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The Irish Plumbing and Heating Engineer, October 1965 (complete issue)

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et al.: The Irish Plumbing and Heating Engineer, October 1965 (complete i

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For Central Heating

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Irish Shell and BP Limited
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OCTOBER 1965
Vol. 3 No. 7

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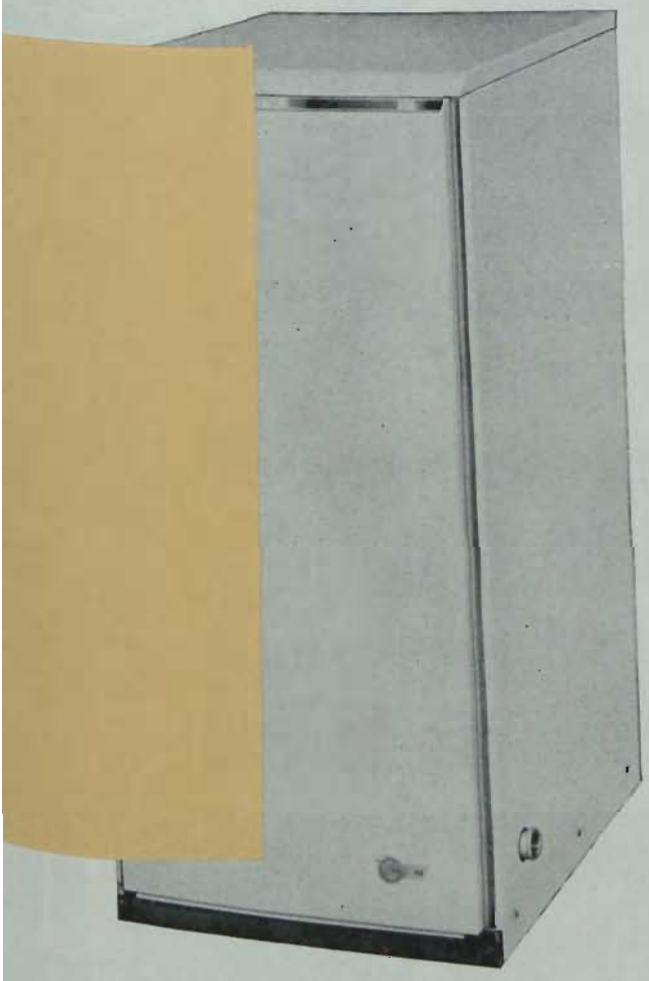
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Easy Servicing

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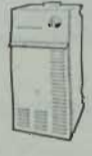
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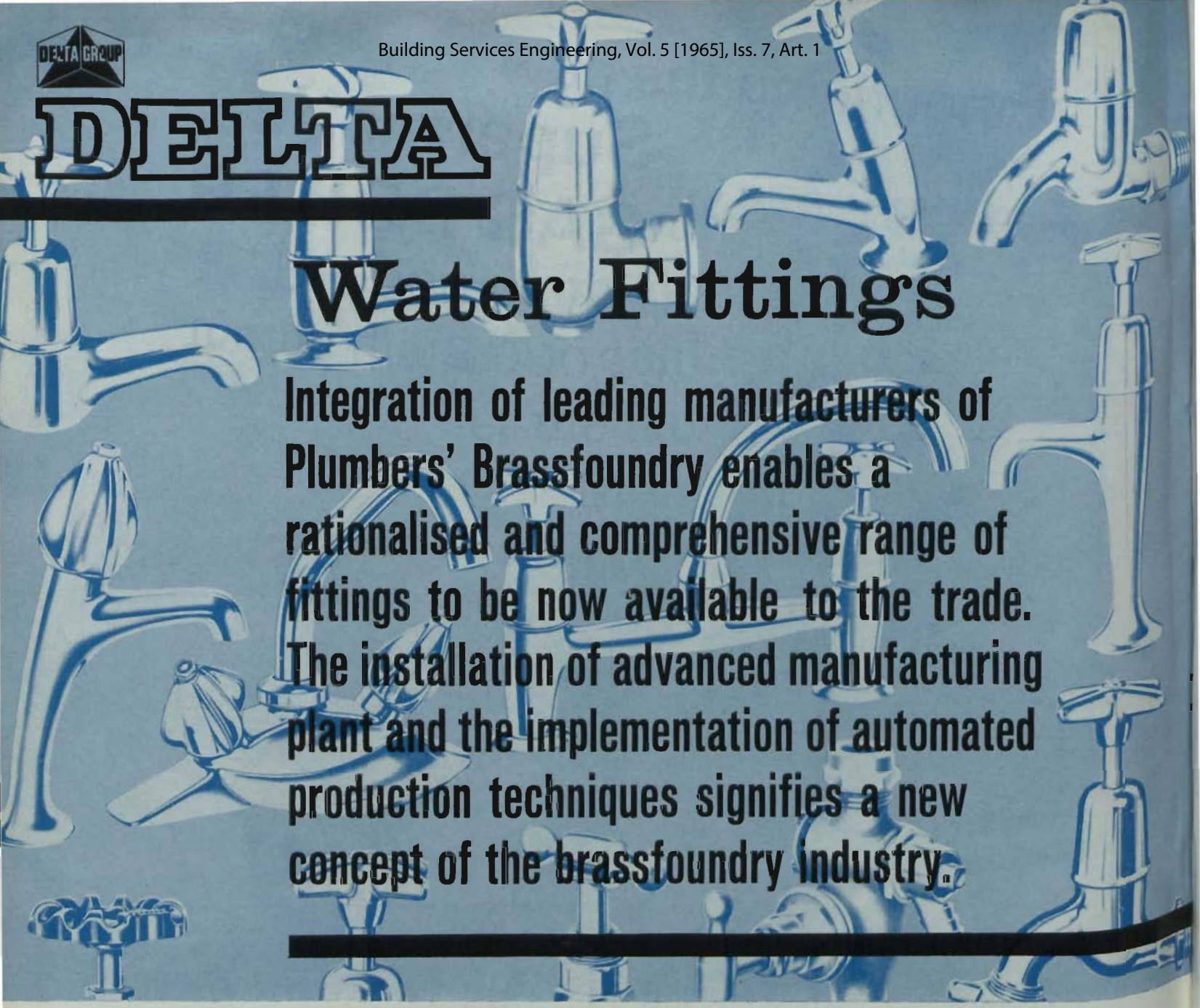
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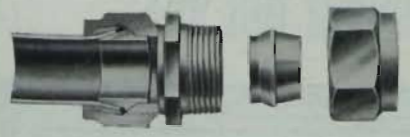
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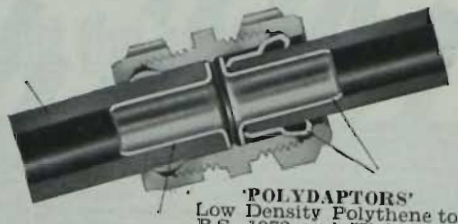
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For converting standard Conex-Instantor Type 'A' fittings for use with soft temper Underground Copper Tube to B.S. 1386.



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For use with Irish Domestic Copper Pipe and Polythene Tubes: Low Density to B.S. 1972, and High Density to B.S. 3284.



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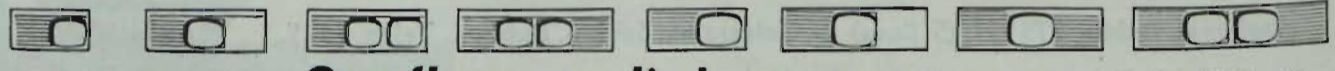
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Multifluted for efficient draining
Multifluted for sound-deadening
Multifluted for good looks



FISHOLOW multifluted sinks, made of finest British Stainless Steel, are designed to give better draining, better sound-deadening, greater strength and longer life. What's more, they look good, too.
And what a wonderful range of styles and sizes!
Single or double bowl; single or double drainer; with or without work-top;
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Model W 21" x 42" Model WW 21" x 63" Model DL 18" x 54" Model TL 18" x 72" Model N 18" x 42" Model WN 18" x 63" Model DW 21" x 63" Model TW 21" x 84"



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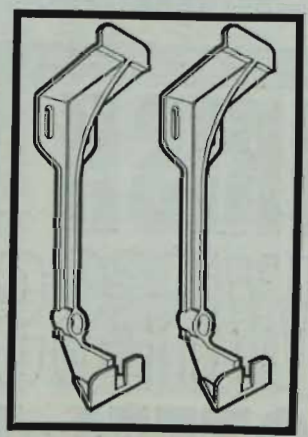
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I'm not taking my coat off till you put the heat on.

New Capital Radiators now come in this protective pack. And what's more they're going to **stay** in this protective pack, throughout despatch and delivery. And you can leave the pack on during installation, too. No need to unpack them until the heating system's ready to go.

It's all because we're so pleased with the new warm white primer. New Capital Radiators are now supplied ready-primed in warm white and it's a primer worth protecting.

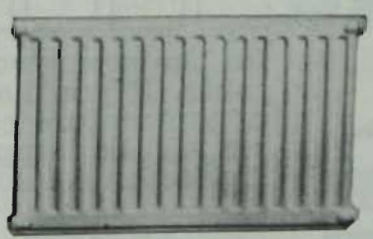


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NEW
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International
BOILERS AND RADIATORS LTD

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Heating and Insulation Division, 67/73 Townsend Street, Dublin, 2. Telephone: 76282.

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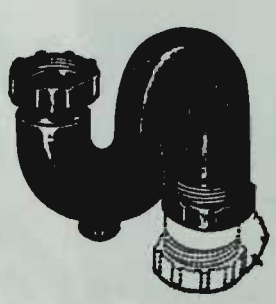
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"THE DUBOIS PLASTIC TRAP" (Regd.)

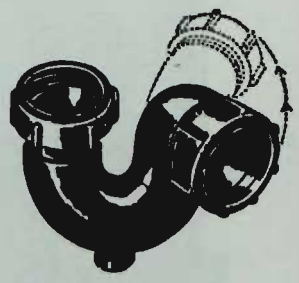
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Orthodox Shape!
Smooth Bore Tubular construction.
Outlets can be turned through 220°.
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Outlet on 'S' trap turned to inlet forms a through-bore bottle trap.
Frost and damage resisting.
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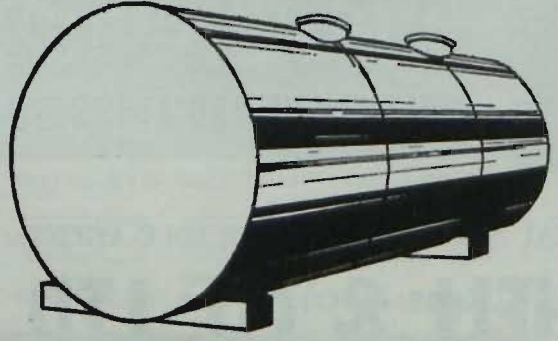


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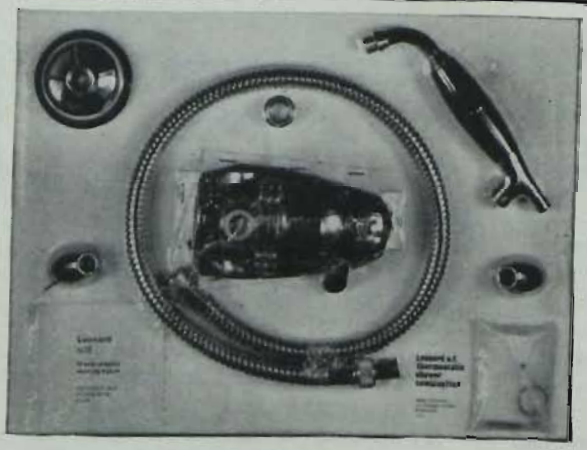


for the storage of liquids and gases. If you have a problem of this nature consult us and we will be happy to give you free technical advice.

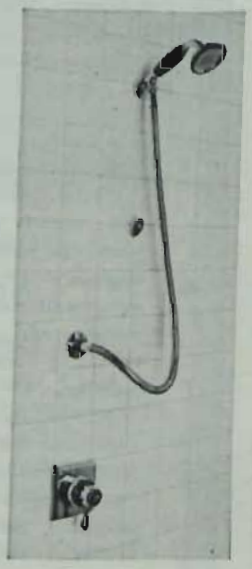
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WHESSOE (IRELAND) LIMITED,
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Tel: 73475.

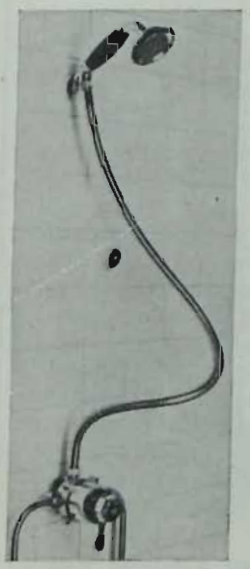
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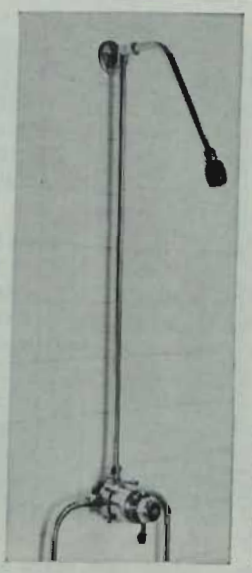
choose a packaged Leonard shower



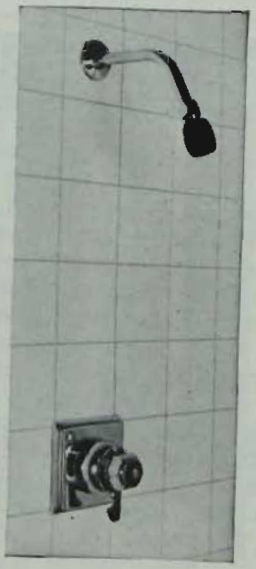
Leonard-bif
The Leonard 72B built-in thermostatic mixing valve with flexible tube fitting.



Leonard-ef
The Leonard 72 with flexible tube fitting.



Leonard-er
Leonard 72 with two-position rigid fitting and low-head shower rose.



Leonard-bir
The Leonard 72B built-in thermostatic mixing valve with shower arm for use with concealed piping.

Leonard thermostatic showers are easy to choose, easy to buy, easy to install. Each shower combination is complete down to the fixing screws, and cunningly packed for safe, whole and convenient delivery. The Leonard shower you choose is thermostatic. It includes a separate choice of the force of the shower; it works off water pressures as low as 3' head. Leonard showers give you a choice from four standard combinations.

Sole Distributors in Eire:

MODERN PLANT LTD.

