes it ideal for installation in places where space is limited.

Irish Agent and Stockist: Messrs. R. T. Large & Son, Stephen's Place Rere, 47 Merrion Square, Dublin.

TOP LEFT: Volta.  
BELOW: Eterna.



Furthermore, the greater the difference in temperature, the faster will be the rate of flow of the heat.

Thus heat will flow from a hot radiator to warm up the air around it; but on the other hand it will also flow through the walls of a building to be wasted in the cooler air around it.

Heat may be transmitted in three distinct ways: by radiation, conduction or convection.

**Radiation** occurs when heat is transferred in the form of straight lines of heat energy. These radiant waves will pass through a vacuum. They will also pass through air without

*continued page thirty-five*

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

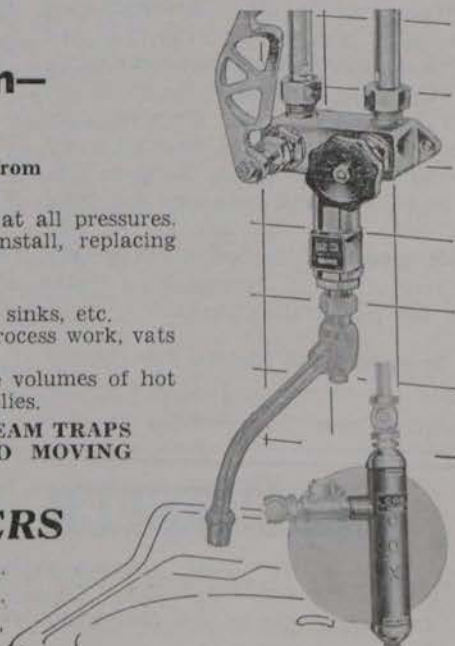
## COX WATER HEATERS

Manufactured by COX ENGINEERING CO. LTD., Dept. IP.L, 14 Park Lane, Sheffield, 10.

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Bedford Buildings, 7 Bedford St., BELFAST. Tel. 26343.





# PLASTICS IN PLUMBING

PART  
FIVE

**L**AST month we discussed the laying of hard PVC watermains and the methods of providing for branch connections. It is now proposed to consider the laying of the service or branch pipe and the general domestic installation of cold water and waste pipes.

**Service Pipes Connections To Ferrule:** The service pipe of hard PVC or Pe is connected to the ferrule by means very similar to those used

By

**D. C. COYLE**

M.E., M.I.C.E.I.

M.I.P.H.E., A.M.I.C.E., A.M.I.W.E.\*

for conventional materials. For the more useful hard PVC service pipes, we have developed a detachable coupling. This coupling may be used with metal ferrules or the patent Wavin self tapping ferrule. In either case the joint is of the face to face type with a leather washer between the two PVC mating surfaces or the metal and PVC surfaces. The coupling consists of a tailpiece and detachable nut—rather similar to the “copper” or “lead” tails and nuts used for pipes of these materials. For  $\frac{1}{2}$ ” size service pipes an alternative fitting consisting of a nut bearing on a flange on the pipe end is available.

**Stopcocks and Meters:** For connections to meters and stopcocks the coupling used for ferrules is also

\*Technical Manager, Wavin  
Pipes Limited, Dublin

*Increasingly the plumber uses plastics in his day-to-day work and this series of articles propose to deal thoroughly with their applications to the trade.*

applicable. In the case of supplies to factories, where flanged meters may be used, a full range of flanged connections is available.

**Laying of Service Pipes:** The ferrule fixed in the saddle on the watermain should be fixed so that the outlet is in line with or parallel to the main. The service pipe should then be brought for a distance of 6” to 12” along the line of and over the main and then, by means of two “slow” curves, to run at right angles to the main into the premises to be served.

The service pipe should be laid at a minimum depth of two feet beneath the finished ground surface. The usual precautions should be observed in preparing the bed of the trench (see previous article of this series dealing with preparation of the trench bed for watermains).

Where the service pipe passes beneath boundary walls through the rising wall of a house—it is good practice to thread it through a hard PVC ducting pipe. Alternatively a short length of service pipe of suitable size may be used as the duct.

**Proximity To Gas Pipes:** Polythene is not suitable for service pipes in any location where mains and service pipes for gas distribution are laid. This is due to the fact that leakage of gas may penetrate the walls of the polythene pipe and pollute the water in the pipe.

Hard PVC pipes are immune to this type of attack and so may be used in all locations—even immediately adjacent to gas pipes.

**Colour of Pipes:** The Provisional Irish Specifications for hard PVC Pipes—and the Continental Specifica-

tions—require that pipes used above ground shall be of a dark colour. Pipes below ground may be of the basic cream or yellowish colour of unpigmented hard PVC. The reason for this specification requirement is simply that sunlight may pass through the wall of a plain cream coloured pipe and by action on organic matter, which may be present in the water, cause the growth of slimes and algae. In the case of the dark coloured pipe, sunlight cannot penetrate to the water and so no difficulty due to obnoxious growths can arise.

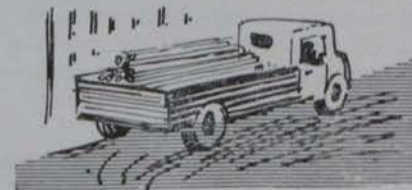
**Service Pipes in the House:** A full range of hard PVC fittings is available from Wavin for connection to the stop tap where the service pipe enters the house. This connection, and similar ones elsewhere in the house, to fittings having a screw thread of the Instantor type is made by means of a special fitting.

This fitting consists of a short section of PVC pipe—one end of which has a socket for making a solvent cement joint to the PVC pipe—the other end has an outside diameter equal to that of copper pipe. The usual Instantor nut and ring is placed over this section of the fitting and screwed into the stoptop or other unit in the usual way.

Teepieces, elbow and sweep bends, reducers and other fittings in hard PVC are available for use with service and distribution pipes.

**Distribution Pipes:** The hard PVC distribution pipe is connected to the storage tank or cistern by means of a tank connector. This fitting utilizes two back or lock units in the usual

*continued page thirty-five*



## A Contractor report from London

# 45,000 VISITED OLYMPIA FOR FIRST HEVAC EXHIBITION

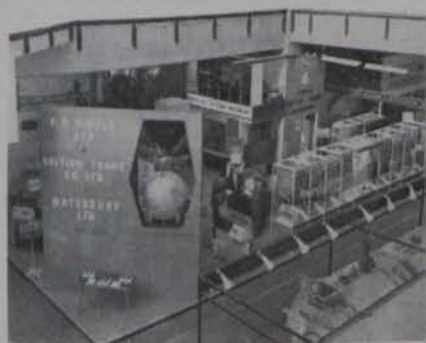
**T**HE First International Heating, Ventilating and Air Conditioning Exhibition occupied stand space of more than 75,000 square feet covering the whole area of the three floors of the Empire Hall of Olympia. There were some 220 exhibitors in all.

During the ten days of the Exhibition a total of 45,476 people visited it. There were 1,345 visitors from 60 countries overseas.

As the Exhibition closed, Mr. C. J. Atkins, M.I.Plant E., Chairman of the HEVAC Exhibition Advisory Committee, said: "This is the first time that our industry has co-operated in an exhibition of this kind and the result has been even more successful than my organising committee expected."

The next HEVAC will be held in September/October, 1962, it was officially confirmed when the 1961 Exhibition closed.

Here now are just some of the more interesting items seen at Olympia:—



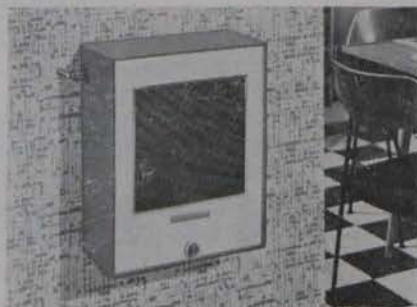
The Biddle Group Stand

### Biddle Group competition

ON the Biddle Group of Companies stand great interest was taken in the Biddle International Competition, which offers prizes worth over £1,000 (Contractor, September).

POTEZ Industries of Ireland Limited, the French firm which has extended its activities to this country, showed a new system of central heating by natural air circulation for use in the home.

★ ★ ★



### Agavector from Allied

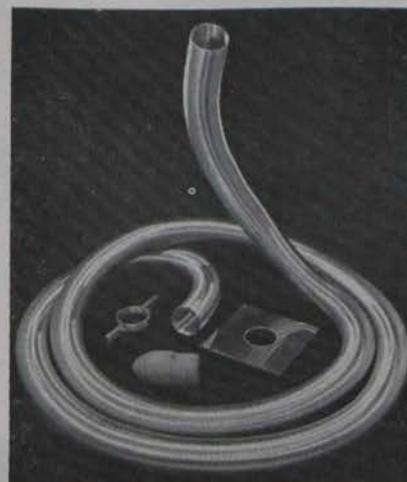
ALLIED Ironfounders' newest product, the Agavector 10, was on display. It is a single-sided 10,000 B.t.u. wall model. Equipped with three speed control the heater battery has 1" B.S.P. connections and provision in the casing for left or high hand, back or bottom mounting of heating pipes.

★ ★ ★

AT the Keith Blackman stand the "Heat Throw" unit heater for down discharge was introduced. The new unit is complementary to the established diagonal discharge unit of similar design. The range employs either steam or hot water as the heating medium. Heat outputs: 32,000 to 158,000 B.t.u. per hour.

★ ★ ★

IN the forefront of the G.E.C. exhibits was found the "Californian" air conditioner. Self-contained, slim and elegant, the dimensions of this floor-mounted unit are: height, 30";



### New pliable flue lining

UNI-TUBES Limited introduced a new lead lined pliable flue lining tube. Our illustration shows twenty-five feet of Kopex lead lined pliable flue lining tube, a sealing plate, clamp and wooden plug—a very compact flue lining kit.

Complete protection against condensation damage from the flue gasses of gas fired heating appliances by the new tube.

width, 33", and depth 10", with two-toned finish.

AT the Colt Ventilation Ltd. stand we were told that since May pneumatically-operated Colt Ventilators have been standard equipment. The system is a very flexible one, capable of operating from one to 30 ventilators of all types, regardless of their location, from one control valve.

★ ★ ★

FOR £11 the Permutit Company Ltd. offer an amazing portable water softener, the Model P4. The unit completely softens 150 gallons of water of a hardness of 16 degrees E between regenerations.

## NEXT MONTH

Next month's issue will contain a special survey on electric heating systems, appliances and controls.

## NEXT MONTH



# COMPUTATION OF THERMAL INSULATION VALUES

By A. L. TOWNSEND, A.M.I.P., M.R.S.H.

**T**HE fallability of certain well-intentioned rule of thumb methods of heat computation for buildings must be guarded against. Many of these are quite unsuited to modern building techniques and materials. Except where used in informed manner in particular applications and circumstances, as basis for estimating, etc., almost all will give erroneous results. Costly oversizing of equipment or alternatively disappointing inefficiencies due to undersizing through neglect to adopt proper heat loss computation method is unfair to the highly efficient heating equipment now available and is unworthy of the person who installs it.

One such rule of thumb method suggests an allowance of 20 sq. ft. of radiation for each 1000 cu. ft. of room space to be heated. A few moments spent in consideration of the following will show some of the reasons why such a rule can provide hopelessly incorrect assessments of radiator sizing and consequently, pipework and boiler sizes as well.

Taking an extreme hypothesis as a basis for comparison. A light timber garden shed and a room in a sodidly built brick house. If both had volumes of 1,000 sq. ft. then by the

above quoted "rule" each would be equally warmed by a 20 sq. ft. radiator. It is plain that in practice this would not be so.

The rule is an old one. It was devised at a time when domestic building materials and styles were more uniform than of to-day. It does not take into account the differing heat loss values of different thicknesses and materials of construction. It does not take into account the differing temperatures which obtain inside and outside those constructions, neither does it make satisfactory allowance for the cooling effect of infiltrating air so necessary in natural ventilation.

**Air change for ventilation** requirements arising from the opening of windows, etc., or by infiltrations of air through structural joints and the inevitable gaps around openable windows and doors, imposes an additional heat load on space heating equipment. The incoming cold air must be warmed to room temperature. This Air Change or Infiltration heat load must be assessed and added to the heat loss through structure loads computed as described in the September issue.