JOHN F. KENNEDY DRIVE, NAAS RD., DUBLIN, 12. Telephone: 505640. Telex: 5191

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trade Topics

INTERNATIONAL LAUNCH NEW BOILERS

INTERNATIONAL Boilers & Radiators Ltd. have launched the new City range of gas-fired boilers. The range is being supplied in two sizes (35,000 B.t.u./h. and 50,000 B.t.u./h.), each of which are supplied with conventional flue, balanced flue or equipped for se-duct application.

The City range takes the place of the Gas-Pak boilers at present marketed by International which will be discontinued. (It should be noted that the Gas-Pak boiler is not to be confused with International's highly successful Gas-Pak range of packaged deal central heating systems which continues to be marketed as previously).

The City boiler, while similar in external appearance to the Gas-Pak (slightly shallower and only 1½" wider), is the result of extensive testing and experimentation by International's research team based at Gateshead. The range is regarded by International as a considerable step forward in the field of gas-fired domestic boilers and is complementary to International's range of Capital small bore units.

* * *

FLEMINGS FIRECLAYS EXPAND

FLEMINGS' Fireclays Ltd. announce the commencement of the second phase of their modernisation programme. A £45,000 order has now been placed for an automatic clay handling plant. This will ensure greater control over clay preparation and will eliminate the worrying variations in the quality of the finished product.

Orders, too, amounting to £25,000 have been given for equipment to enable Flemings' Fireclays Ltd. to convert the firing of kilns to oil. Combined with pyrometric heat control facilities, this will ensure greater control over the firing temperatures of the kilns and improve, even still further, the over-all quality of their finished product.

Flemings' Fireclays Ltd. commenced operations thirty years ago at The Swan, Co. Laois, and to-day can announce this second phase in a modernisation programme. From a modest beginning, Flemings' Fireclays now produce a complete range of vitrified clay sewer pipes and fittings. The factory has gradually expanded, now employing over 180 operatives, many of whom were the firm's original employees.

Just two years ago, Flemings' Fireclays Ltd. commenced the first phase of their modernisation programme, which is now in the final stages of completion.

Champagne for two— in bath

ORDERS, especially from the Middle East, are apparently pouring in for the Forum bath made by Carron, the Scottish iron-founders. Originally designed as an exhibition showpiece, this is priced at £300, and features remote-controlled taps, a built-in thermometer and an integral stand for champagne and glasses, It is big enough for two.

Irish Shell course launched



IRISH Shell and BP Technical Officer Mr. W. J. R. Couchman is pictured here with the attendance at the first of a series of training courses for trade sections associated with the domestic heating market.

The courses began with a series of four lectures for members of the builders providers' trade. They are being followed by a series of some 24 evening lectures for the installing trade.

IRISH PLUMBING & HEATING ENGINEER

Vol. 5. No. 7. OCT., 1965

THE IRISH PLUMBING AND HEATING ENGINEER is the only publication produced in Ireland catering exclusively for the heating, plumbing and ventilation industries with a guaranteed circulation covering the Republic of Ireland and Northern Ireland every month.

THIS month an IPHE correspondent has been to London to report on the International Plumbing and Central Heating Exhibition.

Our serialisation of A. L. Townsend's Plumbing (stage two) continues—part three deals with roofwork.

Special Review subjects this month cover (i) plumbers' and heating engineers' tools, welding equipment and plumbers' metals, and (ii) industrial and commercial insulation.

W. J. R. Couchman continues his "Talking Shop" column, while Trade Topics review the month's news in all sections.

●

Editorial and advertising offices:

Callaghan Chambers, 13/15 Dame Street, Dublin 2.

Tel. 56465-6.

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Belfast: 26 Carnamena Ave., Belfast 6. Phone: 643095.

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trade Topics



New Wilson Wallflame introduced

MR. Alan Bunagar, Chief Technical Officer, Henry Wilson & Co. Ltd., lecturing on the new Wilson Wallflame Boilers at the "Installers Evening" organised in conjunction with Irish agent, Mr. George A. Reid, at the Irish Heating Centre, Dame St., Dublin, this month.

B.S.A. HARFORD VALVE

B.S.A. Harford Heating have recently introduced their new slimline Barnet radiator valve for use with low pressure hot water central heating systems. A product of careful research into market requirements, the valve has a functional and contemporary appearance. It is available in ½" size, angled or straight, either in brass or polished chrome.

A single revolution of the hand-wheel will open or shut the valve and a non-rising spindle ensures that the small gap between the body of the valve and the hand-wheel remains constant during this process.

A long-life "O"-ring seal of heat resistant material seals off the spindle and makes the valve leak-proof at the spindle at pressures up to 150 psi. Backseating of the valve in the fully closed position allows for easy replacement of the "O"-ring while the valve is in service without draining down the system.

* * *

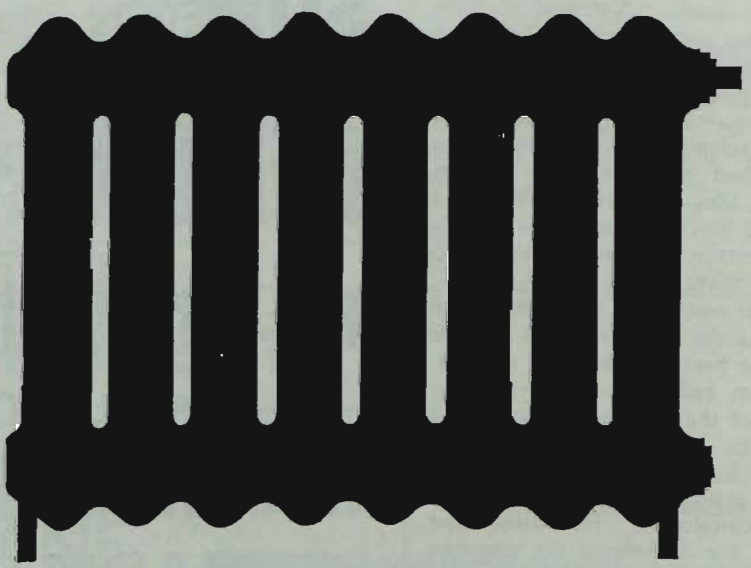
SATCHWELL PRODUCE GUIDE BOOK

"SATCHWELL Controls, part of the Elliott-Automation group, has set up a much-needed service for heating engineers in the form of a book called "Heating Engineers Guide." This was the comment of The Financial Times' Scientific Editor on this new publication.

In three parts, the book, of course, deals with the many aspects of automatic control of space heating.

The book firstly puts forward the reasoned argument about the need for control schemes. Then there is an analysis of homes and the sort of control they may need. Finally there is a detailed listing of systems, with their circuitry. Any heating engineer can get a copy of the book free on application.

Of the new publication, Mr. R. E. Ayers, Satchwell Manager for Ireland, said: "The launching of the guide is a further step in bringing the knowledge of temperature controls to the domestic heating market."



Nobody can give you better central heating equipment better than Brooks Thomas.

BROOKS THOMAS & Co. Ltd.
4 SACKVILLE PLACE. DUBLIN 1. TEL: 41841

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TALKING SHOP
BOB COUCHMAN



Layman's many odd notions on heating

IT is very difficult to stand back and see central heating as the layman sees it. Somehow one assumes that the layman knows the form in the same way as we do.

Recently, however, I have had a couple of shocks. A friend of mine was talking about heating his own house, which is a smallish four bedroomed affair, and he told me that he supposed it would cost eight or nine hundred pounds. It is an awful pity that he had been put off by this mistaken idea of prices. When I persuaded him to get a couple of estimates, neither of them came up to the £600 mark.

Another one that was thrown at me lately was the statement that the use of central heating promoted dry rot, woodworm and what have you, due to the fact that the timber was dried out by the heating system. It so happens that I once had a very interesting discussion with an eminent timber technologist. He actually had a gadget for measuring the moisture content of timber by electrical resistance—the first such unit that I have ever seen. He made the point that the installation of central heating reduced the likelihood of timber decay and checked woodworm (or furniture beetle), together with Camberley beetle and death-watch beetle.

THESE beasties thrive in timber with a fairly high moisture content. Because of this it is commonly found that there is very little infestation in new houses. After some years, particularly if the houses are unheated, the moisture content of the timber, especially in the roof space, gradually creeps up, since the increase in moisture that takes place in the Winter is not fully relieved in the Summer months and over the years there is a steady build-up. After a critical level has been reached, the risk of infestation becomes very much greater. If central heating is installed, then the critical level may never be reached.

Turning now to dry rot: maybe it is because of the name that it is associated with central heating. In fact dry rot is so called because, due to the break-down of the cellulose in the timber, infected wood has a parched or charred appearance with fissures across the grain. Dry rot actually

Continued opposite page

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Standard range now extended to include most sizes likely to be required in the popular 18", 24" and 30" heights.

New low prices for Standard Range Singles and Doubles—at only 5/- per square foot of heating surface.

Brackets supplied free for all radiators.

Finally, remember that **every** Wilson radiator has a guaranteed heat emission figure determined after tests to B.S. 3528/62 by the Heating and Ventilating Research Association.

Henry Wilson

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Agent in Republic of Ireland: MR. GEORGE A. REID,
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Central heating will not cause rot

from previous page

starts as a result of two conditions—the first of these is a high moisture content, which is commonly associated with bad ventilation. The second necessary condition is an infection, since dry rot is a fungus and must be started by the presence of fungus spores.

Once the infection has started it generates moisture for its own propagation, and sends out tendrils (known as hyphae) which spreads the infection further. Now, without the necessary degree of moisture the infection cannot start in the first place, and since central heating tends to reduce the moisture content of the timber and to promote ventilation there can be no doubt that the presence of a central heating system does nothing to increase the danger of dry rot and often may help to reduce the risk.

There can be no doubt that dry rot is a very serious state of affairs in any house but one can be quite definite about this: it is caused firstly by an infection and, secondly, by damp woodwork. Other factors which assist its development are mild temperatures and lack of ventilation. Incidentally, there is only one way to deal with it, if it should rear its ugly head, and that is to cut out all the infected woodwork plus sound woodwork which adjoins, hack out any brickwork joints which are close to the infected woodwork, sterilize them with a blow-lamp and then replace the infected timber with new work that has been treated with a suitable preservative. (I trust I have got all my homework right).

Talking of homework, as an engineer one is supposed to know something about mathematics although this generally resolves itself to knowing how to use a slide rule. Recently, my sixteen-year-old daughter has been roping me in to assist with her maths homework. On her busier nights this virtually means that I do it for her and I was horrified the other day when she came home and told me that I had got 3 out of 10! You will be glad to hear that my marks are improving now.

in brief . . .

MODERN Plant Ltd., distributors in the Republic of Ireland of Leonard and Mira thermostatic mixing valves and Unataps manufactured by Walker Crosweller & Co. Ltd., have now moved to their spacious new premises at John F. Kennedy Drive, Naas Rd., Inchicore, Dublin, 12 (telephone 505640).

The new offices and showrooms are easily accessible from the main Naas Road, approximately 200 yards beyond the Volkswagen assembly works.

* * *

MONSELL Mitchell & Co. Ltd. report the success of their country-wide demonstration tour. The company's demonstration caravan displayed a wide range of equipment, including the new Delstar boiler, Capital rads, insulation materials and the like.

* * *

A NEW six-page folder (publication S2149) giving full details of Shires range of Naiad and Robin "Perspex" baths is now available. In total, Shires now offer 76 baths, all in "Perspex."

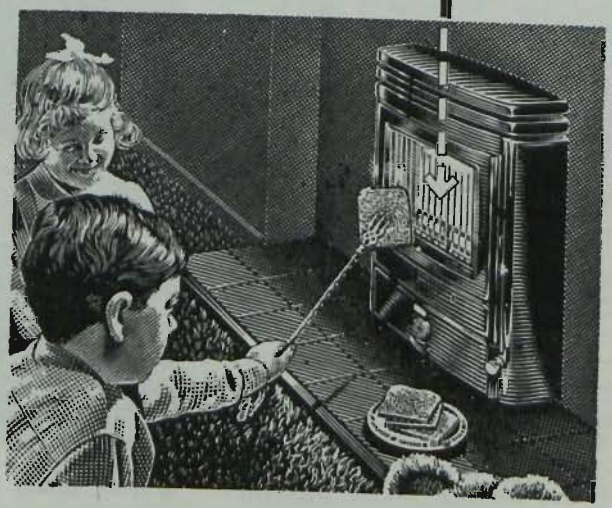
HEITONS
HAVE IT!

PARKRAY, WATERFORD and HAMMOND LANE
Inset and Free-Standing
Room Heaters

•

TRIANCO, IDEAL SUPERMATIC & POTTERTON
Boilers

Parkray open fire behind glass



Thomas Heiton & Co., Ltd. 37 George's Quay, Dublin 2. Tel. 72931.

Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1

OPPORTUNITY TO VIEW MUCH NEW EQUIPMENT

THE EXHIBITIONS

WE CONTINUE HERE OUR PROGRAMME FOR COVERAGE OF THE MAJOR EXHIBITIONS. THIS REPORT, BY A SPECIAL CORRESPONDENT, IS FROM THE INTERNATIONAL PLUMBING AND CENTRAL HEATING EXHIBITION.

THE exhibition, as we anticipated, proved most useful by providing the opportunity seeing such a wide range of equipment, much of it completely new, at first hand.

Bells Asbestos and Engineering Ltd. (Bestobell Works, Slough, Bucks.) showed their Repco range of hot water skirting convectors in 3, 4, 5, 6 and 8 in. prepainted lengths, which is little more than 2 ins. in depth.

An Irish exhibitor was the Barlete Co. Ltd. (Nenagh, Co. Tipperary). They displayed their comprehensive range of light, medium and heavy weight toilet seats. Another Irish exhibitor was Potez Industries of Ireland Ltd.

W. Kennedy Ltd. (Station Works, West Drayton, Middlesex) exhibited for the first time the new Kwickie copper tube bender with ranges from ¼ to ¼ in. bore.

Although the Marley Tile Company Limited Plumbing Division is a relatively young addition to the company's diverse activities it has certainly managed to establish the Marley name firmly among the leaders in the field. As can well be appreciated the diversity and simplicity of design in the Marley range of vinyl plumbing attracted keen interest.