0.02 B.t.u. will raise 1 cu. ft. of air 1 degree Fahrenheit. Thus, the heat requirement for ventilating air within a room is quickly and easily computed as follows:—

$$\text{Volume of room (L X B X H) x N} \\ \text{of air changes/hr. x 0.02 x Diff. inside} \\ \text{and outside} \\ \text{air temps:}$$

**Example 1.** Heat requirement for air in room of 1000 ft. cu. with air change twice in each hr. when inside temp. has to be kept at 62 F when it is 30 F outside.

$$1000 \text{ ft. cu. x } 2 \text{ x } 0.02 \text{ x } 30 \text{ F} \\ \text{equals } \mathbf{12,00 \text{ B.tus./hr.}}$$

(See also "Special Survey—Ventilation and Insulation," July issue).

The ease with which Thermal Transmittance or "U" value Tables are applied to heat loss calculations was outlined in the September issue. A little practice in their use will soon convince that they are essential to sound design practice even for quite small schemes.

**Published Thermal Transmittance Tables**, those contained in the publication, "The Computation of Heat Requirements for Buildings," by the Institution of Heating and Ventilating Engineers, are quite extensive. They cover most of the conventional materials and methods of construction as well as offering modified values for varying degrees of building exposure. It is common knowledge that a room facing South will generally be warmer in winter than a North facing room in the same building. Similarly, a building standing alone in the centre of an open site will be colder than one sheltered by other buildings in a built up area. The complete Tables

TABLE I.

Material.	Conductivity	Resistivity
	(k)	$\frac{1}{k}$
Wood .. .. .	1.0	1.0
Plasterboard .. .. .	1.4	0.71
Lightweight concrete .. .. .	2.0	0.50
Plaster .. .. .	4.0	0.25
Glass .. .. .	7.3	0.137
Brickwork .. .. .	8.0	0.125
Stone and Dense Concrete .. .. .	10.0	0.10

provide substitute "U" values to cover such varying degrees of orientation and exposure to cooling winds.

On occasions it may be found that values for certain form or thickness of structure is not listed in the Tables. It is then that ability to work out "U" values for yourself is a valuable asset. This is not at all difficult as the following examples will show. But first, a few definitions.

**Conductivity** (k) denotes the amount of heat in B.t.u.'s that will flow through one sq. ft. slab of material

**EXAMPLE A** (see text below)

Or Conductance =  $\frac{k}{L}$  where L = Thickness in inches.

e.g. Conductance of 9in. brick work =  $\frac{8}{9in.} = \frac{8}{9} = 0.9$ .

Conductance for ½in. plasterbd. =  $\frac{1.4}{0.5} = 1.4 \div 0.5 = 2.5$ .

in one hour when the slab is one inch thick and a temperature difference of 1 F exists between its two faces.

Table I lists Thermal Conductivities of some common building materials.

It will be seen that materials of low "k" values will be better insulators than those with higher "k" values. In this way comparisons of materials can be made. It must be remembered, however, that the Tabulated values of "k" are for **one inch** thickness of material only. Materials of greater thickness will more resist the passage of heat whilst those of less than one inch thickness will pass it more quickly.

**Conductance** is a term used to denote the rate of heat flow through a material of any thickness or through a combination of materials which go to make up a structural component, wall, roof, etc.

As previously mentioned, Conductance will become **less** as the material thickness increases and **increases** as the thickness is reduced. As you would expect, the rate of heat transfer through a ½ in. thick plasterboard would be twice as much as through a 1 in. board. Similarly, the rate of flow through a 9 in. brick wall would be just half of that which would occur through a 4½ in. wall.

Thus to find Conductance of materials greater than 1 in. thick one divides the "k" value by the material thickness in inches.

(see Example A above)

**Resistivity** is the reciprocal of "k" and is denoted by the symbol  $\frac{1}{k}$ . It relates to the time taken for one B.t.u. of heat to pass through one sq. ft. of material one inch thick when the temperature difference between both faces is 1 F. A little arithmetic check of columns 2 and 3 of Table One will clarify this reciprocal business.

**Resistance** (R) of a material varies as the thickness of the material. Whereas Resistivity relates to the one inch slab thicknesses, Resistance relates to the full thickness of a material in thicknesses other than 1 in. For material over 1 in. thick Resist-

*continued overleaf*



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Switch - Warmhome Towel Rail  
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from previous page

## COMPUTATION OF THERMAL INSULATION VALUES

ance is found by multiplying the Resistivity  $\frac{1}{k}$  by the number of inches or part inches of the material.

e.g. Resistance of 9 in. brickwork =  $0.125 \times 9 \text{ in.} = 1.125$ .

Resistance of  $\frac{1}{2}$  in. plasterbd. =  $0.71 \times 0.5 \text{ in.} = 0.355$ .

Resistance is the reciprocal of Conductance, thus  $R = \frac{L}{K}$  where L = thickness in inches.

**Surface Resistances** to heat transfer occur between air and contact surfaces at different temperatures. These are denoted by the symbols  $R_{si}$  for internal surfaces, and  $R_{so}$  for outside surfaces of structural components.  $R_{si}$  is commonly taken as a value of 0.7 and  $R_{so}$  as 0.3, thus producing a convenient total of unity or one which is sufficiently accurate for our present purpose.

**Overall Thermal Resistance** for single homogeneous components, e.g., solid brick wall, plastered or unplastered; a pane of glass, etc., is the sum of the material resistance (R) and the Surface Resistances ( $R_{si}$  and  $R_{so}$ ).

Remember  $R = \frac{L}{k}$  where L indicates inches thickness of material.

Alternatively R may be found thus:—

Resistivity  $\frac{1}{(k)}$  x Material thickness in inches.

Applications using both methods follow.

**Example 2.** Determine the overall or Total Resistance for a 9in. solid brick wall.

Total Resistance:

$$= R_{si} + R_{I} (9\text{in. Brkwk.}) + R_{so}$$

$$= 0.7 + \frac{9\text{in.}}{8} \frac{1}{(K)} + 0.3$$

$$= 2.125$$

**Overall Thermal Transmittance or "U" value** sometimes referred to as overall air to air losses, i.e., heat loss from air inside a warm building,

# OPENING OF NEW BAXENDALE SHOWROOM



• Pictured at the opening last month of the new extensive central heating showroom at Messrs. Baxendale and Co. Limited were:

Left to right—Mr. J. V. B. Tighe, Dublin Manager, Irish Shell and B.P. Ltd.; Mrs. J. P. Murphy; Mr. J. P. Murphy, General Manager, Baxendales Ltd., and Miss Val Mai Johnston.

Miss Johnston, an Australian singing star, performed the opening ceremony.

through structure to the colder air outside, is the reciprocal of the overall Resistance, thus:—

$$"U" = \frac{1}{\dots}$$

Total air to air resistance.

Then, for the 9 in. brick wall the "U" value becomes  $\frac{1}{2.125} = 0.47$

This figure of 0.47 differs slightly from that of 0.5 given in the abridged, simplified heat loss Table 1, page 33, of the September issue but you will accept that any error here is due to the simplification of that Table and not to the method of computation adopted here.

## COMPUTATION OF U VALUES FOR COMPOSITE STRUCTURES

The foregoing definitions apply as does the simple calculation work as shown in Example 2 above.

As opposed to solid brick walls and the like, and walls of this kind with plaster facings attached so as to be part of the overall wall thickness, a composite wall is composed of two or more disjointed leaves, more often than not with an air space between.

An 11in. cavity wall of two leaves of 4½in. brickwork with a 2in. cavity

between is a typical example of a composite structure.

**Air Resistance ( $R_{ai}$ )** in cavities depends upon whether the air is still and upon the width of cavity. For normal work cavities which are not ventilated and are between ½in. and 2in. across are given a Resistance value of unity or one. This as you will see is very convenient.

**Example 3.** Determine the "U" value for an 11in. cavity wall in brickwork. The internal surface is plastered ½in. thick.

Total Resistance:

$$= R_{si} + R_{1} + R_{2} + R_{ai} + R_{3} + R_{so}$$

plaster    inner    air    outer  
leaf        leaf        gap        leaf

$$= 0.7 + \frac{0.75\text{in.}}{4} + \frac{4.5\text{in.}}{8} + 1 + \frac{4.5}{8} + 0.3$$

$$= 0.7 + 0.19 + 0.56 + 1 + 0.56 + 0.3$$

$$= 3.31$$

"U" = Reciprocal of Total

$$\text{Resistance} = \frac{1}{3.31}$$

"U" Value = 0.30

(See also Table I, page 33, Sept. issue).

continued page thirty-six

## £18,250 WATER SCHEME AT CASTLEBLAYNEY

AT a special meeting of Castleblayney, Co. Monaghan, Urban Council early last month it was decided to get a new water scheme costing £18,250 under way.

A report to the meeting stated that duplication of the pipelines was required to effect an increase in the output of the pumping unit from 135 gallons per minute to 170 g.p.m. A 16-hour daily cycle would be required for an estimated daily demand of 160,000 gallons.

## W.H.O. ON WATER SUPPLY

Progress in water supply schemes was again in the news last month when Mr. H. Clerkin, Assistant Chief Engineering Adviser, Department of Local Government, told the World Health Organisation European Symposium in Dublin that until recent years the emphasis on community water supplies centred on areas of high population density.

The pattern had now changed, he said, and while continued progress was being made in the improvement of existing water supplies, the development of community water supplies throughout as much of the country as possible was the stated policy of the Government.

## GENERAL ELECTRIC TRADE SHOW

A new night storage heater was a highlight of the two-day G.E.C. trade show held in the Shelbourne Hotel, Dublin, last month.

At the annual event a number of new products introduced during the year were shown to traders.

The General Electric Company of Ireland Limited reports that since last year's trade show their export business has increased considerably and is now worth over £30,000 per month.

## NEW GUIDE FROM ESSO



• At a luncheon given in the Shelbourne Hotel, Dublin, to launch the Esso "Guide To House Heating," were (from left): Mr. J. H. Donovan, a director of Esso; Professor M. A. Hogan, Dean of the Faculty of Engineering, University College, Dublin; Mr. D. J. Dunne, Managing Director of Esso; Professor J. C. I. Dooge, University College, Cork, and Mr. B. Martin, a director of Esso.

## ESSO "GUIDE TO HOUSE HEATING" INTRODUCED

AT a luncheon held in the Shelbourne Hotel, Dublin, last month, Esso launched their "Guide To House Heating," a magnificent publication which brings together all the information needed for the complete design of domestic oil-fired central heating systems.

The volume is not restricted to oil-firing equipment alone but deals with all aspects of the problems of heating from the basic principles through to the completion of design and calculation.

"Guide To House Heating" thus concentrates into one publication the

relevant technical information which is at present distributed through many books, journals and other documents.

The guests at the luncheon were received by Mr. J. H. Donovan, Director, Esso Petroleum Company (Ireland) Limited, who said that with increased demands for more modern conditions in Ireland there had been a great expansion in the demand for central heating, which was now no longer considered a luxury.

Other speakers were: Mr. M. Gleeson, C.E.O., Dublin City Vocational Education Committee, and Dr. P. Byrne, President of the Engineers' Association.

## PIPE AND FITTINGS GROUP FORMED

Mr. R. L. H. Damerham (pictured here), Technical Director, of Durapipe & Fittings Ltd., has been elected Chairman of the new Thermoplastic Pipe and Fittings Group of the British Plastics Federation.

Initial membership of the Group was stated at the recent inaugural meeting to be 20. Membership is open to firms engaged directly in the production of thermoplastic pipe or pipe fittings.





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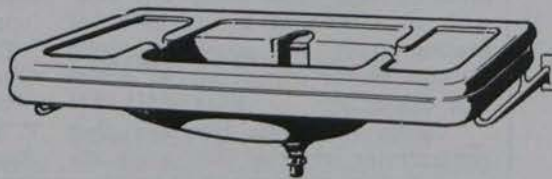
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## Success story

# DUBLIN FIRM ANSWERS NEED FOR SPECIALIST SERVICES

**T**HE realisation that the era of domestic central heating had arrived requiring the specialist research of the qualified engineer and the capability of handing out to clients the individual attention, information, and advice demanded, has led to a remarkable story of success in this very specialised and, until quite recently, comparatively unexploited field.