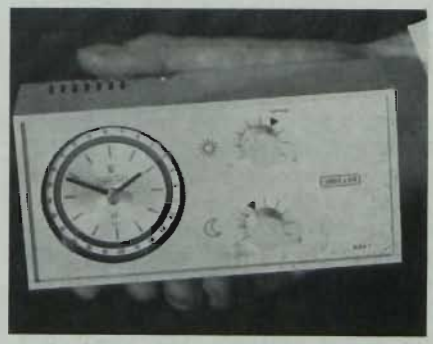
Stand No. 16—that of William H. Meyer Ltd. (9-11 Gleneldon Road, S.W.16), displayed the company's well known range of Sievert propane gas apparatus and the range of petrol and paraffin blowlamps.

Designed for the "new house market," the Tortoisaire ductless warm air system (40,000 B.t.u./h.) was shown by Charles Portway & Son Ltd. (Tortoise Works, Halstead, Essex).

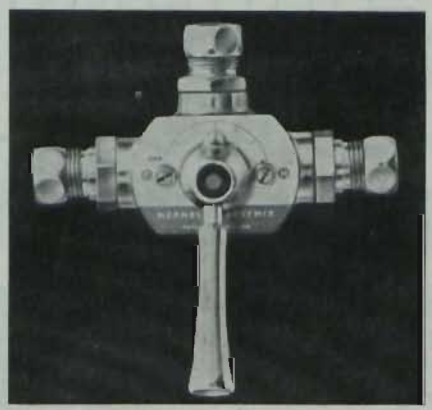
The Ridge Tool (U.K.) Ltd. showed their range of Rigid pipe tools, pipe and bolt threading machines and accessories. This unique range is available here through the Republic agents, Hendron Bros. (Machinery) Ltd.

The stand of the Nuralite Co. Ltd. (Whitehall Place, Gravesend, Kent) provided the first public demonstration of the new "cold moulding" method of using Nuralite which dispenses with the use of heat and enables chimney and other flashing work to be effected without the use of a blowlamp or other conventional tools.

Low cost Gecal small bore tube for closed circuit and hot water central heating installations, already reviewed in I.P.H.E., was shown by the Oriental Tube Co. Ltd., the G.E.C. subsidiary.



● **Landis and Gyr showed two central heating controls—the Villagyr, a weather sensitive control, and the new Chronogyr (pictured here) which incorporates an electric clock and two thermostats for day and night control.**



● **From Meynell & Sons Ltd.—a new mixer shower valve.**



● **The Mason Master Skew Drive—a close approach attachment by John M. Perkins & Smith Ltd.**

A new apartment heater to meet the demands of warm air heating, which can be connected to any form of domestic boiler, was shown by Dunham-Bush Ltd. (Farlington, Portsmouth, Hampshire).

Important modifications and new developments designed to increase efficiency were shown by Hilmor Ltd. (Caxton Way, Stevenage, Herts.) in their wide range of bending machines.

On display for the first time by Shandon Scientific Co. Ltd.—represented here by H. R. Holfeld Ltd.—were the Pollux range of B.t.u. meters, which give direct clegital readings of heat supplied over a period and solve the metering actual heat supply, particularly to groups of consumers.

Pride of place on the Steel Radiators Ltd. (Stelrad Works, Bridge Rd., Southall, Middlesex) stand went to the new Stelrad Fifty. With a 50,000 B.t.u./h. output, this new boiler was reviewed last month for I.P.H.E. readers.

New control and measuring systems for district heating schemes, flats, factories and hotels were shown by Carlton (Thermo Equipment) Ltd., of Birmingham, 26.

This new equipment from the Danish Clorius and "OK" Organisations, brings a welcome ease to the problems of heating; both from the point of view of simplicity in the initial design, cost and efficiency. Recently appointed Irish agents are: Republic, J. R. Taylor Ltd.; Northern Ireland, S. Stewart (Therma) Engineering) Ltd.

The new 6 in. Temple pitch fibre stack system was shown by Temple Tubes Ltd. (Temple Mill, Passfield, Nr. Liphworth, Hampshire). This is an "O" ring jointed system. Unit cost with the system is low and the temperature resistance high.

Working and cutaway models from the Thermalrad range of convector radiators were shown by Thermal Radiators Ltd. (Falcon House, Perimeter Road, Woodley, Reading, Berks.).

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trade Topics

A NEW name for the well-established products of a £73 million British Metal Group is being launched on markets later this year.

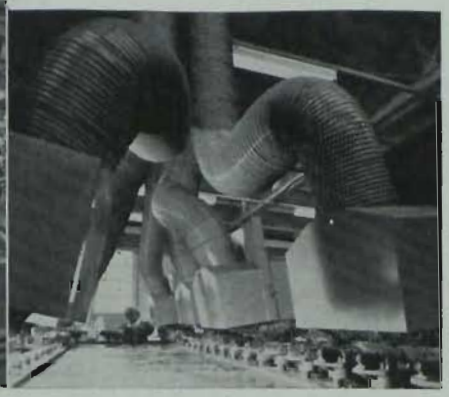
NEW NAME FOR OLD

From October 1 and coinciding with the Building Exhibition, the Delta group offers its range of water taps under its own.

Several Delta Companies make taps at present, which range from the exalted Bourner's Supatap to the basic British Standard taps. All these taps have been sold through existing companies, such as Sperryn. However, come the Building Exhibition in October and the overall name of Delta Water Fittings will be announced, appearing at the head of all the catalogues and literature. The Delta sales representatives will be the same men who now handle the Sperryn business, and they will work from the same address.

The Delta group comprises 80-odd subsidiary companies and is Britain's 53rd largest business. Under chairman William Ogden, the group's annual profits have soared from £2 million seven years ago to nearly £10 million.





RIGHT—The inspection department at the Delta Works. BELOW—A unique polishing machine at the works.



Shower Tray

THE market for shower installations is a growing one and here we feature from the Alfred Goslett Co. Ltd. (127-131 Charing Cross Road, London, W.C.2) a Perspex shower tray. Design features include tiling rim on three sides, reduced leakage risk and safer, anti-slip base. The base is available in four colours.



The Barking Trap is so flexible, so adaptable that whatever the position of the basin in relation to the connection, fitting is easy to carry out and the installation of one-pipe systems is simplified. The introduction of the Barking trapped waste, which has been specially designed and developed to maintain the highest standards of hygiene, marks an important step forward in the field of sanitary fittings.

Note theses special design features

- Instantaneous rubber seal
- Adjustable slip joint for height and alignment
- 3" water seal
- Outlet suitable for capillary soldering to domestic copper pipe
- Wall flange to mask joint
- Fingertight nuts
- Smooth internal surface
- U Bend instantly removed for easy cleaning

BARKING BRASSWARE

No. LE2

Write for full details and illustrated literature to:
Barking Brassware Co. Ltd., River Road, Barking, Essex. Telephone: RIPpleway 3033/9

Published by ARROW@TU Dublin, 1965



oerlikon arc-welding electrodes...
will soon be on your doorstep

Oerlikon, makers of the world's finest welding electrodes, are soon to open their own manufacturing plant in Dublin. On your doorstep, so to speak, from early 1966.

The advantages to users and stockists are legion; faster delivery service and reduction in freight charges, to name but two.

But you need not wait until the spring: Oerlikon electrodes are *available* in Ireland *NOW*! Send off the coupon for further details.

MADE IN 27 COUNTRIES THROUGHOUT THE WORLD

OERLIKON ELECTRODES LIMITED, JAMESTOWN ROAD, FINGLAS, DUBLIN 11. Tel: DUBLIN 71805. Telex 5141

OERLIKON

To Oerlikon Electrodes Limited - Please send me fullest details about your new factory and facilities in Ireland together with literature on Electrodes

NAME .....

COMPANY .....

ADDRESS .....

.....

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SPECIAL REVIEW THIS MONTH

PLUMBERS', HEATING ENGINEERS' TOOLS, WELDING EQUIPMENT AND PLUMBERS' METALS.

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

SIEVERT propane gas equipment comprises many different items of apparatus among which is the range of burners producing flames from a fine precise needle flame to a large voluminous flame. These burners are interchangeable on a series of different supports, thus making them complete tools for tackling almost any job in the plumbing or central heating field.

The manufacturers also offer a complete burning outfit, comprising a slim Container, No. 2960, which is refillable, and either Burner No. 2935 or 2936. This outfit is supplied as a complete outfit under set number 2920 and is an extremely useful appliance for the plumber who must consider the bulk and weight of his kit.

The Sievert plastic welding torch No. 3888 is suitable for the welding of thermo plastic tubes and sheets, while the Sievert Furnance No. 3857, which is of light construction in spite of its strength, has a burning unit which can be removed and used as a torch when necessary.

The sole concessionaires for Sievert blow lamps, stoves and bottled gas apparatus—which are Swedish made—are Wm. A. Meyer Ltd. (Liquefied Petroleum Gas Division, Gleneldon Road, Streatham, London, S.W.16).

* * *

MONSELL, Mitchell & Co. Ltd. are sole agents here for the range of pipe threading equipment manufactured by The Oster Manufacturing Co. of the United States.

Stocks of hand and power operated Oster equipment are carried by Monsell Mitchell in Dublin.

This precision-built equipment can be supplied to cater for a variety of duties.

* * *

AMONG a wide range of Armstrong products are the Heli-Coil-Standard, screw lock and push type-screw thread inserts. They are coils of diamond section wire, which when wound into Heli-coil tapped holes provide precision female threads of high surface finish, hardness and strength.

The insert is wound into its tapped hole by means of a driving tang at its leading end. The tang may be removed if required, by breaking off at the notch. This is only necessary when the bolt is required to pass through the insert.

The Armstrong Wej-it retraction bolt provides an anchoring system which will fix anything to concrete, masonry, steel or any non-frangible materials. It is made from high grade steel with an ultimate tensile strength of 84,000/90,000 lbs./sq.inch, and supplied complete with nut and washer galvanised for all weather protection. There is no need for additional washers, shields, etc. The manufacturers are the Armstrong Patents Co. Ltd. (Eastgate, Beverley).

* * *

A MACHINE designed to speed the cutting of chases in breeze, brickwork and concrete is now available from Trend Industrial Equipment Ltd. (Dudden Hill Lane, London, N.W.10). Known as the Trend Wall Chaser Mark IV., it is fast in operation, extremely safe in use, and has many improved features compared with the Mark III. introduced two years ago.

The Mark IV. incorporates a powerful high speed double-insulated motor developing over 2½ h.p.—sufficient to give the high rotary speed necessary to ensure efficient cutting performance. In contrast with many other types of wall cutter, the Trend Chaser operates without vibration and can thus be used on "green" newly built brickwork or breeze without causing cracks or the breaking away of mortar joints.

Continued overleaf

FOR ALL YOUR DIRECT AND INDIRECT FIXING

AND DRILLING PROBLEMS THE SOLUTION

WILL BE

HILTI

HILTI (IRELAND) LTD.,
DUBLIN INDUSTRIAL EST.,
FINGLAS ROAD,
DUBLIN, 9.

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Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1

Original SIEVERT

PROPANE GAS TORCHES

CRAFTSMEN KNOW THEY CAN RELY ON SIEVERT—
A BURNER FOR EVERY JOB

- **LEAD WELDING**
- **PLASTIC WELDING**
- **PIPE BENDING**
- **BRAZING**
- **SOFT SOLDERING**
- **PAINT STRIPPING**

and many other jobs



9 burners + **8** supports

Sievert Propane Gas Burners ignite immediately and burn with an intense clean flame adaptable to all requirements from a small pencil flame to a powerful voluminous flame. Plumbers, Builders and Painters readily appreciate the advantages of using Sievert Propane Gas appliances with a burner for every job, all interchangeable—even furnaces and soldering butts.



HANDYMAN SET 3790
These sets contain a range of equipment enabling most jobs to be undertaken and includes Paint Remover, Soldering Iron with 3¼ oz. copper bit, three different burners with a wide heat application all housed in a strong metal carrying case finished in impact resistant green hammer enamel.

Further details, technical information and address of nearest stockist available on request.

WM A MEYER LTD

9-11 GLENELDON ROAD, LONDON, S.W.16

SPECIAL REVIEW

from previous page

FERROUS are welding and brazing transformers—oil cooled—are double wound, oil immersed, self-cooled and totally enclosed in a heavy tank, impervious to dirt, atmospheric impurities and weather conditions, and suitable for both indoor and outdoor services. The windings are below oil level and immune from moisture and corrosion.

Type FM 200 has a maximum welding current of 200 amps and a minimum of 40 amps, while type FM 400 Duplex has a maximum welding current of 400 amps and a minimum of 40 amps.

* * *

OERLIKON, manufacturers of electrodes, welding plant and accessories, with factories in twenty-seven countries throughout the world, have announced that they will shortly be manufacturing in Ireland. In the meantime, the full range of Oerlikon products are available from stock, and supplies are being shipped from the factory in Crawley, Sussex. This arrangement will continue until production in Ireland in early 1966. Immediatte supplies may be had by contacting Oerlikon Electrodes Limited, Jamestown Road, Finglas, Dublin 11.

The Oerlikon Electrodes range includes the Fincord mild steel, heavy coated rutile type, electrode. It is economical and easy to use on all thicknesses of material where touch technique is required.

The Citobest high quality mild steel, medium coated rutile type is well suited to applications of general purpose welding. The Supercord is suitable for most applications and in all positions but particularly vertical up and overhead welding.

The Cellocord DC, AC, mo (DC) is a range of three mild steel, medium coated cellulose electrodes with iron power added. They are recommended for welding pipes, storage tanks, etc., using the stove-pipe of vertical down welding techniques.

* * *

THE Flowsilver brazing alloys and Fluxes make it possible to select the correct alloy and flux for any brazing operation. The alloys are extremely

Continued page eighteen.

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WELDING SERVICES LTD.

14-16 AMIENS STREET, DUBLIN

WELDING RODS
FLUXES
ELECTRODES
STELLITE
BLOWPIPES
CUTTERS
REGULATORS
HOSE
TROLLIES
NOZZLES
ADAPTORS
GOGGLES
SKULL CAPS
LEATHER JACKETS
CHROME SLEEVES
PLATE-LIFTING CLAMPS



ARC WELDERS
SPOT WELDERS
PROFILE CUTTERS
STRAIGHT LINE AND CIRCLE CUTTERS
PIPE BEVELLING MACHINES
CABLE
ELECTRODE HOLDERS
EARTH CLAMPS
HANDSCREENS
HELMETS
GLOVES
APRONS
POSITIONERS
TEMPILSTIKS

PREHEAT AND STRESS RELIEVING EQUIPMENT

★ WE SPECIALISE IN **PROPANE** FOR CUTTING - BRAZING - HEATING - LEAD MELTING - BENDING PVC PIPES - FLOODLIGHTS.
★ WE REPAIR AND SERVICE EXCHANGE ALL MAKES OF GAS WELDING AND CUTTING EQUIPMENT.
★ WE GIVE YOU FREE ADVICE AND DEMONSTRATIONS.
★ WE HIRE ARC WELDING MACHINES.
★ WE CARRY THE WIDEST RANGE OF WELDING EQUIPMENT IN EIRE.
★ WE SPECIALISE IN ARGON-ARC AND CARBON-DIOXIDE EQUIPMENT.