Just over a year ago the Minister for Industry and Commerce, Mr. Jack Lynch, officially opened the Heating Centre of Messrs. H. A. O'Neill, at 162 Lower Rathmines Road, Dublin. Mr. Lynch then said: "Up to comparatively recently central heating was known only in public buildings, and in homes was a luxury reserved for the wealthy. With the advances in techniques and increased range of fuels there has been an increasing interest among people with modest incomes."

Time has proved him true, and in the short intervening time the Rathmines Heating Centre has supervised the installation of more than one

By \_\_\_\_\_  
CONTRACTOR REPORTER

hundred domestic central heating systems.

Moving into the field of domestic central heating was breaking new ground for a firm with more than seventy years' experience of industrial heating, ventilation and plumbing. Managing Director of the firm, Mr. Christopher Jones, explained that the directors, sensing that a new era of building was at hand, decided to ensure that the Company would be staffed to meet it. Personally he felt that there was a great need for a centre to impart informed information on central heating to the general public.

### Great difficulty

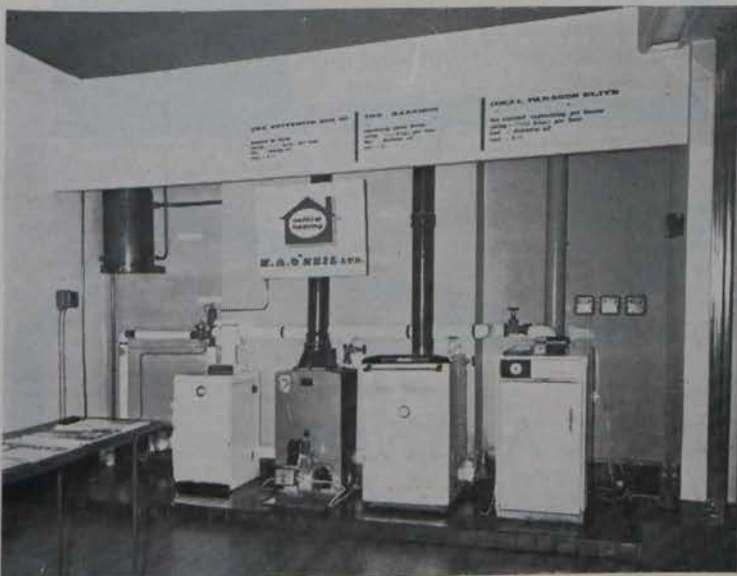
Technical Manager, Mr. D. B. Magee, B.E., A.M.I.C.E.I., told the Contractor: "The average person can experience great difficulty in getting the reliable technical information on domestic central heating and service which our engineers can give. Without this assistance, considering the

amount of publicity being given to the public on the subject at the moment, it is easy for them to be quite confused. We feel, therefore, that we have a responsible attitude towards the market."

"The centre offers a package deal to the public. It is the only place where the prospective customer can examine heating equipment, radiators, boilers, pumps, thermostats and insulation systems of all kinds, and can see the entire range available in the country in operation.

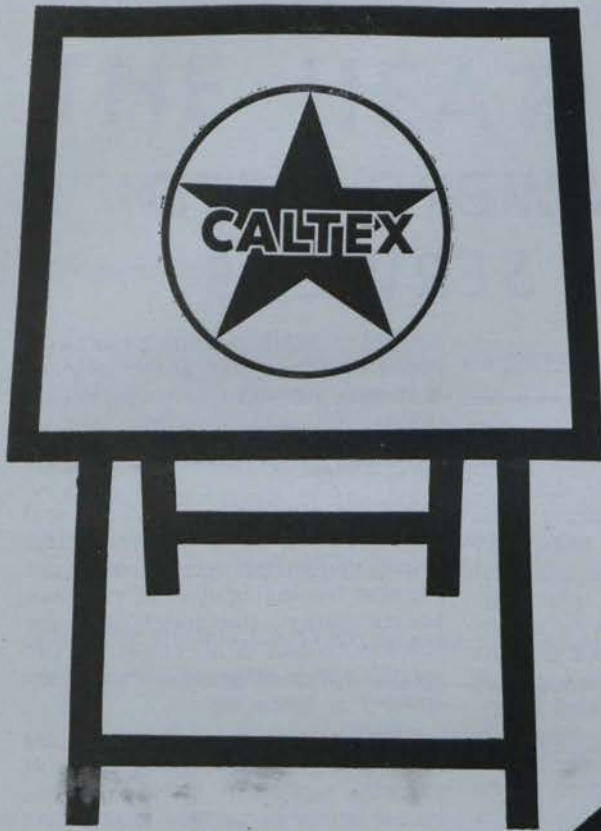
"We perform five services in the Heating Centre. The entire range of available equipment is shown; impartial advice is given as to selection; we can design a complete heating system for an old or new house; we will install it; and lastly but by no means least, we will maintain it."

There is a staff of heating engineers in the firm, which already covers the country. A permanent staff of receptionists, under Miss Mary Roche, and engineers are in attendance at the centre every day. Every Monday and Wednesday, this service is maintained until 9 p.m.



*the  
showrooms . . .*

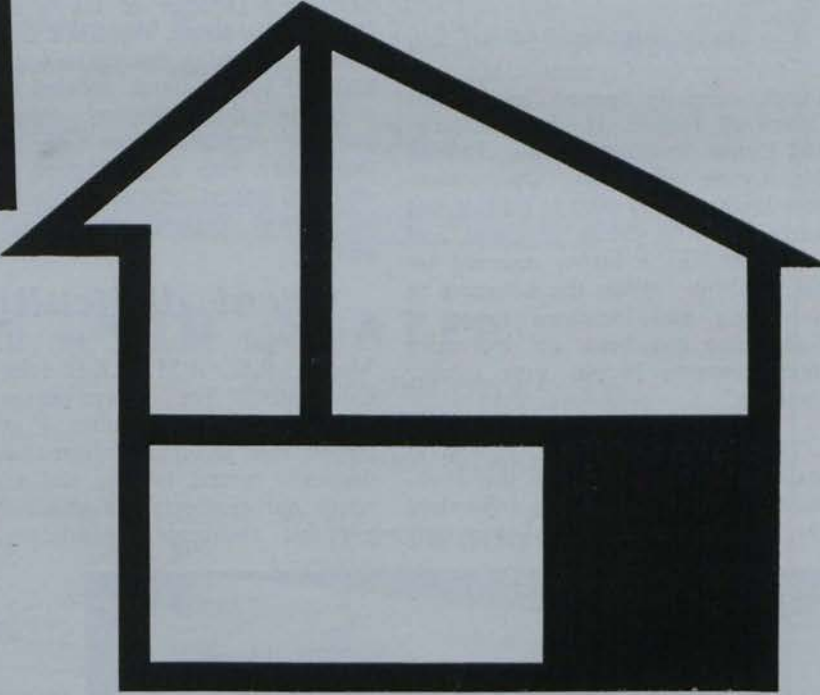
*Our picture shows just one section of the Heating Centre showrooms in Rathmines where the entire range of available equipment is shown.*



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**Low Pressure Hot Water Systems** using the well tried radiator as convective emission appliances and using oil fuel in modern high efficiency boilers continue in popularity. Improvement in radiator design both in cast iron and the newer pressed steel kinds offers wide choice to meet all conditions of heat emission needs with efficiency and enhanced appearance.

**Medium Pressure Hot Water Systems** heating finned emission tubulars arranged perimeter fashion is an increasing trend for new speculative office rental buildings. Pressurisation of the system by controlled amounts of chemically inert nitrogen gas prevents corrosion products within the oil fired boilers and allows the water to be heated to approaching 250 F. without steaming. Circulation of this higher temperature water provides increased emissivity from the finned

tubular heating elements. Overall economies in appliance and circulatory pipework results. The high temperature heating elements are enclosed in pressed steel enclosures which may be purpose made to architect design. These usually fill the spaces from floor to cill and between structural columns. Operation of moveable dampers at the louvred cabinet outlets affords some measure of individual room control.

**Radiant Heating** by L.P.H.W. embedded panels becomes more widely used as understanding of the basic requirements necessary to achieve a full measure of physiological comfort conditions in space heating and ventilating grows. Its application to the warming of lofty structures wherein convection heating would be costly, and unsuitable, is fast becoming standard practice. Likewise the heating of places where abnormal air-change rates would render any form of convection heating worthless.

Embedded panel warming is a form of thermal storage in structure. It consequently suffers a considerable time lag.

Radiant heating by one or other of the patent ceiling systems now available offers all the advantages of this heat emission arrangement but without time lag. Basically the patent systems comprise serpentine coils of

mild steel tube affixed to light angle iron frames which form the foundation of a suspended ceiling. Independent of the structural floors above, the heated coils transmit radiant heat to the space below. Pressed steel or aluminium panels are clipped easily and conveniently to the heating pipes to form a pleasing, and in some cases an acoustic ceiling finish.

Either system lends itself to oil fired prime heating equipment, and apart from particular applications as outlined above, the lower air temperatures which obtain in radiant heated spaces does reduce the heat loss through structure with some economy in system design load and operating cost.

Such systems will continue to find application in places like hotels, hospitals, public buildings, etc., which demand **continuously operated central heating**.

For schools and other buildings of part time occupancy, Intermittent heating lends itself to economy in running costs. Here, too, the flexibility and facility of oil fired prime heat sources is appreciated.

**A noticeable trend in intermittent heating** is the use of fan assisted

*continued page nineteen*



*This special survey—the fifth in a series on important aspects of the plumbing and heating trades—has been compiled by technical expert A. L. Townsend, M.R.S.H., M.I.P.*

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*from page seventeen*

convector units. Available in form to meet any architectural scheme, these emission appliances provide rapid warming of the air and the fan assisted convection overcomes the time lag associated with the slower moving natural convection movement of air experienced in radiator systems.

**Warm Air Heating** appears to be a decided modern trend. The wide range of equipment for this form of space heating as displayed at the recent International Heating, Ventilating and Air-Conditioning exhibition in London, shows how well developed air warming apparatus has become and indicates the support that manufacturers are offering the trades in this new trend.

### Comprehensive

**Oil Fired Warm Air Heating Equipment** ranges from the simple selective ducted style for domestic dwellings, to the comprehensive high velocity systems for large buildings of all kinds, and to the oil fired heat exchangers with integral blowers for mounting "in line" into ductwork for the warming of factory and work spaces.

In one or other of these forms, it

finds ready application in up to date heating design and very often in the refurbishing of existing properties where oil fired central heating offers economic installation with a minimum of structural disturbance.

**Oil Fired Boiler Design** tends toward Continental and American practice. This is not to suggest that our own manufacturers are devoid of new ideas or that boilers presently available leave much to be desired. The opposite is, in fact, the case. British boiler manufacturers have wisely studied the trends and particular needs of space heating in our more temperate clime and have proceeded with developments which in a short time might well surprise foreign competition. But one could not fail to notice the boilers shown at the HEVAC exhibition. One of these showed what can be done by development of pressurised combustion chamber techniques and by studied attention to flame path characteristics, both aimed to secure more effective oil fuel combustion, and a greater liberation and absorption of useful heat to service. An oil fired boiler of this kind is offered in capacities of 1,000,000 to 4,000,000 B.t.us-hr. and of dimension

that it occupies about  $\frac{1}{4}$  of that space required by a comparable boiler in conventional design. This economy of space together with absence of need for induced draught flues, and a remarkable reduction in costly flue sizing, may well set the pattern of things to come.

### Moving

**Boiler Houses** are moving from ground floor or basement sites to the roof. This trend in heating service design for tall buildings eliminates costly flue construction and saves valuable space for more profitable use. The fluidity of oil fuel enables easy transfer from low level bulk storage to smaller storage vessel and high level as required.

**Dual Purpose Boilers** are not new but they never seemed to win the favour which their efficiencies and economy of operation warranted. There is now a decided move toward this type of equipment which is readily obtainable for oil firing. Dual purpose or double duty boilers are

*continued page twenty-one*

● *In conjunction with this special survey on oil fired heating systems, appliances and controls we review products from the leading manufacturers' ranges.*



**GLOW-WORM** Boilers Ltd., of Hatton Garden, London, manufacture a comprehensive range of central heating and water heating boilers and radiators—including the new Major, Minor, and De Luxe boilers.