USE SIFBRONZE FOR 100 p.c. LEAKPROOF JOINTS

Published by ARROW@TU Dublin, 1965

fluid at comparatively low temperatures, and give joints of high tensile strength. They are manufactured to the highest standard under strict laboratory control.

The standard grade, with a melting point of 740-780 degrees C., is ideal for use together with a lower melting alloy, where adjacent joints are brazed separately. Grade No. 6, with a melting point of 625-780 degrees C. in an inexpensive phosphorus containing alloy, giving good strong joints on copper without the use of flux. When used on brass, flux is necessary. It should not be used on steel or alloys containing more than 10 per cent. nickel.

The manufacturers are Fry's Metal Foundries Ltd. (Tandem Works, Merton Abbey, London, S.W.19).

JONES & Attwood Ltd. (Stourbridge, Worcestershire) market Jones' Pipe Cutters. The spare parts include handle (lever and socket portion), claw, bolt and nut to fix claw and eyebolt, eyebolt, washer used on eyebolt, adjusting nut used on eyebolt, shouldered links, end links, handle link and short end link; wheels, pins for shoulder links and wheels; pins for end link wheel, and spanner for large cutters only.

The range includes cutters for cutting pipes from ½" to 24" diameters. Catalogue No. 2322 cuts pipes from ½" to 2", while at the other end of the range, catalogue No. 2325 cuts pipes from 12" to 24". This cutter has two levers, which may be fixed at any angle by substituting the handle links for the other links.

INTERLAS Limited (Bury Mead Road, Hitchin, Herts.) introduce a new type of specially prepared high quality aluminium welding wire designed for inert gas welding applications. The wire can be obtained in all normal grades to BS.2901 either in 36" cut lengths for tungstem arc welding, or on nominal 1 lb. or 10 lb. spools for metal inert gas arc welding. Wire sizes range from .8 to 2.4 mm diameter.

The Mk. IV. Frequency Unit with inbuilt remote control circuit, voltage sensitive relay circuit for both AC and DC welding ("continuous" or "start only" switch) is complete with gas and water solenoid valves, post-flow timer assembly, and 400 amps single pole welding contractor.

Interlas Ltd. are also able to supply the new KGM Argon-Arc torches in addition to their wide range of other Argon and metal arc equipment.

SPECIAL REVIEW

from page sixteen

INDUSTRIAL Gases (I.F.S.) Ltd. are now making available a most comprehensive range of welding and cutting equipment in conjunction with their Associates, the British Oxygen Company Ltd., and British Industrial Gases Ltd. The equipment includes welding and brazing rods and fluxes.

The Company's new range of "M" type regulators covers all requirements with the gaugeless model being particularly suitable for site work. An extensive range of cuttings machines features the Pug portable straight line unit and the Cub Minor profile machine as the most popular models.

Fluxobronze, the flux-coated brazing rod, has grown in popularity, and Unibronse flux, a brazing flux for many applications and which was marketed for the first time last year, has also made a very good impression.

Arrangements have just been completed with Johnson Matthey Ltd. by which Industrial Gases (I.F.S.) Ltd. are now marketing the world famous range of Easi-flo silver solders, fluxes and specialised brazing alloys.

In the specialised field of welding aluminium and copper alloys, the demand for Argon arc process shows no sign of abating. With a new range of lightweight torches and the appropriate Quasi-Arc power sources (A.C.P. 300 A.C. transformer for aluminium and M.F.B. 225a D.C. generator for copper and stainless steel), this equipment is now within easy reach of most operators. Industrial Gases are at Bluebell, Dublin 12.



● **From the Interlas range (see Review).**

* * *

AB Bahco (Stockholm, Sweden) have published an interesting booklet on Primus equipment. Among the features are details of the Primus L.P. Gas Bottles numbers 2000, 2005, 2007, and 2010 with gas capacities from 0.34kg. to 1.95kg.

Illustrated with the Primus 2000 are the standard flame burner 8719 to be fitted on feed tube and valve 8716; chisel bit and holder 8339—bit 8379 fitted on bit holder 8430 and pin-point burner 8720; compete pin-point burner 2144, comprises feed tube end valve 8716 and burner 8720; fan tail burner 8723 to be fitted on feed tube and valve 8716, and the Propane Bottle 2000 itself which is suitable for lighter soldering work. The Irish agents for this equipment and the full Bahco range or Kjellbergs Successors A.B. (13 South Frederick Street, Dublin 2).



New Control

A NEW control has been introduced by Thomas Potterton Limited which, according to tests carried out by the manufacturer, saves up to £10 a year on the household fuel bills.

Called the Prefect, the new control operates the hot water system independently of the central heating, controls the hot water supply at a lower temperature than the water in the radiator circuit, and offers a choice of 12 different programmes.

The Prefect, in fact, consists of three items—an attractive, wall-mounted controller with an over-ride switch, a motorised valve, and a cylinder thermostat. These three items working in conjunction with a room thermostat give the householder a choice of 12 programmes for central heating and hot water supply.

Three factors produce the substantial fuel savings which can be gained via the Prefect: The hot water supply can be controlled at a lower temperature than the water in the radiator circuit.

Short cycling of the boiler is eliminated.

The central heating can be operated separately from the hot water supply (and vice versa).

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AT THE SERVICE OF THE

PLUMBING AND HEATING ENGINEER

- Gas Welding and Cutting Equipment
  Gas Rods - Fluxobronze
- Electric A.C. and D.C. Welding
  Plant - Electrodes
- Silver Solder - Brazing - Alloys
  and Fluxes

INDUSTRIAL GASES (I.F.S.) Ltd.
DUBLIN CORK



Illustrating THE WALDORF SUITE in 'PYRAMID' Vitreous China.

Johnson Slater

'PYRAMID'
Vitreous China

'WESTWOOD'
Fireclay Ware

Colours to match

Irish Foundries Ltd.
BATHS

JOHNSON & SLATER LIMITED

(Vitreous China Division)
ALFRED JOHNSON & SON LTD.
QUEENBOROUGH - KENT

(Sanitary Fireclay Division)
JOHN SLATER (STOKE) LTD.,
BERRY HILL, STOKE-ON-TRENT.

Agent:
C. BRINSLEY SHERIDAN
10, HERBERT PLACE, DUBLIN, 2. TELEPHONE: 66283.

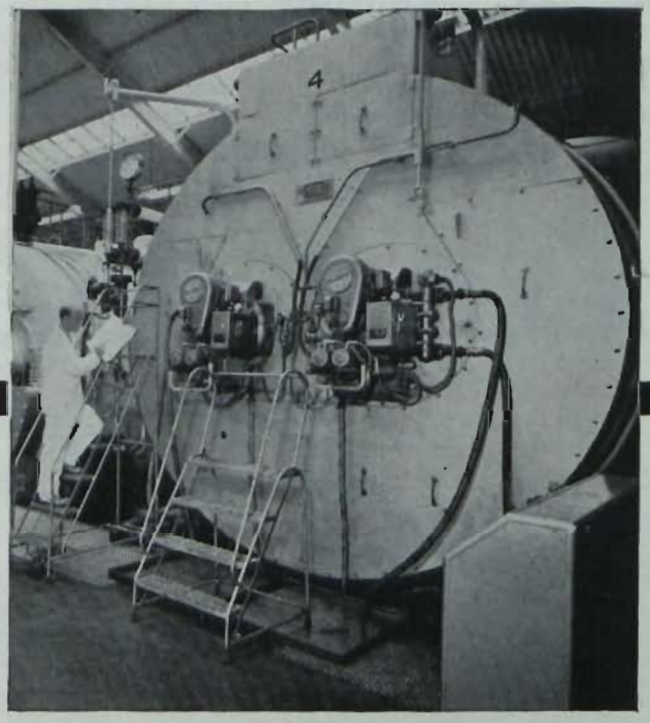
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Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1

FOR KING-SIZE STEAMPOWER

IT MUST BE MULTIPAC

(up to 40,000 lb/hr!)



EDINBURGH BREWERY CHOOSES OIL

30,000 lb/hr of steam from this oil-fired Multipac Package Boiler keeps the beer flowing fast and free for Scottish and Newcastle Breweries Ltd. Requiring only a few minutes attention each day, this compact and fully-automatic unit is capable of handling all your big steam-raising requirements up to 40,000 lb/hr. Already proven in refineries, chemical works, textile mills and car plants. An important plus — every Multipac is backed by the nation-wide Multipac Maintenance Service!

DONBROS BANKS ON COAL

Donbros Knitwear chose a coal-fired Multipac to supply 20,000 lb/hr of clean, economical steam-power for process and heating duties. The fully-automatic Multipac arrives complete with two Triumph Stokers, steam-tested and ready for immediate connection and commissioning by a Thompson Service Engineer. A neat package unit quickly and neatly installed!



JOHN THOMPSON GROUP

If you would like more proof of the sound economic value of Britain's best-selling package boiler—and of the superb Multipac Maintenance Service, write JOHN THOMPSON PACKAGE BOILER DIVISION, LILYBANK WORKS, LONDON ROAD, GLASGOW, E.1.

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industrial heating & ventilating IN IRELAND

trade Topics

FUEL ECONOMY HEVAC THEME

FUEL economy is the major theme of the International Heating, Ventilating and Air Conditioning Exhibition (HEVAC) at Olympia, London, next April.

It is the biggest International HEVAC ever held, almost 20 per cent. greater in area than last year's exhibition. Exhibitors' stands will cover almost 100,000 square feet and at least a dozen countries will be competing against the fast developing British industry.

International HEVAC 1966 is the only specialised exhibition of its kind in Europe during the year. Exhibits will range from biscuit-tin-size domestic heating equipment to multi-ton industrial plant.

The exhibition embraces refrigeration equipment, process heating, air handling and treatment, dust and fume extraction and all forms of domestic and industrial heating, cooling and ventilation. It deals with the industry in depth and includes methods of keeping air passengers comfortable, maintaining the health of factory workers and keeping the housewife free of

SPIRAX-SARCO HOLD DUBLIN RECEPTION

SPIRAX-SARCO Ltd. staged a well-attended function at the Intercontinental Hotel, Dublin, this month.

Among the newer pieces of equipment shown were:—

Sarco type 31D temperature regulator. This regulator is a development of the DP reducing valve and has many parts in common with the latter. A small, sensitive oil-filled thermostat controls a pilot valve through capillary tubing and no external power is required.

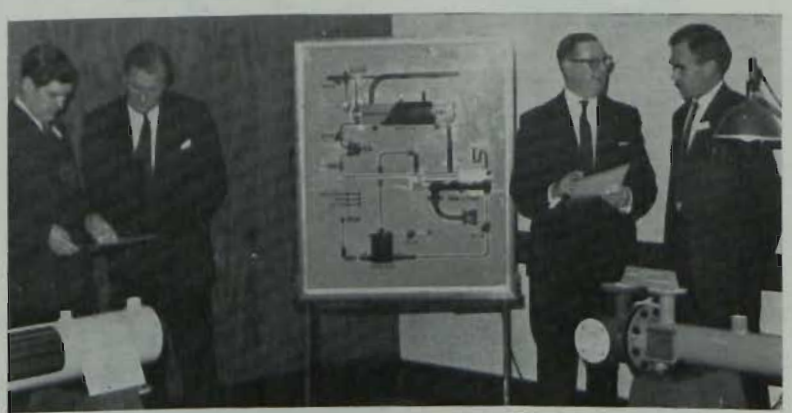
Spirax SM 250 bimetallic stem trap: This trap has been designed with the particular needs of the oil and chemical industries in mind. The trap holds back condensate until it has cooled below steam temperature.

Flow counter of Ogden pump: The well known Ogden automatic pump can now be supplied with a stroke counter which turns it into a simple and reliable steam meter. The counter can easily be fitted to existing pumps if required.

The new Cotswold and Charlton ranges of non-storage heating calorifiers use low-fin extended surface tubing for the tube bundles and this allows a significant reduction to be made in the overall dimensions compared with other calorifiers having the same output. The Cotswold calorifiers are steam to water units and the Charlton range are for high or medium temperature water to water.

The Sarco 201 control is for controlling heating calorifiers from outside air temperature.

The Spirax DP reducing valve is a single-seated diaphragm operated valve suitable for dead end service. The main valve is controlled by a pilot-valve giving sensitive and accurate control of downstream pressure. It is made in a range of sizes up to 2", and maximum upstream steam conditions are 250 p.s.i., 450 deg. F. It can also be used on compressed air.



● At Spirax-Sarco Ltd. reception at the Intercontinental Hotel this month were (from left): Mr. W. M. Barber, Technical Director; Mr. A. W. O'Neill, Merchant Warehousing Co. Ltd., Chief Engineer; Mr. Laurence Moses, Arthur Guinness, Son and Co. Ltd., and Mr. Palk, Spirax-Sarco Ltd.

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trade Topics

WANSON EXPAND HERE

THE Wanson Company Limited (Borehamwood, Hertfordshire), manufacturers of Thermobloc air heating equipment, have recently appointed Mr. T. A. Baird of Holmpatrick, Skerries, Co. Dublin, as their Irish Branch Manager. Mr. Baird has had wide experience of industrial heating equipment and will be responsible for consolidating Wanson's position in Eire.

Thermobloc oil and gas-fired air heating equipment is the result of continuous research and development and is available in a range of units from 200,000 B.t.u./h. to 16,000,000 B.t.u./h. It is backed by a widespread and well organised after-sales-service team.

The Wanson Company Limited were the pioneers of industrial warm-air heating equipment and have done much, probably more than anyone else, to popularise this modern and efficient form of heating.

INDUSTRIAL SECTION
continued page thirty-one.

in brief . . .

● THREE new L.P. Gas industrial infra-red radiant heaters, called the Porta-Radiant range, have just been introduced by Infradex Limited (21a Avenue Road, Southgate, N.14). Incorporating an effective adjustable bottle clamp stand, designed to enable radiant heater units to be attached simply and directly to L.P. gas bottles, the new range combines portability with ratings from 12,500 B.t.u./h. to 6,000 B.t.u./h. in the smallest model.

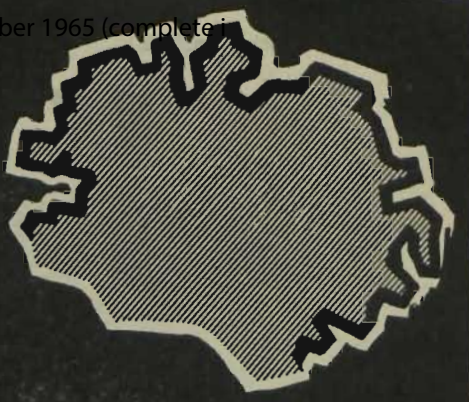
* * *

GEORGE Birkbeck Ltd. (23 Upper Mount St., Dublin 2), who are the agents for Newry Metal Fabrications Ltd., are now the sole importers of the Parlox Self-locking nut into the Republic. The Parlox self-locking nut can be obtained from stock in almost any varying size. The nut is produced with four different threads as standard, and special requirements can be obtained on application.

https://arrow.tudublin.ie/bsn/vol5/iss7/1
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et al.: The Irish Plumbing and Heating Engineer, October 1965 (complete i

Northern Ireland monthly review

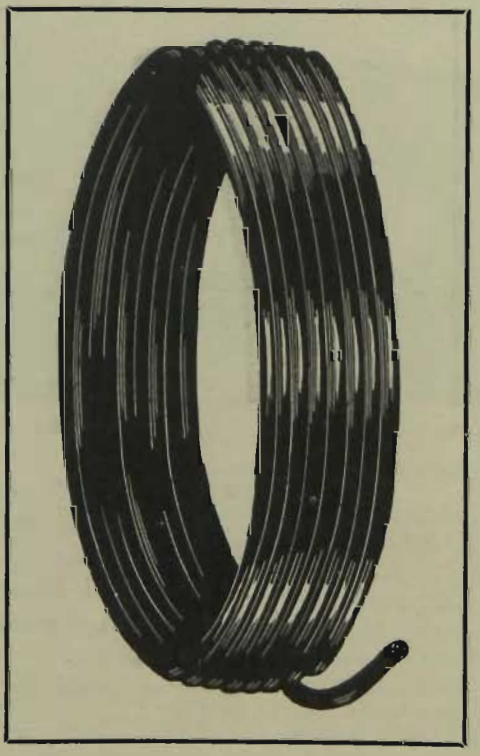


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NORTHERN IRELAND AGENT: Edward J. McBrien, Bank House, 142/146 Albert Bridge Road, Belfast.

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Northern NOTES

KEY TERRAIN SYSTEMS LAUNCHED

KEY Terrain Limited, a new Reed Paper Group Company, is now marketing a unique comprehensive drainage system incorporating pitch fibre, polypropylene (P P E) and polyvinlychloride (PVC). It provides a complete drainage system from the roof top to sewage works.

Four complete systems are available in plastic and two in pitch fibre. These systems comprise: PVC rainwater, PVC waste, PPE waste, PVC soil, pitch fibre soil and pitch fibre stack.

In addition to the pipes in three materials, the system comprises 250 fittings, of which more than half are new, and includes single and double branches, bath traps, vent connectors, soil stack bosses, gutters, couplings and shoes, with bore sizes ranging from 1¼ in. to 6 in. and up to 9 in. for drains. Most of the PVC fittings are available in grey or black with some bathroom fittings in white. Pitch fibre and PPE fittings are supplied only in black.

The new system has been achieved by offering the choice of either a PPE seal ring waste system for temperatures over 70°C, or a solvent welded PVC system for normal domestic waste, which discharges into a similarly jointed PVC stack. In turn, this flows into a dry jointed pitch fibre drain and subsequently into the pitch fibre sewer.

Enquiries should be addressed to:—In Northern Ireland: Norman MacNaughton & Sons Ltd., 101 Corporation Street, Belfast, 1. In Co. Armagh: Unidare Engineering Ltd., Unidare Works, Seago, Portadown. In the Republic: Unidare Ltd., Unidare Works, Finglas, Dublin, 11.

* * *

COPPERED WARM AIR RANGE

COPPERAD Ltd. have announced the introduction of a range of warm air circulators. The units belong to the Copperad pan convector family and have been designed to meet the demand of local authorities and estate developers for a compact high output heater suitable for installation in builders' work cabinets or cupboards in blocks of flats or housing estates.

The units are available in a wide variety of sizes with outputs from 7,000 to 52,500 B.t.u./h. The air inlet is at the base and a choice of five spigotted outlet apertures is offered which makes it possible for a single unit to simultaneously supply the requirements of a flat or maosonette by way of short lengths of ducting.

The units are fitted with three-speed motors and silent running is claimed as a particular feature. The units are also said to be suitable for heat metering by fan power consumption. Filters can be supplied as an optional extra

* * *

NEW LOOK HEATER SKIRTING

SPURLINE continuous-profile electrically heated skirting for complete or background heating of homes, offices and other buildings, is now available in a modern new styling to blend more readily with contemporary decor.

Spurline skirting is based on the principle of heating by combined radiation and convection from a low-temperature source extending over a large area, to eliminate fierce circulating currents and associated draughts. It is basilly a hollow metal skirting fitted onto or in place of conventional skirting boards, enclosing all electrical wiring and rod-type elements operating at 50 or 75 watts per foot, and incorporating continuous air intake and outlet louvres.

The skirting shell is supplied in standard lengths which can be cut to size and fitted with corner sections as a complete skirting.

When fitted with thermostatic and time controls to maintain a predetermined temperature, it is claimed that Spurline heated skirting is more efficient and up to 15 per cent. more economical than other electrical heat-

Continued overleaf



SUCCESSFUL GOLF OUTING



SANBRA Conex Ltd. (Tipton, Staffs.) recently held a golf outing at Royal Belfast Golf Club in conjunction with their agents, C. H. Lockhart Ltd. (16 Linenhall St., Belfast).

The outing was well attended by architects, consulting engineers, heating engineers and plumbers' merchants, and was followed by a reception at the Culloden Hotel.

Top picture shows (from left) Messrs. W. G. Smyth, H. Messe, E. Ollis, C. Munro, J. Rogers and J. M. Aitken. Left: Messrs. G. P. Marshall, R. J. Love and J. R. Hunter.

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from previous page

ing systems. The design obviates heat-staining of walls, by projecting the stream of warm air inwards at low velocity towards the centre of the room.

* * *

A NEW THERMOSTAT RANGE

PERFECTION Parts Ltd. (Union Street, London, S.E.1), sole U.K. agents for the range of products manufactured by Penn Controls Inc. of Indiana, U.S.A., announce the introduction to this country of the new Penn Click Dial range of thermostats.

The Penn Click Dial units are electric heat thermostats which feature an extremely small temperature differential of only ½ deg. F. The units are adjustable by a "click" dial setting to calibrations of 1 deg. and feature an unusually large sensing area of the tubular type liquid expansion element to provide quick response to both convective and radiant heat. They also feature a concealed dial lock which permits the locking of the temperature setting at any fixed level, and are also equipped with a new type of "straight in" terminal to provide easy installation.

Penn Click Dial thermostats are available in three types, 800A, 800B, and 800 AF. Type 800 A is a single pole unit and Type 800 B is a double pole. Overall dimensions of the units are 3" wide, 5 1/8" high x 13/16" deep. Types 800 A and 800 B have a temperature range of 40—84 degrees F.

* * *

TO SUIT DOMESTIC MARKET

CORRIE, MacColl & Son, Limited, announce the newly designed Herz-Dr (formerly Herz-As) and Rapid valves in ½" size with compression fitting. The Herz-Dr and Rapid valves are already widely used in larger installations, but the compression fitting now makes them suitable for the domestic market.

The development of the fitting has been carried out after considerable research and the valve body is a completely new casting so that the compression nut fits externally. A tight seal can be made with only a light pressure on the nut, and the olive—made of a specail alloy—can be reused.

The Herz-Dr. valve is a double regulating valve capable of very fine regulation and at the same time extremely simple to operate.

* * *

in brief

● THE Marley Tile Company's plumbing division have now added to their extensive range of 4" injection moulded soil pipe fittings a double branch 104° with fully swept throats which, like the Marley single branches, meet the general design recommendations of B.S.C.P. 304/1953.

This fitting is immediately available from stock in either black or grey and is supplied either plain or with single or double mounted bosses to receive 1¼", 1½" and 2" wastes, etc.

● MR. John Harris Chislett has been appointed Sales Director of O.B.C. Limited, of Droitwich. Mr. Chislett, who joined the company five years ago, has been the company's sales manager for the past three years.

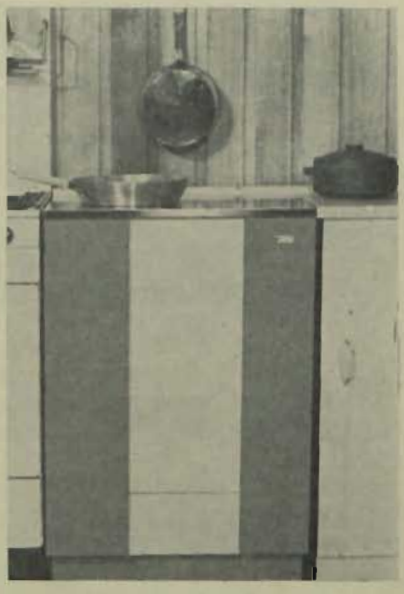
PEGLERS BELMONT VALVE

THE new Belmont thermostatic radiator valve for controlling individual radiators within a hot water central heating system, and which incorporates a new type of thermostat operated by room air temperature, is being introduced by Peglers Ltd. (Belmont Works, Doncaster).

Developed in conjunction with Teddington Autocontrols Ltd. (Sunbury-on-Thames, Middlesex), the new valve can be fitted in place of the standard Belmont angle-pattern, wheel-operated, valve, or others with the same centre-to-centre measurements (i.e., 2¾ inch).

Changes in air temperature are sensed rapidly by a liquid encased in flexible metal bellows which consequently expand or contract on a rise or fall in temperature. The movement is transmitted to the valve head which opens or closes the valve itself, so controlling the flow of hot water into the radiator.

The headwork is calibrated in nine temperature settings, ranging from 45 deg. F (7 deg. C) to 80 deg. F (25 deg. C), selection being by a simple rotating control knob which increases or slackens pressure on a range spring regulating the bellows. With the control knob turned to maximum heat, it follows that maximum pressure is required to be exerted by the bellows before they can expand enough to operate the valve to shut off the water flow.



Radiation's new gas-fired unit

THE new 45,000 Bt.u./hr. Radiation Heatmaster gas fired small bore central heating unit combines high speed heating up, more sensitive control than hitherto possible, competitive running costs — both achieved by its unique modulating device—sleek, modern styling and wide flexibility of installation.

Pictured here is the Heatmaster in its freestanding form. Measuring 36in. high, 25in. wide, and 16in. deep, it levels up with standard kitchen equipment, and a stainless steel top provides an additional kitchen work surface. Without its outer case the unit is light and compact enough to be wall-mounted at high level, tucked away under a draining board or in a cupboard under the stairs.

* * *

FLAMELITE BOILERS RANGE

A NEW range of Flamelite boilers to supersede the Flamelux boilers which were produced by Mef Engineering Company, has been announced. The Flamelite boilers, available in sizes from 40,000 to 100,000 B.t.u./h., are

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from previous page

to a new design and incorporate advanced features.

Precision engineered, they are fitted with Kingsway wallflame burner and complete with fire valve. Output is guaranteed by boiler rating certificate issued with every boiler in the range.

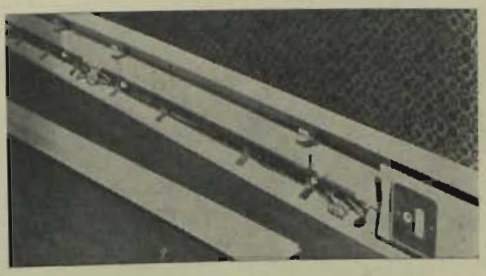
Full automatic operation is with accurate temperature control. The boilers are also fitted with a built-in, non-mechanical flue break.

Safety in operation is ensured by a probe mounted directly into combustion chamber to comply with the latest B.S.S. The boiler casing is easily removed without disturbing flue, to readily allow maintenance and cleaning.

* * *

DOUBLE DUTY BOILER

THE CTC Series 170 Double Duty boiler, already available for operation on either oil or solid fuel, can now be supplied complete with burner and controls for gas firing. This means that this compact domestic boiler is now offered for operation on any of the three principal fuels used for central heating and domestic hot water supply.



● **Spurline electrically heated skirting (see report page twenty-five).**

The versatile CTC Series 170, available from CTC Heat (London) Ltd. (17 Sloane Street, London, S.W.1) has an output of up to 70,000 B.t.u./h. per hour.

Developed in Scandinavia, the Series 170 incorporates a built-in galvanised or copper-lined indirect cylinder, manually-controlled mixing valve, boiler thermostat and the burner and controls appropriate to the fuel used. One of the principal advantages of this "packaged" unit is the provision of the built-in cylinder.

* * *

SAUNDERS SOLVE VALVE PROBLEM

THE problem of operating valves automatically in remote and isolated areas — particularly where no mains power supply is available—has been overcome by Saunders Valve Company Limited, Cwmbran, Monmouthshire.

They have designed and developed a revolutionary new method of valve actuation which is so versatile that it can be operated from a DC or AC source of any voltage, adjusted to a nominal DC voltage at the actuator. Thus an ordinary car battery can successfully be used.

The unit is compact and self-contained and there is no need for ancillary equipment such as compressors and other units. The valve actuation is based on the electrolytic principle. When current is passed through the electrolyte, hydrogen and oxygen gasses are created causing a pressure build-up until the operating diaphragm opens. Safety devices incorporated in the system prevent further expansion once the valve is open.

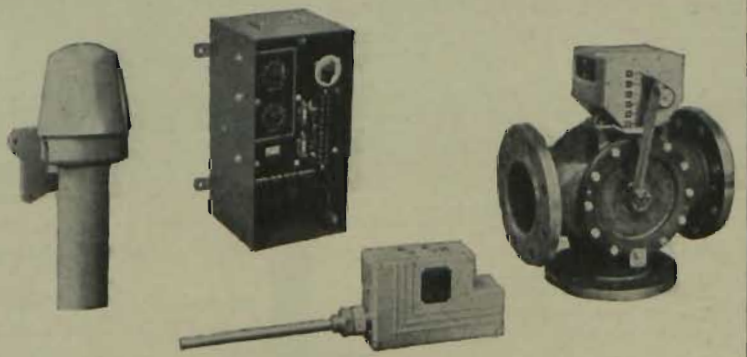
To close the valve, the gaseous mixture is ignited by means of a glow-plug. The hydrogen and oxygen then re-combine to form water and immediately the operating pressure disappears and the valve is closed.