Most Glow-Worm boilers have provision for convector kitchen heating. This company's panel radiators and skirting heaters are available in a wide range of sizes, 192 in all.

Pictured here is a Model V43 oil-fired boiler by Sunrod Domestic Boilers Limited—a Glow-Worm associate company—which has an output of 43,000 B.t.u.s/hr.



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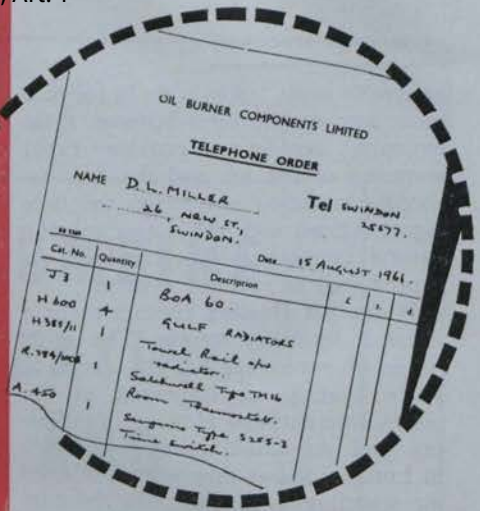
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**GLASGOW:** 7, Park Circus Place. Phone: Douglas 5115.

**CARDIFF:** 17, St. Andrew's Crescent. Phone 23526.



**Largest Factors to the Heating trade.**

from page nineteen

those with inbuilt D.H.W. storage vessel. The boiler provides central heating and D.H.W. with economy of fuel, installation cost, and space in boiler housing.

**Domestic Oil Fired Boilers** have moved through the early stages of experimental design and now emerge as highly efficient, trouble free appliances. Development work is far from finished though and improvements in automatic control and thermal efficiency will continue to result from observed field trials and far-seeing manufacturing aims.

### Development

**Boiler Controls** have shown rapid and valuable development in recent times. **Automatic Ignition** enables fully automatic domestic oil fired boiler control. Vaporising burner boilers of ratings from 30,000 B.t.us/hr. are now obtainable as fully automatic. Popular domestic consumer trend is decidedly toward the installation of boilers offering this convenience and economy of automatic control.

**Central Heating System Controls** are now highly developed to meet all possible control needs. The principles of the various control devices, i.e., thermostatic radiator valves, blenders, motorised valves, etc., were adequately explained in the April and May, 1961, issues of this Journal. It only needs, therefore to emphasise that wisely incorporated in system design, whether it be the simplest of small bore systems or extensive zonal control in large buildings of widely differing aspect, such components will ensure control of desired comfort conditions and at the same time ensure economic fuel consumption.

### Valuable

The maintenance of high thermal efficiencies with absence of atmospheric pollution rank high among the valuable properties of oil fired central heating equipment. How well these properties are established at initial installation and during subsequent usage depends largely upon competent analysis of flue gases.

The relative quantities CO<sub>2</sub>, draught, and flue gas temperatures have important bearing on operating efficiency. The emission of smoke has bearing on efficiency of combustion and upon atmospheric pollution.

Competent measurement of these and compensating adjustments to plant can only be made with the aid of suitable Combustion Testing Equipment.

#### Portable Combustion Testing Equip-

ment is now readily available. It forms the initial oil fired equipment control and as such all oil fired equipment installers will be acquainted with its applications.

continued page twenty-three

## For Heating and Ventilating Installations

Always Specify—

# KOPEX

### 1. PLIABLE DUCTING

A great advantage of KOPEX Pliable Ducting, especially in intricate layouts, is offered by its pliability, ease of cutting and fixing on site.

KOPEX composite paper and metal ducting has good heat insulation properties, making it invaluable for heating and ventilation installations. It is also widely used for fume and dust extraction. Available in sizes from 3" to 7½" i.d.

### 2. Pliable Flue Lining Tube.

Fit a KOPEX Flue Lining Tube when installing Oil or Gas Fired Boilers. Eliminates the risk of interior and external wall staining, improves draught, checks brickwork corrosion and reduces degree of condensation.

Manufacturers: UNI-TUBES LIMITED, 197, Knightsbridge, London, S.W.7.

Irish Agents and Distributors: TECHNICAL SALES COMPANY, 79, Lower Leeson Street, Dublin. Telephone: 61662.



### BOILER EFFICIENCY IN POUNDS, SHILLINGS AND PENCE

Meters for accurate measurement of water and industrial liquids

- ★ Maintenance
- ★ Servicing Facilities
- ★ Technical & Engineering Service

### TYLORS NEW

#### MODEL TL-3 FUEL OIL METER

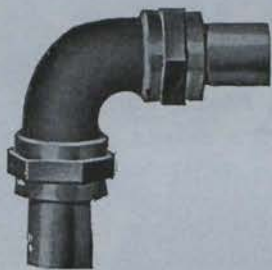
½" size with flow rates from 5 g.p.h. Suitable for temperatures up to 220° F. and working pressures up to 150 p.s.i.g. £10-10-0 nett.

**TYLORS OF IRELAND LTD**  
55 RATHGAR AVENUE · DUBLIN · EIRE  
Phone: Dublin 904354 Grams: "Tyland" Dublin





# FYFFES MAKE THE FITTINGS THAT DO YOUR JOBS JUSTICE



## INSTANTOR

the most efficient joints in the world, keep your contracts watertight.

## ENDEX

capillary fittings for small bore central heating are efficient, neat and cheaper to install.



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plumbers brass ware at your stockists to-day. All patterns can be supplied polished or chromium plated. SPECIAL FITTINGS MADE TO ORDER.

*It pays to keep to the  
FYFFE lines.*

TELEPHONE: 53376.

## FYFFE COUPLINGS (Ireland) LTD.

INSTANTOR WORKS, JAMES'S ST., DUBLIN

from page twenty-one

RECENTLY introduced by Hattersleys, of Ormskirk, Lancs., is a new conception in central heating regulators.

The handwheel and stem of the conventional valve have been dispensed with, for the new regulator incorporates a sleeve which rotates in the cast gun metal body. Movement



of the sleeve is controlled by a neat ivory-coloured head incorporating a complementary grey indicator plate.

★ ★ ★

KOPEX Pliable Ducting as manufactured by Uni-Tubes Limited, of London, has already proved its worth in Ireland by making extensive savings in labour costs on jobs where it has been used.

The ducting saves detailed pre-planning and prefabrication because it is shaped and cut on the site.

Irish agents are: Technical Sales Company, 79 Lr. Leeson Street, Dublin.

★ ★ ★

AT THE recent HEVAC exhibition at Olympia considerable interest was taken in the newly introduced Golcalor packaged hot water boiler by the Vauxhall Boiler Co. Ltd., of Bondway, London.

This boiler is of 3-pass cylinder design, annular waterways being arranged within each other with annular gas passages between waterways. The burner fires into the central tubular furnace of adequate size.

★ ★ ★

FROM the Allied Ironfounders, Aga Heating Division, range we will re-

view their line up of pressure jet oil fired boilers. Five in number, they are fully automatic and thermostatically controlled.

The model OFK70 is the smallest of the range and can heat a 40-gal. indirect cylinder plus 345 sq. ft. of radiation surface. The OFK85 will also heat a 40-gal. indirect cylinder with a greater radiation surface, 425 sq. ft. The OFK100 will heat a 60-gal. i.c. plus 450 sq. ft. of radiation surface and the OFK125 a 60-gal. i.c. plus 625 sq. ft. of radiation surface.

The largest boiler of all is the

OFK150, which will heat an 80-gal. i.c. plus 700 sq. ft. of radiation surface.

★ ★ ★

NEWS of Valor Oil Conversion Units manufactured by the Valor Company, Birmingham, comes from their sole Irish distributors, the Esso Petroleum Company (Ireland) Ltd., Stillorgan, Co. Dublin. Made in two sizes, the units are suitable for most domestic boilers.

The 6½" models—B.70 (supplied continued page twenty-four

# "FRANCIA" Package Units



- Model 25F — Output, 72,000/120,000 BTUs per hour. Price £150.
- Model 45F — Output, 120,000/208,000 BTUs per hour. Price £160.

COMPLETELY AUTOMATIC,  
WITH PHOTO  
RESISTANCE CONTROL,  
DRAUGHT STABILISER,  
BOILER STAT AND ALL  
BRICKING.  
SUITABLE FOR GAS  
OR OIL.

- Hundreds now installed in Ireland. Supplied and Serviced by Irish Agents:—

**Irish Technical & Production Co. Ltd.**  
25, Upper Mount St., Dublin. Tel. 62636.

# OIL FIRED CENTRAL HEATING



*Right from  
the Start ✓*

AVAIL OF THE  
DESIGN & TECHNICAL  
SERVICES

WHICH  
WE CAN OFFER

**FREE**

TO CONTRACTORS



MUNSTER SIMMS & CO. (DUBLIN)  
LTD., ALEXANDRA RD., DUBLIN.  
Tel. Dublin 47941-4.

with inside storage tank) and B.74 (for connection to outside storage tank) are suitable for boilers with list ratings up to 25,000 B.Th. units per hour, connected to a water storage tank of 25-30 gallons capacity.

The 9" models, B.71 (supplied with inside storage tank), and B.75 (for connection to outside storage tank) are for boilers with list ratings up to 50,000 B.Th. units, fitted with a 50-60 gallon water storage tank.

Installation consists simply of siting the storage tank, connecting to the existing boiler, fixing the burner inside the boiler with a small control unit, and adding a draught diverter to the flue pipe.

Fuel consumption per hour for the B.70 and B.74 is: low-flame, 0.5 pint; high flame, 1.0, and for the B.71 and the B.75, low flame, 0.70, and high flame, 2.0 pints.

The price list is: B.70, £11 15s.; B.74, £14 10s.; B.71, £13 17s. 6d.; and B.75, £16 2s. 6d.

★ ★ ★

OUR illustration shows the Elco oil burner being fired in the open, and although there was a certain amount



of wind the flame is extremely stable. The Elco is being marketed by Corrie, MacColl & Son Ltd., of London, in association with the Swiss manufacturers.

The Elso oil burners work on the pressure jet principle and are available in a range of from 60,000 B.t.u.'s per hour up to 7,000,000 B.t.u.s/hr. All burners have photo-electric cell flame failure control.

*continued page twenty-seven*

from page twenty-four

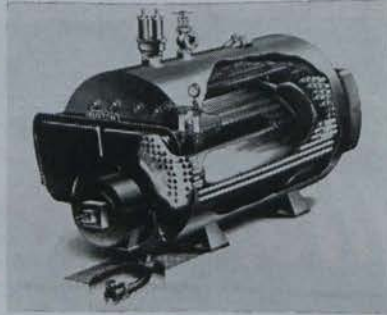
★ ★ ★

THE Biddle "Warmflo" has been specially designed to provide in one compact unit all the advantages of a warm air heater combined with hot water supply. Consisting of hot-water-to-air transfer coil, an indirect hot-water storage cylinder and a centrifugal fan and motor set, the "Warmflo" is designed to be incorporated into the normal hot water service installation in a similar way to the ordinary indirect cylinder.

The casing is a specially made fibre board for maximum sound attenuation and heat insulation mounted on rigid angle steel supports. A removable front panel allows access to all interior components. The overall dimensions are 2' 0" x 2' 0" x 5' 8½" high. The overall weight when the cylinder is filled with water is just under 500 lbs.

The manufacturers are F. H. Biddle Ltd., 16 Upper Grosvenor St., London, W.1, and the Irish agents, Quadrant Engineers, 6 Mount St., Crescent, Dublin.

THE Horizontal Thermax sectionally illustrated here, is manufactured by Ruston & Hornsby Ltd., of Lincoln. The standard H.T. is made in sizes from 9' 0" x 5' 6" to 15' 0" x 12' 6", with evaporative capacities



from 1,200 to 17,500 lb./hr. F. and A. 212°F. (544 to 7940 kg./hr.).