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'of course, Temple pre-fabricated units with the new 'O' ring joints were used'

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By F. R. McBRIDE, A.M.I.Mech.E., M.Inst.F.



INDUSTRIAL SPACE HEATING

PART TWO

TYPES of Heating Systems.—When the heating requirements are known and the use to which the building is to be put are also known, it is usually relatively simple to select a suitable type of heating and this selection will most likely be made from one of the following systems:—

(1) Conventional Radiators;
(2) Radiant Heating;
(3) Hot Air;
(4) Under Floor Heating.

These four systems are in turn subdivided into various categories.

The older industrial units were mostly warmed by long lines of pipes at high level usually heated by hot water or steam; however, in most modern plants these pipes have been replaced by radiators for the simple reason that a radiator of a given length has a much greater output than an equal length of pipe.

Let us examine first the requirements of the standard and most common system, the **low pressure hot water system.**

In this system water is heated in a boiler and it circulates either by gravity or with the aid of a pump through the pipes and the chosen heating media.

The variation in the water temperature between the flow and return at the boiler can vary between 20°F and 100°F with the flow temperature usually 180°F.

IF the building is small a gravity system may be installed, though these are gradually losing favour; the water temperature difference is usually about 40°F.

Where a circulating pump is used the differential is usually calculated on a figure of 20°F.

It may be asked why add to the initial expense by using a pump. The facts are that it is most likely that the installation of this additional piece of equipment will reduce the cost as it will permit the use of smaller pipes and smaller radiators. In addition it will be possible to raise heat much quicker and maintain a generally higher temperature in the pipes and radiators.

The manufacturers of circulating pumps have now overcome all their earlier difficulties and nowadays one seldom hears of breakdown or failures.

OF recent years there has been a tendency by consulting engineers to break away from low pressure systems to the medium and high pressure hot water systems, particularly for the larger installations.

It has also become common practice to use specially adapted steam boilers as the source of heat, and while initially there were a few cases of corrosion at the back end of the boilers due to low exit gas temperatures, this has now been overcome, as the manufacturers realised the problem and amended their designs accordingly.

Medium pressure systems are, as their name implies, closed systems and operate at pressures higher than atmospheric and thus water or steam temperatures in excess of 212°F can be used. The usual operating pressure is in the region of 30 to 50 lb./sq. inch giving flow temperatures of up to 280°F, but there has been a trend to design for pressures in excess of those aforementioned.

The higher temperature water is normally found to be used in conjunction with radiant panels, convectors and unit heaters.

In installations like schools or hospitals where there may be a number of buildings spread over a large area, it may be decided to install a central boiler house from which water heated at medium pressure would be distributed to the various buildings in which by the use of mixing valves the flow and return temperatures are mixed prior to circulating round that particular building at a lower temperature.

From the medium pressure hot water system has developed the high pressure hot water system, which is basically the same as the former but, as the name implies, much higher pressures are utilised. The average pressure used to-day is about 150 lb./sq. inch but as in the case of the medium pressure, figures in excess of the foregoing figure are becoming common-place. Various methods for generating higher pressures are used from the use of pumps to the use of gas.

NATURALLY, the use of higher pressures necessitates the installation of special pipes, valves, etc., but on the other hand less water has to be circulated, and where pipe runs are of excessive length the higher temperatures prove themselves beneficial.

Among the great advantages of high pressure hot water heating are:—

(1) Flexibility;
(2) Great capacity of heat storage;
(3) As it is a closed system there should be little or no scale problems.
(4) Small mains.

Steam Heating.—All the systems we have so far discussed have used water as the heating media; let us now consider the use of steam, which is the most common source of heat among the larger industrial users.

The use of steam allows less radiating surface to be called upon than in the case of hot water.

If, for example, an average steam temperature of 220°F is available and we compared this with water at 160°F, then if there is an air temperature of 60°F calculations indicate that the transmission factor for steam is 1.8 times more than that for hot water.

Though the use of steam allows less heating surface, this is somewhat nullified by the fact that steam heating equipment is more expensive than

Continued overleaf

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Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1

Space heating

from previous page

that required for hot water as is the attendant pipework.

Another disadvantage is the high surface temperature of the pipework, radiators, etc.; these can be uncomfortable to human touch and it is for this reason that steam is seldom used in offices or schools but instead it is more applicable to factories and stores where the heating is most likely to be at high level.

Radiant Panels.—Radiant panels are just a special form of radiator. The panels are usually a flat panel with waterways on the back. They could nearly be described as a radiator cut in half and then a piece of flat plate welded on to one of the remaining sections to seal off the waterways.

The flat surface at a low temperature is accepted as giving a greater degree of comfort than a smaller and much hotter surface; in addition there is much less air movement.

It is essential that the back of the panels be fully insulated and in the average installation it is found that the best position for radiant panels is about 9 feet from ground level.

Hot Air Heating.—As the writer has already, in a previous article in this series published in I.P.H.E., given a comprehensive coverage to the use of free standing hot air heaters for factory heating, it is not proposed to deal with this section again.

The most popular form of hot air heating is the unit heater. This is a grill similar to that of a car radiator through which steam or hot water passes and behind which there is a fan. Such heaters can have a considerable air throw as the output of the heater varies from between 200 and 3,000 feet per minute, the latter of which would be equal to a hot air throw of 250 feet approximately.

The amount of fresh air coming into the room controls the output of the heater and the temperature of the air coming from it, and in some concerns the choice is made in favour of unit heaters because it ensures plenty of ventilation in a factory; on the other hand, they should not be used in an area where there is a lot of dust or where air movement is to be a minimum.

Underfloor Heating. — Finally we come to underfloor heating, the least popular, as yet, of modern heating methods.

The writer does not know as yet of a case where underfloor heating has been extensively used for the production spaces; it is, however, regularly used for offices, hotels, showrooms, shops, schools, etc.

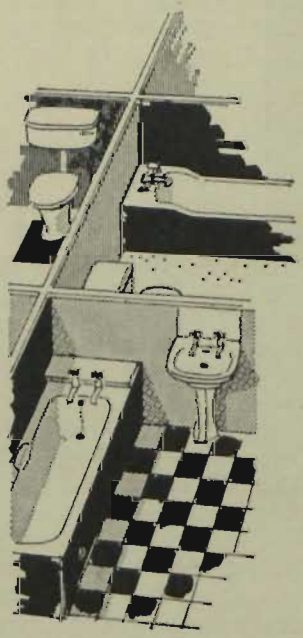
Most people associate underfloor heating only with electricity, but this of course is not correct as hot water passing through copper pipes or coils embedded in the screed is quite a usual method of installation.

To facilitate the use of copper special formers are available as it a special grade of pipe which is softer than that usually installed in more normal installations.

The main disadvantage of underfloor heating is that it does not react nor is it as flexible as the more conventional methods; on the other hand it provides a form of heating that is unseen and that leaves floor and wall spaces absolutely clear.

No doubt the immediate future will bring forward new forms of heating involving new methods of installation, and who knows someone may experiment with a solar system as has been done in America, France and Egypt, but maybe the first problem to be solved is how to get adequate sunshine to provide the initial source of heat.

(CONCLUDED).



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trade Topics

CRAMPTONS OPEN NEW HEADQUARTERS

ARCHITECTS, builders, surveyors and engineers were among the attendance of over 300 when G. and T. Crampton Ltd., the Dublin building and civil engineering contractors, showed them their new head office, joinery works and stores at Shelbourne Road.

The viewing party were conducted on a tour of the new premises by the company's Chairman, Mr. G. H. C. Crampton.

At a reception later Mr. Crampton outlined the history of the company since its foundation in 1879 by George J. Crampton.

The Company has been employed by the Dublin Corporation almost continually since 1926 to the present time in its housing projects, and during 1935 they completed 750 dwellings for the Corporation in one year. The company has built four completely new hospitals—Holles Street National Maternity, St. Luke's, Rathgar, Ballyowen, and Clonskeagh; Boland's bakery at Grand Canal Street; the Head Office of the Hospitals Trust at Ballsbridge; the premises of Cement Ltd. at Fitzwilliam Street; Players' Factory at Glasnevin; printing works for Messrs. Brown & Nolan, Hely, and Thom; the runways of the military aerodrome at Baldonnell; Wynn's Hotel, the Clarence Hotel, and the new Irish Intercontinental Hotels at Ballsbridge, Cork and Limerick—the two latter in association with P. J. Hegarty Ltd. of Cork; as well as substantial additions or alterations to Messrs. Guinness, and Jacob, and to six of the eight Irish banks. At present they are building the new Trinity College library. Recently the company erected the United States Embassy at Ballsbridge to the design of an American architect, and were honoured by having their name mentioned in the Congressional Record.

The latest building operations, of course, concern themselves and their new Shelbourne Road headquarters.

A NEW publication—Tapes For Industry—has been produced to help manufacturers identify and select the products which best suit their requirements in the field of self-adhesive tapes and labels, and tape applying machinery. The Industrial Division of Sellotape Products Limited (54-58 High St., Edgware, Middlesex) markets over 80 products, and the characteristics, dimensions and properties of these are set out in a series of

INDUSTRIAL SECTION

continued from page 22

VAN DEN BOSCH Ltd. (Europair House, Alexandra Road, Wimbledon, S.W.19) have introduced a new range of Eurovent polypropylene diffusers. The diffusers, which are a development of the plate valve, are made from non-corrosive polypropylene plastic. In three sizes, they are suitable for extract or inlet use, are extremely light and have a low sound rating.

'If you are looking for pumps', they said

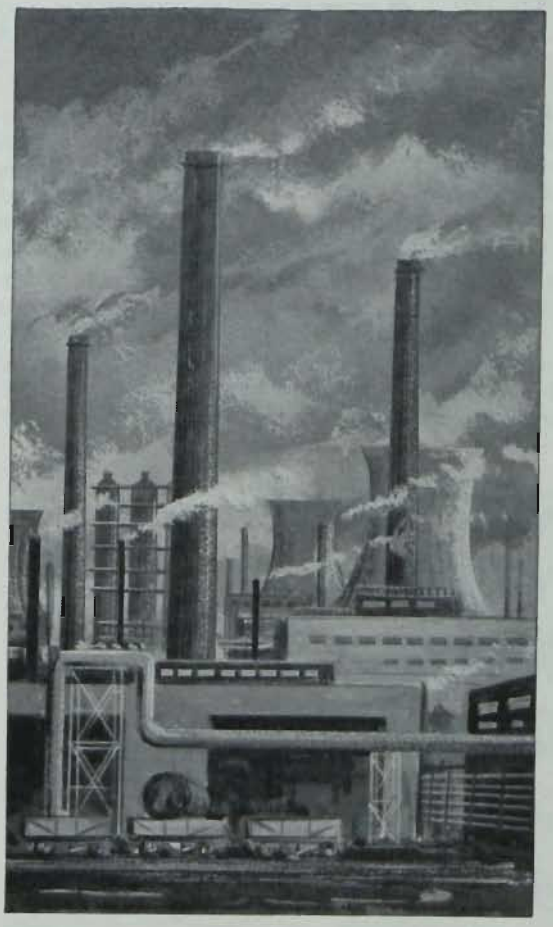
'you are most likely to get the ones you need from Worthington-Simpson', they said

Worthington-Simpson Ltd

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MAKERS OF THE LARGEST RANGE OF PUMPS IN THE COUNTRY

Published by ARROW@TU Dublin, 1965



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VOKES FILTERS

A COMPLETE FILTRATION SERVICE

Vokes have led the world in scientific filtration for over 30 years, offering a comprehensive range of filters for all kinds of applications. And filters are only part of the complete Vokes filtration service. This includes: filter development and research activities in our large Henley Park laboratories; help and advice in filter selection and installation; a filter servicing scheme to keep installations at peak operating efficiency.

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SOLE AGENTS FOR VOKES AIR, OIL AND FLUID FILTERS

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- 500,000 B.t.u./hr.
- Over 82% efficiency.
- Outlet head included for vertical free-standing models.
- Horizontal or vertical models.
- Ducted models available.
- New high efficiency combustion head gives permanently clean flame.
- Nozzle and flame position visible during operation—simple to adjust.
- Photo-electric burner control.
- Complete range of oil heaters now. HO/VO 100, 200, 300, 500. CO 600, 800 1000.

Other products include Gas Fired Air Heaters (Vertical Horizontal); Gas Radiant Heaters, Gas Fired Convector Heater, Electrostatic Air Cleaning Equipment and Mechanical Dust Collectors.



Further details, data sheets, etc., available. Please write to:

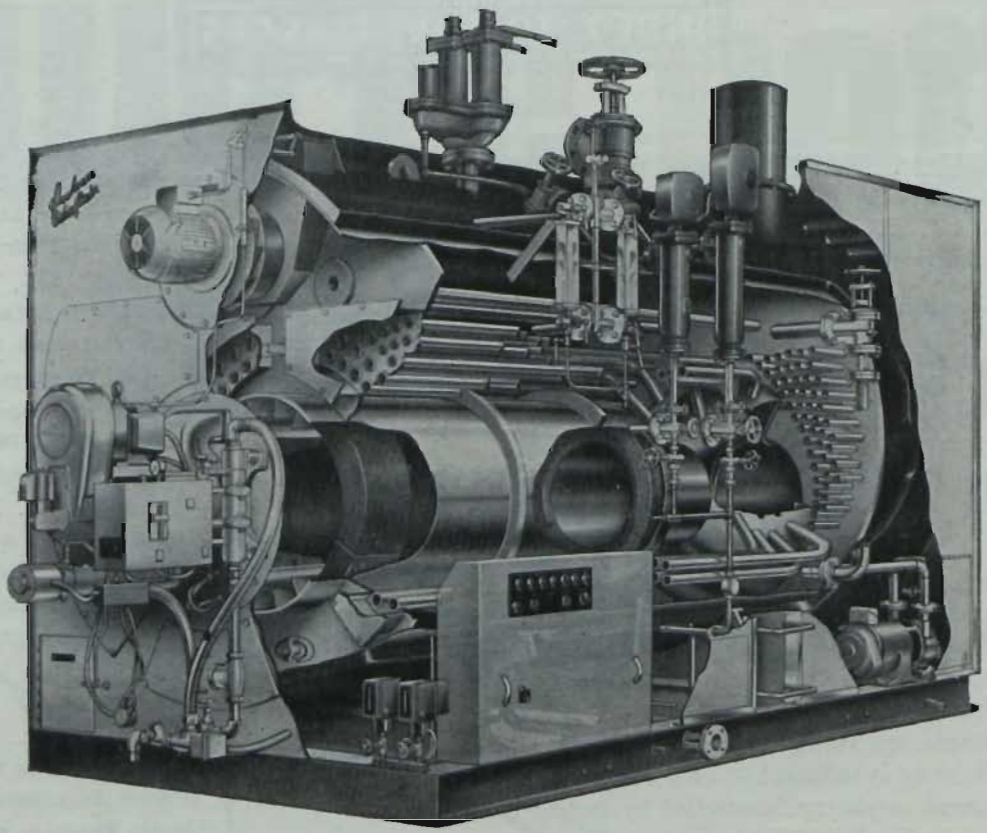
HARRIS ENGINEERING CO. LTD.