The boiler consists of a horizontal shell with one or two internal flues according to the duty. Within the shell and at the back end is a circular all-welded combustion chamber about 2/3rd the diameter of the boiler shell and so arranged that it is completely submerged when under working con-

ditions. Efficiency H.T. boiler varies from 75% to 82%, depending upon the type of fuel and combustion equipment used.

★ ★ ★

TWO new Francia pressure jet burner and boiler package units, the 25F and 45F models, are supplied complete with boiler bricking, guard, flue stat, boiler stat, thermometer, draught stabilizer, 3ft. flexible oil connection and all internal wiring which is coloured and numbered and ready for immediate connection.

The burner and boiler is of welded steel construction and has a thermal efficiency of 80 per cent. minimum. The 25 F sells at £150 and the 45 F is priced at £160. The Irish agents for Francia are the Irish Technical and Production Company Ltd., 11 Hume St., Dublin.

★ ★ ★

THE "Mini Pilot Twin," by Perkins Boilers Limited, Derby, em-

continued page twenty-seven

# Hartley & Sugden Ltd.

— WHITE ROSE BOILER WORKS —

## Halifax, Yorks.

Established 1867

'Grams: Boilers, Halifax.

'Phone: 3238 Halifax.

Representative for Republic of Ireland:

McGRATH & KENNY, 48 Townsend Street, Dublin. 'Phone 73108-9.

### Almost a Century of Service to Heating Engineers

PIONEERS IN OIL FIRED CENTRAL HEATING

THE BOILERS YOU KNOW AND TRUST

**OILEX**—Specially designed and proportioned for oil firing.

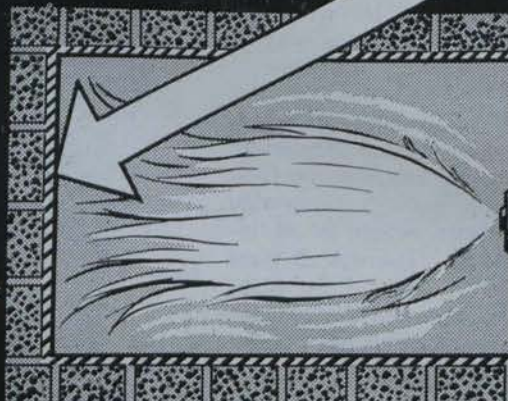
**WHITE ROSE**—Renowned for Efficiency, Strength and Reliability.

Twenty-five

# FURNASCOTE

*WILL* **Treble**  
**furnace life!**

**PROTECTS REFRACTORIES  
AGAINST THE VICIOUS ATTACK  
AND SAND-BLASTING EFFECT  
OF BURNING FUEL OILS**



Furnascote will resist at low and high temperatures chemical attack by sulphuric acid and sulphur compounds produced by fuel oils and solid fuels. ● Gives a Gas-tight Coating ● Does Not Shrink ● Withstands Thermal Shock ● Cuts Furnace Maintenance ● Increases Efficiency ● Good Refractory bricks are made even better ● Bad Refractory Bricks are greatly improved, and old Refractories are given new lease of life ● Furnaces are therefore kept in action.

Leaflets and Technical Advice from: L. R. WOOD LTD., 174 Pearse Street, Dublin. Tel.: 74479.

## Chappee

### Cast Iron Sectional Boilers

★ For Hot Water Installations

AN100 Series .....	33,000/61,000 BTUs/hour
AX200 Series .....	66,000/144,000 BTUs/hour
AN300 Series .....	128,600/278,000 BTUs/hour
AN400 Series .....	269,000/603,000 BTUs/hour
AN500 Series .....	524,000/1,400,000 BTUs/hour
AN600 Series .....	1,100,000/2,500,000 BTUs/hour
B200 Series .....	262,000/628,000 BTUs/hour

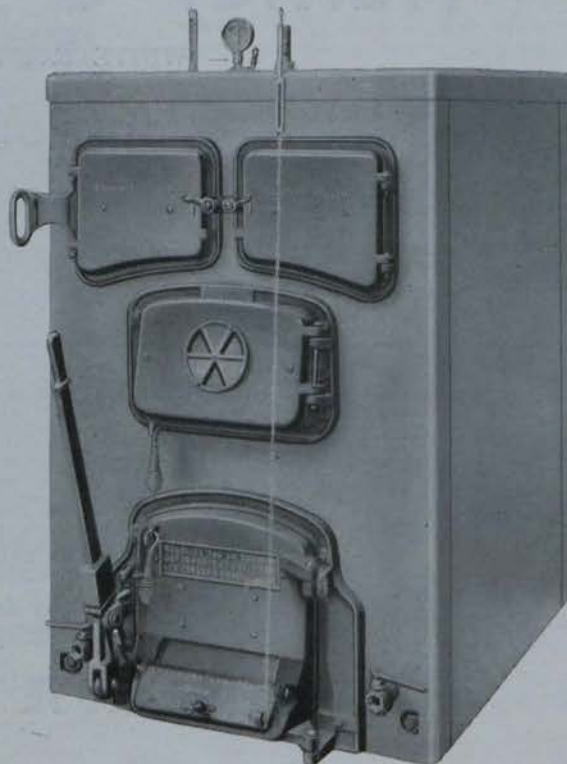
★ For L.P. Steam Installations

A5000 Series .....	270,000/1,250,000 BTUs/hour
A6000 Series .....	975,000/2,260,000 BTUs/hour
B2000 Series .....	262,000/629,000 BTUs/hour

All trade enquiries from Irish Agents:—

**Irish Technical & Production  
Co. Ltd.**

25 Upper Mount St., Dublin. Tel. 62636.



*from page twenty-five*

bodies twin "Mini Boilers" which have a combined heat-output of 100,000 B.t.u./hr. The complete in-



stallation is designed to stand outside the house.

In this unit the boiler and burner are sealed and oil and air for com-

bustion are automatically introduced and mixed within the unit. The operating air pressure is balanced with the atmospheric pressure at the exhaust terminal. Thus the combustion principle incorporated in the "Mini Boiler" eliminates the need for a chimney.

★ ★ ★

FROM the range of "White Rose" cast iron sectional boilers manufactured by Hartley Sugden Ltd., of Halifax, we note the "York" series for use with closed or open fire.

The pipe connections, are screwed up to and including 2" diameter. Returns can be on both sides 2½" from floor to centre on front and back sections, and 5½" on intermediate sections. A return can be provided on the back face 2½" to centre. Flows on any section except the front. There are the usual small tappings on the front section for mountings.

Smoke pipe connections (Y8=6", all others 5") is universal type with

socket end for horizontal or vertical connection, provided with cleaning door, check draught and sliding damper. It is supplied vertical unless ordered otherwise.

★ ★ ★

IRISH Technical and Production Co. Ltd., 25 Upper Mount Street, Dublin, are agents in Ireland for the Chappee range of cast iron sectional boilers.

This range of boilers is suited for both hot water and L.P. steam installations. The hot water range begins with the AN100 series which has a capacity of 33,000/61,000 B.t.u.s/hr. The largest of this range is the AN600 series, which has a capacity of 1,100,000/2,500,000 B.t.u.s/hr.

The L.P. steam range includes capacities of 270,000/1,250,000 B.t.u.s/hr.

*continued page twenty-eight*

**HIGH GRADE OIL FUELS**

**LOBITOS**

**FOR EFFICIENT HEATING**

SHAMROCK PETROL LIMITED DUBLIN AND CORK

from page twenty-seven

(series A5000), and 262,000/629,000 B.t.u.s/hr. (series B2000).

★ ★ ★

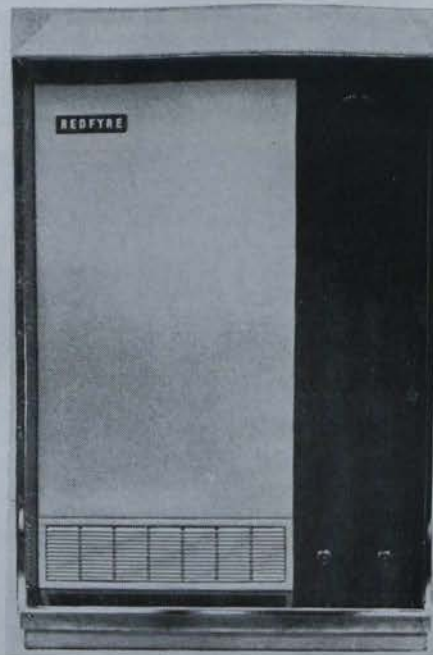
THE Henry Wilson organisation of Liverpool—represented in Ireland by George A. Reid, 16 Fade Street, Dublin—are manufacturers of a wide range of boilers, radiators and allied equipment.

The newly introduced Wilson Oil-heat E.V. Domestic Boiler is a fully automatic vapourising burner. On test the Model 40 showed figures as follows: Rated output, 40,000 B.t.u.s/hr.; heat output in water, 40,000; radiated heat output, 2,000; actual heat output, 42,000.

The Wilson Slimline radiator is now being manufactured in two styles—Waveline and Straightline—and a wide range of sizes.

NEWTON Chambers & Co., Sheffield—represented here by Messrs.

Baxendale & Co.—will show for the first time this month the Redfyre Centramatic 50—Series II.



The "Series II." is completely insulated and may be safely installed between other kitchen units.

Outstanding feature of the new boiler is the use of a printed circuit for its main control system. Capacity of the Series II. is 53,000 B.t.u.s/hr., which will provide 285 sq. ft. of radiator surface, including circulation pipes.

★ ★ ★

FROM the Radiation Parkray Limited range we will take a look at the first of three models of a new Parkray range of solid fuel and oil-fired boilers.

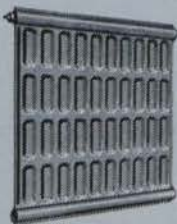
The S.25 is a solid fuel boiler and occupies less than 18 ins. square of kitchen floor space. This model, which is thermostatically controlled, will provide sufficient hot water for the average household and heat 30 to 40 sq. ft. of radiating surface, using a hundredweight of coke or other smokeless fuel per week. Its full heat output is 15,000 B.t.u.s/hr.

continued page thirty-one

for  
**CENTRAL HEATING**  
at its wonderful best

install **dimplex**

**PRESSED STEEL**  
**radiators**



More efficient, lighter in weight and easier to install than cast-iron, these radiators are virtually unbreakable and will not fracture in frosty weather. They are available in a range of 18 sizes and finished in either primer or stove enamel in a choice of nine colours.

**& COPPER**  
**radiators**

Designed for use on open circuits, these radiators are non-rusting and, if correctly installed, non-corroding. They will give a lifetime of trouble-free service. Available in a range of nine sizes and in a choice of nine stove enamel colours.



Write for full details to

**A. BELL & CO., (EIRE) LTD.**  
136, Botanic Road, Glasnevin, Dublin

## Special Surveys

EACH ISSUE OF "THE IRISH PLUMBER AND HEATING CONTRACTOR" CONTAINS A SPECIAL SURVEY.

Previous surveys were: July—**Ventilation and Insulation**; August—**Sanitary Ware**; September—**Hot Water Supply**; October—**Plumbers' Metals and Tools**.

"THE IRISH PLUMBER AND HEATING CONTRACTOR"  
Callaghan Chambers, 13/15 Dame Street, Dublin.

## Thermal Insulation



### M. A. Boylan Limited

A subsidiary of The Cape Asbestos Company Ltd.,  
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Telephone: 52397, 54485 and 51787



We are the foremost insulation specialists in the country with many important insulation contracts to our credit. The huge Oil Refinery at Whitegate and the Derrinlough Briquette factory are recent examples. If you have any heat-loss problem, discuss it with our highly experienced technical staff. Our recommendations are offered free and without obligation.

*Sole agents and stockists for:*

'Rocksil' rock wool

Rigid Sections

Flexible Sections

Blankets

Mattresses (wire-mesh-backed)

Loose Wool

'Caposite' amosite asbestos

moulded blocks and pipe sections

*Also full range of plastic materials and hard-setting com. ositions.*

TS/103



## FOR MODERN BUILDINGS

You need Modern methods of temperature control, and that means the PULLIN range of precision thermostats . . . .

### A.2

Available in two models—A2/W and A2/WNL, this Room Thermostat has been designed to control electric under-floor heating, storage and tubular heaters, and similar systems, and is precision built to critical specifications. Reverse action thermostats, models A2/RA and A2/RANL, for cooling applications in Industry and Agriculture, have a proven record after extensive testing.

### L.4

This Floor Thermostat has been designed especially for under-floor heating installations and has an accuracy of plus or minus one degree. This precision instrument is sealed against dust and moisture and once set and installed, it requires no further attention. It has been designed to be used in conjunction with the A.2 Room Thermostat.

### H.8

The H.8 Immersion Thermostat is designed for the precise temperature control of any immersion heater. Available in lengths from 7"-18" and temperature ranges from 120°—190° F. or 49°—87° C., the H.8 is manufactured to BS 1555-1949.

# R. B. PULLIN & CO. LTD.

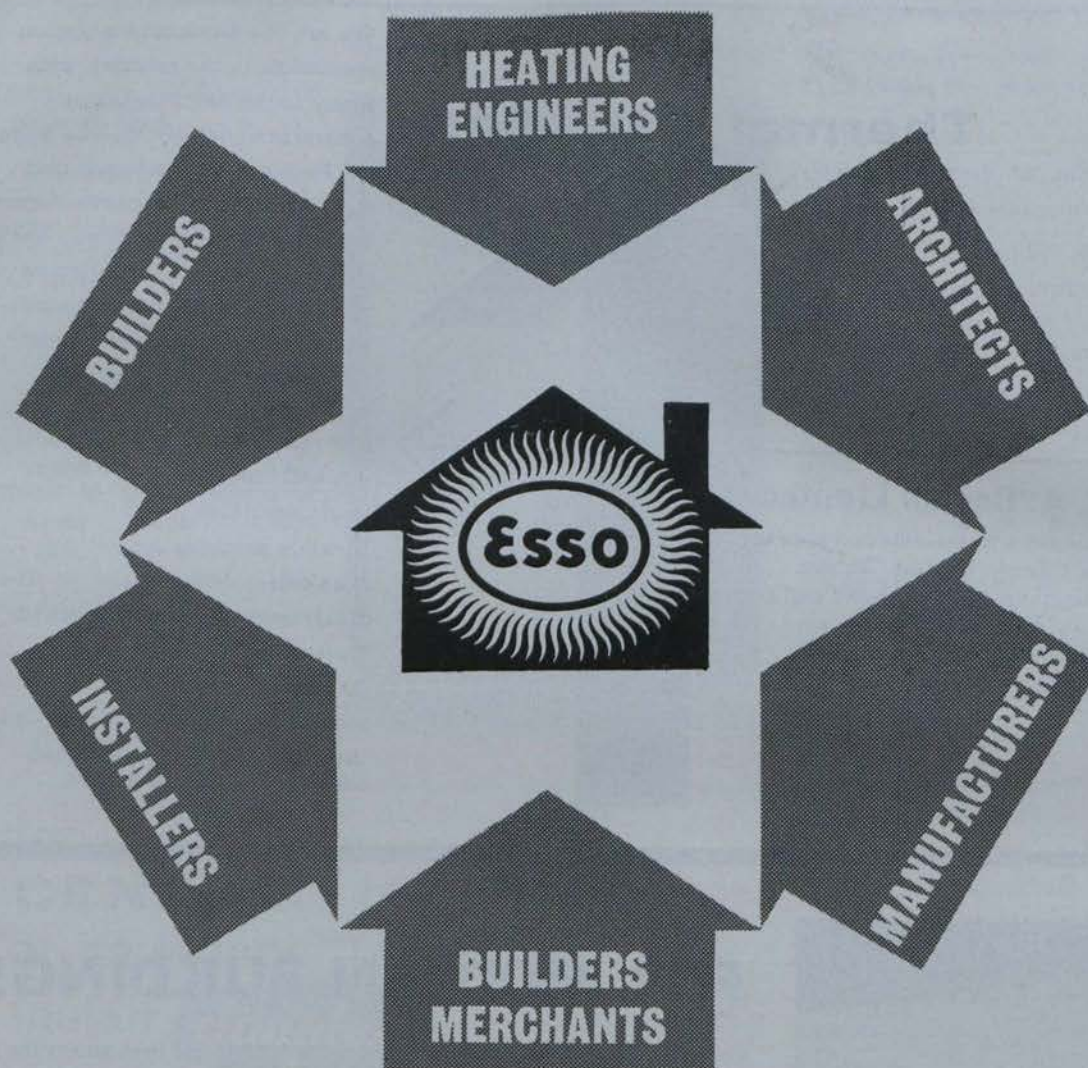
Write for technical leaflet to . . . .

**NATIONAL AGENCIES LIMITED**

7, UPPER CAMDEN ST., DUBLIN, 2 - DUBLIN 53343.

Twenty-nine





## OIL-FIRED **CENTRAL HEATING**

has a lot to offer you!

*If you would like to discuss your particular problems why not contact*

**ESSO HOME HEAT DEPT.**

**STILLORGAN, CO. DUBLIN**

TELEPHONE 881661

from page twenty-eight.

THE Paulomatic Model 20, manufactured by W. H. Paul Limited, Breaston, Derby, consists of a copper coil lead-coated boiler housed in a sheet steel stove enamelled cabinet.

The Model 20 is oil-fired and is thermostatically controlled. With a 30-gallon capacity indirect cylinder the Paulomatic will supply enough heat for 30 gallons of hot water—plus three double panel wall type radiators



The electric controls are fitted as standard, and feature a boiler thermostat with control level and thermometer fitted into the front casing of the boiler and built in electric control valves.

Model 120 provides an output of 120,000 B.Th.U's. The manufacturers are Delmore Engineering Ltd., 51 Gresham Road, Staines, Middlesex.

★ ★ ★

THE Venner "Three Switch" auto-point version of the wall mounting Autopoint is suitable for the control of an oil fired central heating installation by using one toggle switch to control the burner and the second for the circulating pump.

The third toggle switch is available for an additional circuit when required, such as the larger type of installation, using a fan to circulate air through a heat exchanger.

Marketed by Venner Ltd., Kingston By-Pass, New Malden, Surrey, the "Three Switch" can be fitted in new installations with the same facility as a standard socket-outlet, the fixing centres being 2½".

★ ★ ★

COPPERAD Limited of Colnbrook, Slough, Bucks, are manufacturers of the now well-established Copperad Wallstrip.

The all-purpose Wallstrip provides mainly convective heating. The extended surface heating element is contained in a strong sheet metal casing arranged to admit cool air at low level and discharge the warmed air at the top and provide the maximum heat output per foot run.

Wallstrip is primarily designed for use on low and medium temperature hot-water systems with pumped circulation. It is also suitable for use on high temperature hot-water and steam systems up to 100 p.s.i.

★ ★ ★

FROM the Satchwell range of temperature controls manufactured by the Rheostatic Co. Ltd., of Slough, Bucks, England, we illustrate one of the latest in Satchwell models, the FP boiler thermostat.

The FP boiler thermostat is designed to control the temperature of liquids, particularly in applications where a sensitive short stem instru-



ment is required. They are particularly suitable for use in heating installations for the control of automatically fired boilers.

Temperature sensitive stem comprises a liquid filled phial connected to a capsule in the head of the instrument. Changes of temperature of the phial are communicated hydraulically to the capsule which actuates the Satchwell magnetically controlled micro-gap switch mechanism.

Two types of switch are available, one being single pole on-off, breaking circuit with the rise of temperature. The other has a single pole change-over switch.

Thirty-one



and piping (60 sq. ft., including piping).

The range of Paulomatic jig-welded steel panel radiators are made in heights of 15" and 24", and in lengths of from 15" to 75" at 2½" intervals.

★ ★ ★

LATEST addition to the range of Delmore oil fired boilers is Model 120, illustrated here.

The De Luxe model has the following additional features: a controlled air convector operated by an open/shut grille at the top, providing extra heating in the kitchen if required during the winter months. A useful chrome plated towel rail is provided for drying tea cloths.



smooth is the word – **DEL/FLO** the name  
for this new valve by **HATTERSLEY**

streamlined efficiency and ease of operation

HATTERSLEY DEL\*FLO VALVES set new standards of efficiency and good looks with their compact handwheels\* and lockshields in ivory coloured Delrin†. This material is tough, stain resistant and the handwheel design ensures comfortable and cool operation. Other important features include:

- ★ Glands permanently packed with P.T.F.E. impregnated asbestos ensuring remarkable ease of movement and trouble free service.
- ★ Bodies and tail pipes of cast bronze.
- ★ Lockshields interchangeable with handwheels.
- ★ Lockshield conceals an indicator which permits presetting.
- ★ Supplied in cast, polished or chromium plated finish.
- ★ Sizes,  $\frac{3}{8}$  in.  $\frac{1}{2}$  in.  $\frac{3}{4}$  in. 1 in.
- ★ Service up to 150 p.s.i. and 250°F.
- ★ Angle patterns also available with compression joint for BS.659 copper pipe in  $\frac{1}{2}$  in. and  $\frac{3}{4}$  in. sizes.

Please write for details.

\* Registered Design No. 897450

† Delrin is the trade name for Du Pont acetal resin.

Angle patterns – spherically seated disks for proportional flow control.



Lockshield pattern – smooth contoured and compact.

**HATTERSLEY**

ESTABLISHED 1897



the name for good valves

HATTERSLEY (ORMSKIRK) LIMITED · ORMSKIRK · LANCASHIRE  
and at HALIFAX and LONDON

from page thirty-one

**I D E A L**

A NEW oil fired boiler for heating the larger home is announced by Ideal-Standard Boilers and Radiators Ltd., of London. The "Ideal No. 2 Paragon" extends the range of smaller oil fired boilers already made by this Company. Built of cast iron sectional construction and double-pass design—the middle sections having two crown waterways—it gives operating efficiencies of up to 80 per cent.

A special electrical control box has been developed for the "Paragon." This has plug-in facilities for an electric clock controller and room thermostat. Individual switching units control a 12V supply to the heat motor of the oil supply valve. When energised the heat motor automatically adjusts the oil flow rate to "high" and conversely to "low" when the circuit is broken.

★ ★ ★

**P O T E Z**

THE Potez model 631 is a heating unit with warm air circulation.

With an entirely new design it has a heat output at the burner of 28000 B.t.u. per hour and heats 5,300 to 7,000 cubic feet. The fuel tank and the draught regulating shutter are now incorporated in the heater itself.

The tank capacity is 3.08 gallons and the consumption is 0.53 to 1.4 pints per hour. The finish is metallicchrome, hammer finish and vitreous enamel. 1' 3" is the length of the centre line of the flue connection.

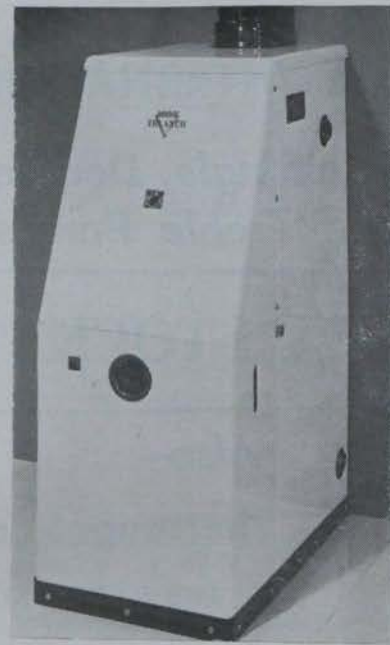
The overall dimensions of the heater are: height, 2' 0 $\frac{1}{8}$ "; width, 2' 1 $\frac{1}{8}$ "; depth, 1' 7 $\frac{1}{4}$ "; and outlet, 4' 59/64". It is marketed by Potez Industries of Ireland Limited, Galway.

★ ★ ★

**T R I A N C O**

THE Trianco model 0100/1, with 100,000 B.t.u. capacity, has been specially designed for domestic installation. One of the range of Trianco pressure jet type boilers, this unit is automatically and thermostatically controlled.

The Trianco 0150 has a capacity of 150,000 B.t.u.s and is designed for the larger home. The model 0250, the



● The Trianco 0100/1 with 100,000 B.t.u. capacity.

largest in the Trianco range of domestic boilers, has a capacity of 250,000 B.t.u.s.