KILLOWEN STREET, COLERAINE, NORTHERN IRELAND

Telephone COLERAINE 2315

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What's so special about the Chieftain?

Plenty. It is, for instance, exceptionally quiet in operation, cool running and most economical in floor space. It ranks as an outstanding 3-pass, oil-fired boiler. It is fully automatic with optional superheaters. It offers excellent internal accessibility. And that's not all. Dominating other important advantages is its performance—rated at 85% gross c.v. efficiency. Small wonder, then, that demand runs high for the Chieftain—the finest boiler of its type available in Europe today. Write now for details to **Cochran & Co. Annan Limited,** Annan, Dumfriesshire, Scotland. Agents: S. W. Carty & Son, 12 Lower Mount Street, Dublin 2. Southern Engineering Co. Ltd., Parnell Place, Cork. W. H. Scott & Son, Ann Street, Belfast.

COCHRAN CHIEFTAIN BOILER

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Lagging alone cannot prevent freezing, it can only delay it. Isotapes — flexible electrical heating tapes — give complete frost protection however low the temperature and however long the cold spell. Resistance elements are embedded in tough high temperature P.V.C. The terminations are at one end and straight tracing or spiralling of the tapes on to the pipe is quick and simple. Mostly used on mains voltages, low voltage tapes available too. Under thermal lagging a minimum of electricity is sufficient to keep the pipe above freezing point in even the most extreme conditions, controlled by Isopad thermostats.





These shots are from the Isotape 16mm colour film "Ready for Winter".

Straight traced or spiralled depending on pipe bore, etc.

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we're talking proven, long-life, oil-fired air heaters

The latest free-standing oil-fired air heaters on the market are three units from Allied Ironfounders, with outputs of 250,000, 500,000 and 750,000 Btu/hr. The standard temperature rise through the units is 90°F, and heaters with higher or lower temperature changes are available. All three are supplied with either discharge heads or flanges for duct connection. Careful design, development and testing have proved that these air heaters have long life, and need minimum maintenance.

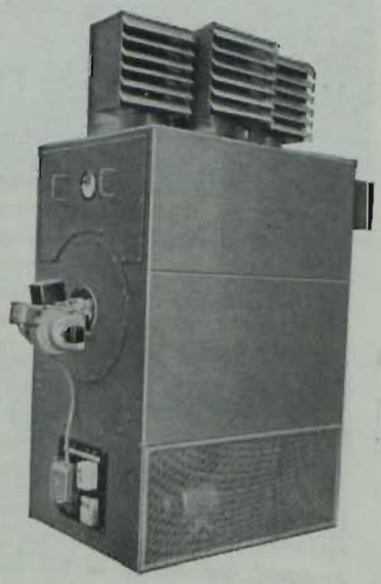
* **CONFLOW HEAT EXCHANGER** Conflow design, where cold air is forced directly over the combustion tube, reduces the surface temperature of the heat exchanger. Greater thicknesses of metal are used than normally found in a Conflow unit. Both these features significantly increase the life of the heater.

* **INDEPENDENT OF CHIMNEY DRAUGHT** High-pressure fan supplies combustion air, avoiding the complication of induced-draught fans.

* **SAFE—RELIABLE** Automatic protection against overloading of blower fan, overheating of burner, and flame failure. Oil burner control unit has been proved reliable over a long period.

* **NO EXTRAS—READY FOR INSTALLATION** All accessories are supplied. Just position the unit, connect up the flue, electric and oil supplies, and the heater is ready for use.

* **SUMMER VENTILATION** A manual fan switch allows the blower unit to be used for summer ventilation.



Full details of these remarkable low-cost long-life heaters are yours for the asking. Telephone SUNbury 5577 or write:

Industrial Heating Division, Allied Ironfounders Ltd., Sunbury-on-Thames, Middlesex.

OIL-FIRED AIR HEATERS MADE BY ALLIED IRONFOUNDERS

Published by ARROW@TU Dublin, 1965

The Irish Plumbing and Heating Engineer.

A Special Correspondent on . . .

Refrigeration in industry today

ANY attempt to describe the specific applications of refrigeration in industry must be doomed to failure, for their number is legion. Every day, further problems are solved, new processes are made possible and production is speeded—by refrigeration.

Refrigeration provides the answer to such problems as chocolate, which does not solidify during hot weather, optical lenses that slip beneath a polishing wheel, liquids that do not absorb a certain gas and solids that will not precipitate from liquids. Add to this brief, representative list ,refrigeration's usage for food preservation, commercially as well as domestically, the manufacture of ice and, in the guise of air conditioning, the control of atmospheric conditions, and some idea is obtained of to-day's importance of the refrigeration, and air conditioning, industry.

The enormous total of specific industrial applications of refrigeration can be classified under approximately seven basic applications. By employing one, or a combination, of these basic applications manufacturing processes may be carried out with increased efficiency and without interruption. Control of temperature, and sometimes of humidity, enables products of consistent quality to be produced economically and to be stored under optimum conditions, thus preventing deterioration and wastage.

The capacity of water and beer to absorb carbon dioxide is increased with reduction in temperature and, therefore, in the production of carbonated beverages and beer for bottling, refrigeration is used to chill the liquid prior to carbonation.

WHEREAS the ability of water to contain gas is increased with a reduction in temperature, the ability of a liquid to retain solids in solution is lowered by reduction in temperature. Refrigeration is used for cooling wine to bring tartrates out of solution and for cooling essential oils employed in the preparation of perfumes in order to precipitate solids. In heavy industrtries the same procedure removes sodium carbonate from cyanide solutions used in electroplating as well as ferrous sulphate from acid pickle liquors.

In the production of chocolate confectionery, refrigeration is used to remove sensible and latent heat in order to speed the setting of the chocolate and to prevent production stoppages during hot weather. Other similar examples are the setting of fat and wax base preparations such as polishes and toilet products. The use of controlled, predetermined temperatures not only ensures constant production flow rates but also enables a strict control to be exercised on quality.

Whenever energy is expended, heat will be generated whether the source of the energy is chemical, electrical or mechanical. Frequently, the effect of this heat is undesirable and must, therefore, be removed before it is absorbed to create a rise in temperature. Exemplifying this is the immersion of yarns or fabrics in a strong alkaline solution of caustic soda to produce added lustre. Chemical reactions occur which liberate heat which, if not removed by refrigeration, would raise the temperature of the solution with advere effects on the quality of the finished product.

PRECISION grinding, lapping and honing demand the maintenance of very close tolerances. The work and the wheel are cooled by a cutting fluid which, by absorbing the process heat, itself increases in temperature. If this increase in temperature is allowed to progressively increase the machining limits will be exceeded, the life of the wheel will be shortened and production will suffer. The answer is obvious: a refrigeration installation to remove the process heat.

Further industrial examples of refrigeration applications include the shrinking of components to obtain an expansion fit, the alteration of the internal structure of certain materials, the hardening of rubber for processing and the rapid conversion of austenite into martensite in the production of tool steel, a process which calls for temperature as low as 120°F.

The solution of the problem caused by the lenses which slipped when being polished again indicates the diversity of refrigeration's services. The use of mechanical holding jigs would damage the lense so the lenses were held by the differences in coefficient of expansions between the glass and a pitch mounting.

After polishing, the lense and its pitch mounting were refrigerated and the bond broken without any possibility of scratching or marking on the finished lense.

THESE few basic applications of refrigeration indicate the extent of the field. With the introduction of new processes and new materials, the demand for increased productivity coupled with quality control, there are few industries which cannot benefit by the use of refrigeration.

Throughout this article reference has been made to actual installations carried out by Frigidaire Division of General Motors Ltd., whose activities range from the household refrigerator to obtaining temperatures below 100°F., as well as all types of air conditioning installations.



Visitors . . . .

A PARTY of British journalists recently visited Unidare Ltd., Finglas, and made a tour of inspection of the plant. The party was welcomed by Mr. P. H. Greer, Managing Director, and were told that 50 per cent. of the entire output was exported.

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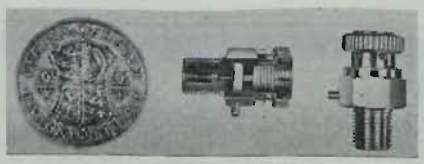
et al.: The Irish Plumbing and Heating Engineer, October 1965 (complete i

trade Topics

Advances in new Taco vents range

TACO Vents are, say its manufacturers intended to replace the common radiator valve and provide a method of manually and automatically allowing trapped air to escape from central heating systems.

The series 417/418/419 Taco vents are an advanced design and development of the air vents which Taco have been supplying to the central heating industry throughout the world for many years. This new range of vents, because of their ability to withstand comparatively high pressures, are particularly suitable for use in the modern tall buildings.

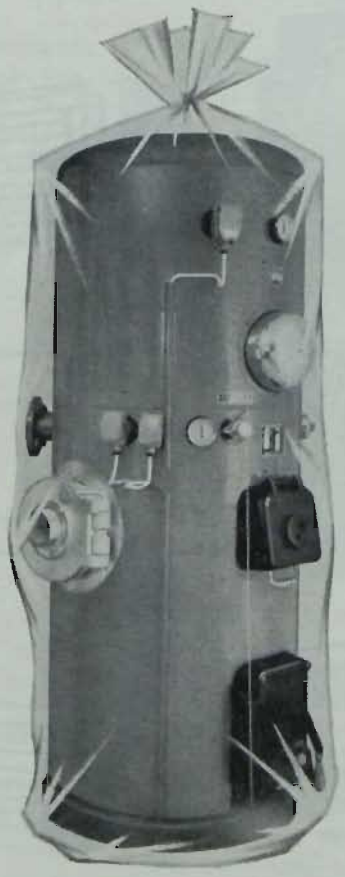


● **New Taco vents.**

The main operating part of the Taco vent consists of fibre washers manufactured from a special material. The washers swell on contact with water and effectively close the escape holes of the vent.

Therefore, on the initial installation of the Super-Vent, air trapped in the system will escape but as soon as water is present the fibre washers swell and seal the system. Should air again accumulate the fibres will dry, releasing the air and the process already described will be repeated.

A method for manual quick venting is incorporated in the Super Vent to enable air venting to be accelerated should this be desired. Should the manual venting head ever be completely removed, no escape of water from the system will be experienced due to the inclusion of a small back pressure valve which automatically closes the vent channel and prevents water escape. The vents are distributed by Anglo-Nordic Burner Products Limited, 74 London Road, Kingston-upon-Thames, Surrey.



Package deal

Hoval send complete boiler installation—you fit it and forget it!

From the moment of delivery Hoval make boiler installation fast and easy for you. *All* fitments arrive together, from one maker—Hoval. So there's only one set of paperwork to deal with. *The calorifier is contained within the boiler!* Installation can take as little as one day! Hoval guarantee all parts of their boilers, and once you've fitted a Hoval, you forget it. Your customers will soon be asking about the Hoval's 20% saving *or more* in running costs and greater heat capacity. Why not anticipate them?

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TKD (400,000–4,000,000 BTU's/hr) with pressurised combustion and high efficiency. All boilers are of welded steel and compact for their capacity, actually *contain* the calorifier and are offered with fully automatic controls. Heating only boilers are also available. Fast delivery of all models.

Our technical advisory service is ready to assist you.
Send for illustrated literature to:-

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All boilers are manufactured at:

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The Farrar Boilerworks Limited,
Newark-on-Trent, Notts.



● **All round band in use.**

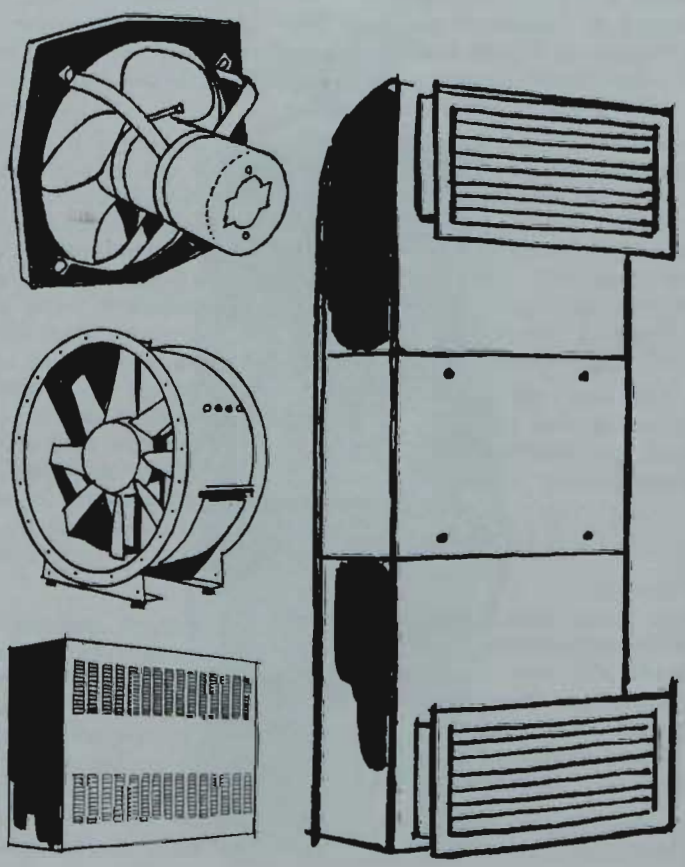
Fixing medium

Available here from M. D. McGrath (48 Townsend St., Dublin 2), All Round Band provides easy installation and convenient handling by the heating engineer of piping, etc. A.R.B. gives uniform mechanical strength, is easily bent and shaped and is supplied in 1, ½ and ¾ in. widths.

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Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1

THERE'S SOMETHING SPECIAL ABOUT FINUCANE...



W. Finucane & Co. are agents in Eire for Fenton Byrn. Fenton Byrn design, manufacture and service heating and ventilating equipment which is making a big impression on people who matter. For further details contact Finucane.