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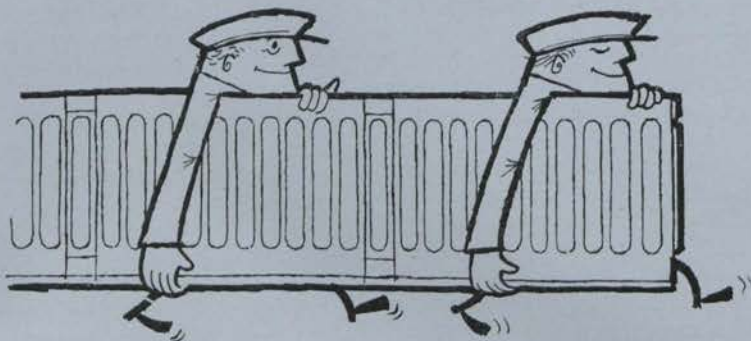
Thirty-three

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from page seven

# HEAT: ITS EFFECT ON AIR and WATER

warming it; but any material which obstructs them will absorb their heat energy, and in doing so will itself become heated.

In a hot water boiler firebox the radiant heat waves travel from the glowing hot fuel to the walls of the boiler, which absorb the radiated heat and become hot. This heat then travels through their thickness, and is passed on to the water on the other side by another mode of heat transfer known as conduction.

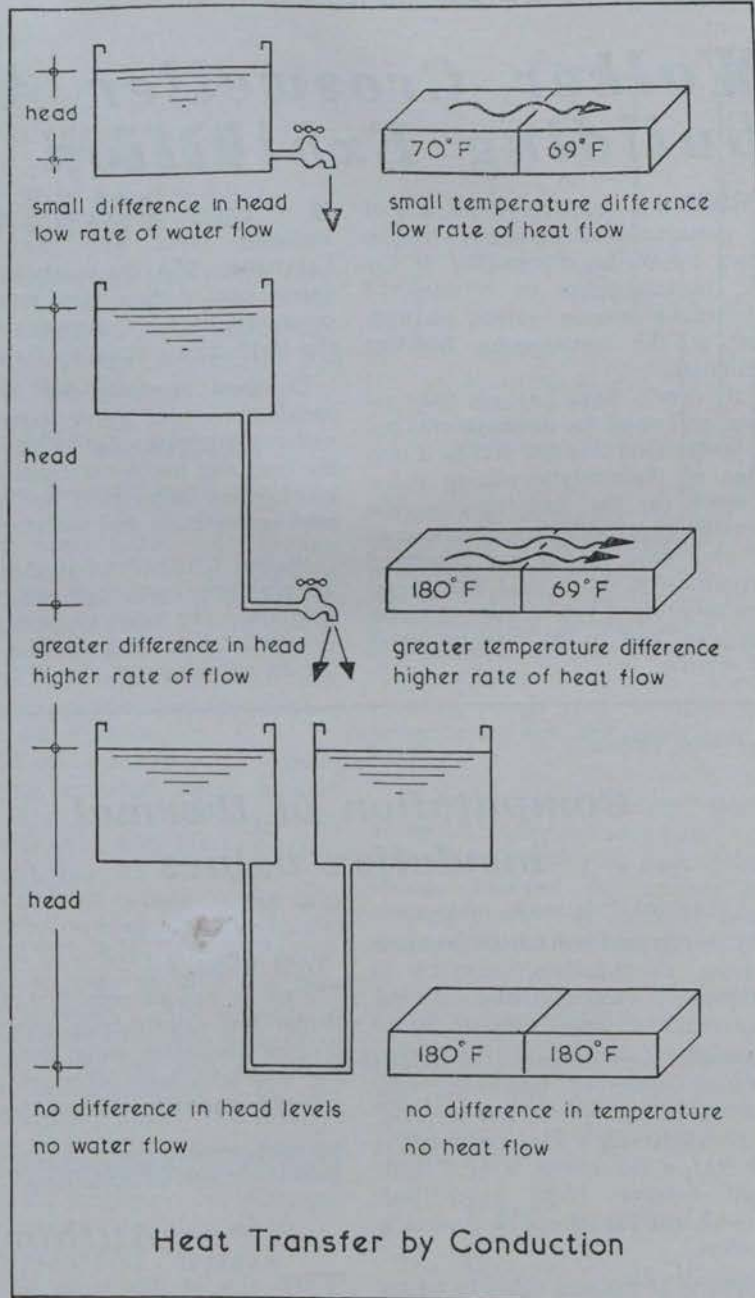
**Conduction** is the transfer or movement of heat throughout a material, or from one material to another in contact with it, by the vibratory motion of particles within the material.

This is where a knowledge of the vibratory motion of molecules is useful. You have seen that these vibrate faster as their heat energy grows. When one molecule or particle gets hot it vibrates rapidly. It passes some of its energy on to its neighbour, which also begins to vibrate more rapidly, and in turn passes on a bit of energy to its neighbour. So it goes on throughout the length and volume of the material, until the heat has been transferred by conduction throughout.

**Convection** is a form of heat transmission peculiar to liquids and gases. Water and air are typical materials in which it occurs. Very briefly, it may be described as the transmission of heat by the actual movement of particles of the liquid or gas. This movement is caused by the change in the particles' weight brought about by a variation in their temperature.

This form of heat transfer explains the movement of heated gases up a flue pipe or chimney; the movement of water through the circulatory pipework of a hot water system; and, in the same way, the movement of heated water around the pipework and radiators of a central heating system. It also explains the movement of warmed air around a room.

Examples of these three forms of heat transfer are shown here.



from page eight

## PLASTICS IN PLUMBING

way. The connections to wash hand basins, W.C. flushing cisterns and similar items do not call for special cement. In the case of the supply to the hot water cylinder, a word of warning must be issued. A hard PVC pipe must **not** be connected to the cylinder or be used for any section of the pipe system into which hot water may enter at any time.

**Clipping of Pipes:** Pipe should be clipped or supported at intervals ap-

proximately equal to those used for copper pipe (a table giving precise data will be given later in this series).

Pipes adjacent to storage tanks must be adequately clamped and supported so that no "whipping" or jerking of the pipe takes place in the event of water hammer occurring, due to a faulty ballcock or other reasons. Pipes in attics should be clipped to the ceiling rafters and adequately lagged if freezing is to be anticipated.

Thirty-five

# Walker Crossweller At Building Exhibition

**T**HREE new products in the field of water temperature control will be shown by Walker Crossweller & Co. Ltd., manufacturers of "Leonard" thermostatic mixing valves, on their stand at the forthcoming Building Exhibition.

Full details have not yet been released on two of the developments but it is understood that one will be a new design of thermostatic mixing valve, in which for the first time in the Leonard range both thermostatic control and flow control are combined concentrically. It is said not to require non-return valves, inlet or outlet stopcocks, and to be easy to install and service.

● A typical domestic heating installation fitted with the Walker Crossweller SB4 thermostatic mixing valve—one of three new products to be shown on the Company's stand at the forthcoming Building Exhibition.

Designed expressly for small-bore installations, the valve controls the entire circuit temperature by blending the outgoing hot water from the central heating boiler with the returned cool water from the radiators.

Walker Crossweller has just formed a subsidiary marketing company in Belgium. The new company, Walker Crossweller S.A., Brussels, is a wholly-owned subsidiary of the British firm.



aims to provide walls, floors, roofs, etc., of "U" value no greater than 0.20.

from page twelve

## Computation of thermal insulation values

obtained thus:—  $R = \frac{l}{k}$   
 where  $l$  represents material thickness in inches.  
 $k$  represents Conductivity of the material (See Table I).

**Example 4.**—Compare the relative insulating values of the cavity wall described in Example 3, and an 11in. cavity wall having a 4½in. outer brickwork leaf, a 2in. cavity, a 4½in. light-weight concrete block inner leaf. The wall will be plastered internally as before.

**Note.**—The working could be set out as for Example 3 or it may be set out as below. **N.B.**—The slightly different way of obtaining individual resistances, i.e., Resistivity (from Table I) x thickness in ins.

	Resistance
Internal surface ( $R_{si}$ )	0.7
¾in. Plaster .. ( $R_1$ )	¾ x 0.25 0.19
4½in. Light Conc: inner leaf.. ( $R_2$ )	4½ x 0.50 2.25
Air gap cavity.. ( $R_a$ )	1.00
4½in. Brickwork outer leaf .. ( $R_3$ )	4½ x 0.125 0.56
External surface ( $R_{so}$ )	0.3
Total Resistance =	5.00

$$"U" = \frac{1}{\frac{1}{5}} = \frac{1}{5} = 0.2$$

Total Resistance 5

Thus it can be seen that this particular wall construction offers better thermal insulation value than a similar wall with both leaves of brick.

### Good domestic thermal insulation

## Author's footnote . . .

**T**HE aim of this series of articles on Thermal Insulation which commenced with the special survey, "Ventilation and Thermal Insulation" in the July issue, has been to interest all those who now wish to provide the most efficient services in the exciting and widening field of space heating and D.H.W. supply.

Simplicity in presentation of the basic principles and a logical development of these has been attempted not only to attract the attention of those to whom this sort of work may be quite new, but also to make its under-

standing easy and its subsequent application more sure.

Such topics as temperature gradients, vapour barriers, etc., and their knowledgeable application in structural design will already be well known to the qualified H. & V. engineer. They have been purposely omitted from this series in the interest of simplicity and because the contractor or plumber in a small way of business seldom, if ever, has opportunity to advise at the early design stage of domestic buildings.

from page five

# INDIRECT HOT WATER SUPPLY SYSTEMS

For a domestic storage capacity as recommended, the boiler rating would be approximately 2,500 to 3,500 B.th.U. per occupant, and for the average household of 4 to 5 persons, this would work out as follows, allowing for a typical heating period of 3 to 4 hours and a certain amount of heat loss, since no insulation jacket is 100% efficient.

## Indirect hot water cylinders

Cylinder Capacity (Gallons).	Boiler Rating (B.Th.U. per hour).
30 .. ..	10,000
40 .. ..	14,000
60 .. ..	21,000

It must be pointed out, however, that the above boiler ratings do not include for the fitting of towel rails, heating coils in linen presses, etc., for which special allowance must be made.

## Installation methods

**I**n fig. 1 it will be seen that two storage tanks are required to service the system. The tank primary supply need only be of small capacity (usually a 10 to 20 gallon tank is used) as its purpose is to make up any slight loss of water by evaporation.

It will also act, of course, as an expansion tank if a heating circuit forms part of the system, although the ballcock must then be adjusted so as to keep the cold water level low and thereby give space for the increase in volume when the water is heated in the system.

On the other hand, the tank feeding the outside cylinder will need to be of normal size—say 50 to 100 gallons capacity—as it is from this that the household requirements will be met. It is not necessary for both tanks to be on the same level, although usually for convenience sake they often share a common base.

If, however, one tank is fitted higher, it will give unequal pressure between the inner and outer cylinders, and should a leak develop on the

inner cylinder, will lead to the overflowing of the lower tank. The author remembers a case where continual overflowing of a store tank was traced to this source.

## Pipe sizes

**F**OR the average house, provided hot water only is required, the ordinary back boiler will provide sufficient heat to work a 30-gallon indirect cylinder, but it is recommended that the flow and return pipes be of 1-inch diameter so as to reduce friction. The cold feed and vent pipes of this primary circuit can, however, be  $\frac{3}{4}$  in. diameter.

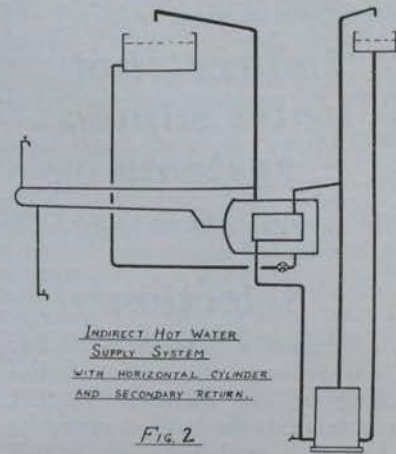
The pipes connecting the outer cylinder or secondary circuit may be  $\frac{3}{4}$  in. although a cold feed of 1 in. dia. will give a better flow and so increase the output from the hot taps.

If the indirect cylinder is part of a small bore heating installation and connected to a more powerful boiler, it would be better to have 1 $\frac{1}{2}$  in. flow and return pipes. The cylinder in this case, apart from supplying domestic hot water, also acts as a heat absorber or accumulator if for any reason the pump stops. This prevents the water in the system boiling during the short time between the closing down of the thermostat and reduction of the burning rate in the boiler.

## Special units

**S**O far, in this article, we have been dealing with the usual standard design of indirect system which requires two storage tanks, but at present available on the Irish market are several patented units by the use of which the second tank may be eliminated. Examples of these units are the "Sigmund Thermo Change" and the "Primatic" Cylinder.

The advantages of the Sigmund Thermo Change, for instance, lies principally in a case where a direct hot water system is required to be altered to an indirect type—for example, where a small bore heating system is being installed and it is desired to incorporate the existing domestic hot water system with it.



Using the orthodox method, we would have to purchase a new copper indirect cylinder, an extra store tank, and extra piping. By the use of the Thermo Change, however, most of this is eliminated, the unit requiring only two connections to the existing cylinder, being itself in turn connected to the flow and return from the boiler.

The unit is made of copper and has an annular inner cylinder with its own built-in feed and vent pipe. Interchange between the primary and secondary water is virtually eliminated and no external feed or vent pipes to the primary circuit are required. It can achieve an average heat transfer of 20,000 B.Th.U. per hour over a two-hour re-heat cycle, provided the boiler is powerful enough, and being only 7 $\frac{1}{2}$  in. diameter and 21 $\frac{1}{2}$  in. high, it can usually be fitted alongside the existing cylinder.

## "Primatic"

The installation of the "Primatic" copper indirect cylinder (S.B.P. Type) is another way of converting a direct system to an indirect type, the existing cylinder being removed and the "Primatic" cylinder being installed in its place.

The advantage claimed for this method is that only one store tank is needed, and little alteration is required to the existing pipework.

The principle of this method is that the water passes into the primary circuit through a patented arrangement in the inner cylinder, which, however, prevents inter-mixing of the primary and secondary circulations when the boiler is working.

continued overleaf



*The Irish Plumber and Heating Contractor.*

*from previous page*

## Indirect hot water supply systems

The cylinder conforms to B.S.S. 699 and has brazed seams.

### Selection

**I**N conclusion, it is important to take into account all factors before deciding on any particular method. For instance, is the indirect system to be part of a small bore job, or is it required for installation in a temporary hard water area?

In the small bore job, it may be an economic proposition to install one of the patented units already mentioned, whereas in the temporary hard water area, the orthodox two-tank system may prove the most suitable.

The author has seen many successful installations of this latter system in various parts of Ireland where scale deposits from the water prevented the erection of the ordinary cylinder system.

## in brief...

### New pump

HARFORD PUMPS LIMITED, of London, have added a new low capacity pump, the HPC 25 (2 gallons per minute, against 2.75 ft. frictional head) to their range of Opi<sub>0</sub> circulating pumps.

The HPC 25 has been developed to meet the growing demand for a smaller capacity pump.

Harford's range of Opi<sub>0</sub> circulating pumps now consists of five models—HPC 25, 62, 70, 80 and 90. All are available in five interchangeable flange sizes or two union sizes at the same price.

Stocked in Dublin by Messrs. British Steam Specialities Ltd., Dockrells Ltd., and Oil Burner Components Ltd.

### December

**N**EXT month A. L. Townsend moves on to application when he deals with the weathering of buildings—structure of roofs; capillarity; roof weathering details; weathering of chimney stacks and parapet walls.



### Sales aids

FIBREGLASS LIMITED—manufacturers of 'Cosywrap' and 'Supawrap'—are offering to the trade a number of new and extremely striking point-of-sale aids.

We illustrate here two of the nine aids. Left: Showcard 30" high, 18" wide and 10" deep. Right: This illuminated display is 5' 8½" high and its sequence illuminated panels tells the Cosywrap story.

Irish Agent: J. C. Parry-Jones, Whitestacks, Killiney Hill Road, Killiney, Co. Dublin.



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## TENDERS

**CAVAN CO. COUNCIL:** Extensions to water supply schemes—Tenders are invited for the carrying out of extensions to Ballinagh, Ballyjamesduff, Kingscourt, Loch Gowaa and Shercock Water Supply Schemes in accordance with the Plans and Specifications.

The works include the laying of P.V.C. Watermains together with ancillary works, particulars of which are as follows:—

Ballinagh Scheme—Laying of 5,616 lin. yds. 4" pipes and 4,733 lin. yds. 3" Pipes.

Ballyjamesduff Scheme—Laying of 1,500 lin. yds. 3" Pipes and 300 lin. yds. 1½" Pipes.

Kingscourt Scheme—Laying of 1,920 lin. yds. 3" Pipes and 250 lin. yds. 1½" Pipes.

Loch Gowaa Scheme—Laying of 3,981 lin. yds. 3" Pipes and 825 lin. yds. 1½" Pipes.

Shercock Scheme—Laying of 2,240 lin. yds. 3" Pipes, 1,380 lin. yds. 1½" Pipes and erection of Booster Station.

Plans, Specifications, Bills of Quantities, General Conditions of Contract and Tender Forms may be obtained from the County Secretary on payment of a deposit of five guineas.

Tender Forms and Bills of Quantities in sealed envelopes marked "Water Supply Extensions" on top left hand corner must reach the office of The County Secretary, Courthouse, Cavan, not later than November 27, 1961.

### NOTICE TO PLANT SUPPLIERS

Tenders are invited for the supply and installation of Booster Plant on Shercock Water Supply Scheme to deliver 1,000 gallons per hour against a head of 95 feet according to drawings and Specification available at the office of the County Secretary.

★ ★ ★  
**KILKENNY CO. COUNCIL:** Piltown and Fiddown water supply—Submersible Pumping Plant. Tenders are invited for the supply and erection of one submersible pumping unit having a capacity of 1,000 gallons per hour complete with all necessary accessories and the supply only of a similar unit in accordance with the specification prepared by Messrs. P. H. McCarthy and Son, Consulting Engineers, 26 Lower Leeson St., Dublin 2.

Documents giving particulars of requirements may be had at the offices of the Consulting Engineers or from the County Secretary, on payment of a deposit of five guineas.

Tenders in sealed envelopes marked "Piltown & Fiddown Water Supply—Pumping Plant" on top left hand corner to reach An Runal, John's Green, Kilkenny, not later than December 2, 1961.

★ ★ ★  
**ROSCOMMON CO. COUNCIL:** Keadue sewerage scheme—Tenders are invited for the construction of a sewerage scheme for the village of Keadue in

accordance with the Plans and Specification prepared by Nicholas O'Dwyer, Son & Partners, Consulting Engineers, 6 Burlington Road, Dublin, from whom copies of the Contract Documents may be obtained on deposit of £10-10-0.

The work comprises the laying of, approximately:—

1,849 lin. yds. of 6" sewer, 69 lin. yds. of 6" C.I. sewer, together with Ejector Station, Disposal Works, and all necessary manholes, ventilating columns and fittings.

Sealed tenders on the form provided endorsed "Keadue Sewerage Scheme" and accompanied by a Bill of Quantities priced and extended in ink should reach the County Secretary, Courthouse, Roscommon, not later than December 7, 1961.

★ ★ ★

**WATERFORD CO. COUNCIL:** Affane/Tourin water supply scheme—Tenders are invited for above work in accordance with documents prepared by Messrs. C. G. McNamara and Partners, Consulting Engineers, 27 Merrion Square, Dublin. Copies of such documents may be obtained from the County Secretary on deposit of £10-10-0.

Latest date for receipt of tenders, which should be enclosed in sealed envelopes endorsed "Affane/Tourin Water Supply Scheme" and be accompanied by completed bills of quantities in separate sealed envelopes suitably marked and addressed to the County Secretary, Courthouse, Dungarvan, is November 30, 1961.

# Sell ELECTRIC WATER HEATING

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## *Electric* water heating is handier!

We have been using ballvalves with plastic seatings, nylon, I believe, but are experiencing trouble on account of leakage past the threads which hold the plastic seatings in place in the valve body. What is the cause of this and is there an effective remedy?

**T**HE B.S.1212 ballvalve may be had with bronze seatings or nylon seatings but in each case the scoriifice seatings are secured within the valve body by a flange formation on the seating itself.

Certain other types of ballvalve use nylon "screw in" orifice seatings and these have been known to give rise to leakage past the screw thread after some months in service.

**The cause:** Nylon has remarkably good and useful properties of corrosion and wear resistance but like its cousin, polythene, it is liable to creep. Creep in this context refers not to the caterpillar's mode of locomotion but the physical deformation of material under load. A screw offers a good example of one means of applying a load, e.g., a screw-jack is used to apply a load to raise another load. When a nylon seating is screwed home in the metal ballvalve body it is subjected to a load. Eventually the plastic material creeps and adjusts itself in conformity with female thread in the valve body, the original "tightness" is eased and leakage results.

Some manufacturers of valves which have shown this tendency have tried to contact all stockists and offer replacements into which the plastic seats have been additionally secured with some form of sealing cement. As to how effective this modification will prove has yet to be shown as result of field trials. We can but suggest that querist tries some kind of jointing compound of the adhesive hard setting variety, possibly of the "petrosist" kind as used for joints in petrol pipe lines.

*Each month this column will solve some of the everyday problems of the plumbing and heating engineer when our consultants deal with queries directed to "Questions Answered." All queries will be replied to and the most interesting published.*

Forty

**Q**uestions

**A**nswered

What is the difference between A.C. and D.C. electric arc welding equipment and why are flux coated rods used for welding mild steel with this equipment?

**A**LTERNATING Current (A.C.) changes in polarity. One complete change of polarity, i.e., from zero to maximum in one, through zero to maximum in the opposite polarity and thence back to zero, is called a "Cycle." In standard A.C. supplies there will be 50 of these cycles per second, and the frequency would thus be referred to as 230/250 volts at 50 cycles single phase, or 400/440 volts at 50 cycles, 3 phase.

Basically, the A.C. arc welding equipment comprises a transformer which transforms these voltages to between 60 or 100 volts at which the best arc properties are obtainable for the welding process.

At one time the equipment was referred to as a welding transformer and will still be described as such sometimes to-day.

### **Economic**

A.C. arc welding equipment is simple, reasonably cheap, and economic to operate. It cannot be used for welding non-ferrous metals, e.g., copper, aluminium, etc.

Direct Current (D.C.) equipment employs current of constant polarity. The current does not alternate but flows constantly and in one direction from positive to negative poles.

Special D.C. generators are commonly used. These may be driven by electric A.C. motors or by petrol engine.

D.C. equipment reduces electric shock risks and is desirable where the maintenance of steady arc condition is required, the welding of thin sections, etc. Though somewhat higher in operating costs, the D.C. plant offers improved arc qualities and

facilities for welding ferrous and non-ferrous metals with the one set of equipment.

Flux coated electrodes, or welding rods, are used because some protection against oxygen and nitrogen in ambient air is necessary to prevent damaging and troublesome chemical reactions at the weld during the high heat intensity as the arc strikes. In addition to this, the slag formed as the flux melts during the weld process provides a protective shield to prevent oxidation of newly deposited weld metal.

### **Protection**

In short, the flux offers protection for the melting electrode tip and the deposited metal from the ill effects of atmospheric gas contamination. For ferrous metals this is all that is generally necessary and the flux composition is fairly straightforward. For the more expensive metals in the non-ferrous range suitable reducing agents and other additives will be combined with the flux coating to prevent damaging inclusions or losses of parent metal by volatilisation, etc.

### **For Olympia Exhibition**

**HILMOR LTD.**, Caxton Way, Stevenage, Herts, at the Building Exhibition will particularly feature among their range of hand operated, hydraulic and motorised machines exhibited the RP.5A Ratchet bender with Mandrel attachment. This model for the first time provides all the advantages of a Compression bender and of a Mandrel bender incorporated in the one machine. Furthermore, whether used as a Compression or a Mandrel bender the machine remains completely portable.



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