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Reporting

WE REPORT HERE THE RECENT EXHIBITION STAGED AT THE INTERCONTINENTAL HOTEL BY W. FINUCANE & CO.—THE LARGEST PRIVATE EXHIBITION OF ITS KIND HELD HERE.

W. Finucane and Co. Exhibition was highly successful

THE trade this month saw one of the most ambitious and successful exhibitions of its kind staged at the Montrose Hotel, Dublin.

The exhibition, organised by W. Finucane & Company, the leading engineers' agents, of 5 Upper Pembroke Street, Dublin 2, drew an exceptional attendance of consulting engineers, contractors, works engineers, technical representatives of government departments, the State and semi-State companies and important private concerns.

Said Mr. Wm. Finucane after the 3-day exhibition: "We are very satisfied with the results. We believe we have provided a unique opportunity for interested parties to view such a wide range of equipment."

Thousands of pounds worth of equipment was on show at the exhibition, which was mounted only after months of careful planning and organisation.

One of the biggest problems to be overcome by Mr. Finucane was that of fixing a date for the exhibition which would not clash with exhibitors' commitments to other shows outside the country.



Mr. William Finucane is seen in conversation with an exhibition visitor.

As it was the timing of the exhibition had to be arranged to follow the recent International Plumbing and Central Heating Exhibition in London without clashing with the forthcoming London Building Exhibition.

THIS hotel show was in fact the largest and most diversified private exhibition of equipment in the mechanical services of buildings ever to be held in this country.

Attendance included Consulting Engineers, Architects, Contractors, Technical staffs of Government Departments and State Companies, Institute of Standards and Research, Universities and Colleges of Technol-

Continued overleaf



● **LEFT: Mr. J. H. Jones, Carter Thermal Engineering Ltd.; Dr. R. E. Worthington, Goulding Fertilisers; Mr. J. F. Rickett, Carter Thermal Engineering Ltd.; and Mr. R. P. Burke, Goulding Fertilisers.**

● **RIGHT: Mr. A. McEvoy, Whessoe (Ireland) Ltd.; Mr. P. G. Stirling, Eltron (London), Ltd.; Mr. J. Finegan, Whessoe (Ireland) Ltd.**

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Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1

AQUAMISER
COOLING TOWERS
New!



the small duty BANTAM...

■ SAVE WATER by as much as 95 to 99% through recirculation after use. ■ EFFICIENT COOLING with continuous flow change over large surface area of corrosion proof long life PLASTIC PACK. ■ NO CLOGGING OR CORROSION with P.V.C. distribution unit that requires no setting up on site. Plastic treated Axial flow fan blades and totally enclosed motor. ■ REDUCE CLEANING TIME with hinged side panel and easily removed units. ■ FIVE SMALL SIZES 6′ 5″ high and base area from 2′ x 3′ 8″ to 4′ x 5′ 8″, supplied complete.

For small industrial, refrigeration and air conditioning applications.

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Thermal Engineering Ltd
Redhill Road · BIRMINGHAM 25 · Telephone: VICtoria 4300
London: Clarence Street · Richmond · Surrey · Tel: RIC 4560
AIRAJUST AIR CONDITIONERS · GYRA-FLO FANS
MIDAIRE FILTERS · RADIAIR COMFORT AIR TREATMENT

Our Agents for Ireland, W. FINUCANE & CO., exhibited at the Montrose Hotel, Dublin, on 12th-14th October.

EXHIBITION

from previous page

ogy. Industrial Concerns, Manufacturing Engineering Works, Shipbuilders and Engineers Merchants.

After the show the various exhibitors reported themselves very impressed by the degree of interest shown and the size of attendance. They were kept busy on all the stands during every minute of the exhibition. Their only regret was that the range of exhibits could not have been greater.

The interest shown by younger members of the Architects' profession particularly pleased the technical representatives on the stands as it shows a growing awareness of the important part now played by the mechanical engineer in the servicing of every class of modern structure.

In all seven leading firms took part in the show. Between them they provided comprehensive coverage of equipment in most all fields.

Fenton Byrn & Co. Limited of Surrey featured their range of forced

the exhibitors

Fenton Byrn & Co. Ltd. Surrey (manufacturers of Forced Fan Convectors, Axial Flow and Wall Fans).

Trox Bros. Limited, Middlesex (manufacturers of Air Distribution Equipment).

Carter Thermal Engineering Ltd., Birmingham (manufacturers of Water Cooling Towers and Chilling Plants, Air Handling and Filtration).

Spiral Tube & Components Ltd. Derby (manufacturers of Unit Heaters, Heater Batteries and Gilled Tubing).

Girdlestone Pumps Ltd., Suffolk (manufacturers of Pumping Sets, Steam Condensate Return Sets and Floatswitches).

Curwen & Newbery Ltd., Wiltshire (manufacturers of Draught Control Equipment, Draught Inducers, as well as Solid Fuel Burners).

Eltron Ltd., London (manufacturers of Electric Air Duct Heating, Oil, Fuel, Electric and Steam Electric Heaters—Industrial Process Heating Equipment).

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● **At the exhibiton with Mr. Finucane was Mr. Fitzpatrick, S. McCormick Ltd.**

from previous page

fan convectors, propellor, axial flow and wall fans. Applications of their convector range attracted keen interest.

Key factors in the range are the units' silent running qualities and high output in relation to size. Numbers of successful installations were instanced.

Trox Brothers Limited of Enfield, Middlesex, manufacturers of air distribution equipment, among the wide range of equipment featured emphasised their products in the filter and fire damper fields.

Their work in the field of silencers also attracted much interest and there was favourable comment among the attendance for their initiative in the provision of an acoustictic advisory service.

With the question of the conservation of our water resources coming in for increasing attention, the featuring of their water cooling towers by Carter Thermal Engineering Co. Ltd., of Birmingham, proved most interesting.

An installation of its cooling tower equipment at the Lever Bros. factory was featured. The company also manufacture chilling plants, air handling and filtration equipment and a range of centrifugal fans.

Spiral Tube and Components Limited of Derby are manufacturers of

Continued page forty-four.

SEE PICTURE REPORT OVERLEAF

AQUAMISER COOLING TOWERS



UNIVERSAL single cell

The Universal range, developed and perfected in operational conditions combines THE MOST EFFICIENT METHOD OF COOLING WITH THE HIGHEST POSSIBLE RATE OF WATER SAVING.
The basic unit of the Universal Aquamiser is the single cell. Compactly designed in fifteen sizes. Used singly or in multiples they can be conveniently sited even where space is restricted.

GREATER AIR DISTRIBUTION by induced draught — EVEN WATER SPREAD through adjustable distribution troughs — and IMPROVED HEAT TRANSFER through the larger surface area of a corrosion proof plastic pack — makes an AQUAMISER the most efficient and economical cooling tower available.
It will save as much as 95 — 99% of your water through recirculation and eliminate the fear of water shortage.

The lightweight 'DURAPACK' plastic pack.
A choice of other packings is available.



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RADIAIR COMFORT AIR TREATMENT • GYRA-FLO FANS
AIRAJUST AIR CONDITIONERS • MIDAIRE FILTERS

Our Agents for Ireland, W. FINUCANE & CO., exhibited at the Montrose Hotel, Dublin, on 12th-14th October.

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Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1





● **ABOVE: Mr. R. Hillman, Sales Manager, Trox Bros. Ltd.; Mr. R. Glinos; Varming & Mulcahy; Mr. J. Walsh, Varming & Mulcahy.**

● **ABOVE RIGHT: Mr. J. Ryan, Urney Chocolates; P. H. Riggs, Girdlestone Pumps; Mr. J. Fogarty, Urney, and Mr. J. Williams, Urney.**



● **ABOVE: Mr. R. B. Clayton, Spiral Tube, and Dr. J. Breen, Technical Adviser, Ceimici Teo.**

● **BELOW: Mr. Power, Mr. D. E. Ellis, Mr. I. H. Darling, all of Fenton Byrn & Co.; also Mr. E. A. Parkinson, Monasterevan, Co. Kildare.**



LINCOLN
WARM AIR CENTRAL HEATING
APPROVED INSTALLER

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22 MILLION PEOPLE WON'T WANT TO KNOW YOU

This Autumn, high impact, full colour press advertisements for Lincoln warm air central heating will be seen by over 22 million home conscious readers in journals like Ideal Home, Homes and Gardens and Reader's Digest. Lincoln installers will be making even bigger profits. Don't you want a share of the cake?

Installing Lincoln warm air makes sense. Lincoln Furnaces. Quality built to give trouble free installations. Bred in Canada's rigorous winters. Many unique features. For five years Lincoln have been warming British homes, so they really know about warm air.

Lincoln design service. When you are a Lincoln installer you just send the plans to Lincoln and they design the installations for you, free of charge. This saves you time and as everybody knows, time is money, so you win both ways.

The wide range of Lincoln Furnaces. The largest range of furnaces manufactured in the U.K. There is a Furnace for every installation. Lincoln ducting, purpose made ducting for every job. So, if you think you measure up to our high standards and like working with a company that likes working, then you deserve a share of the cake. Write for full information on Lincoln Furnaces, or ask our representative to visit you.

☐ Please send me fully illustrated literature.

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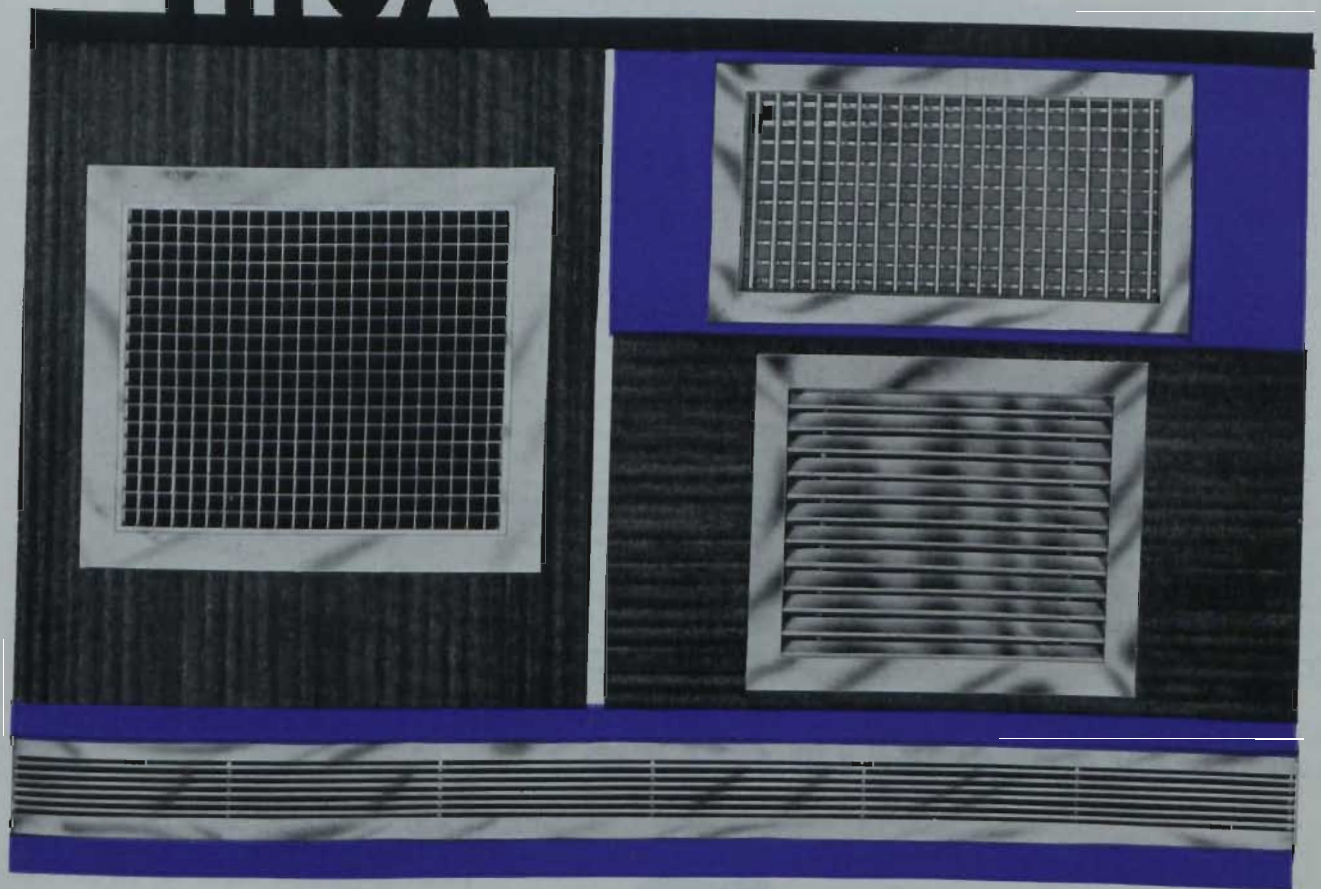
Lincoln Furnaces Ltd.

Area Representative, J. Fleck Esq., 12 Wynnland Road, Carmoney, Newtownabbey, Co. Antrim.

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et al.: The Irish Plumbing and Heating Engineer, October 1965 (complete i

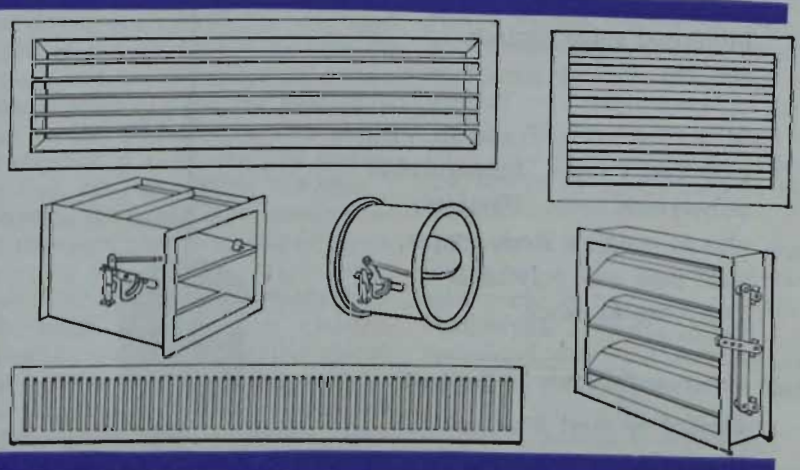
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Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1

UNIT HEATERS and HEATER BATTERIES

SPIRAL TUBE UNIT HEATERS

Spiral Tube unit heaters have won an outstanding reputation for providing a high B.T.U. output, operating off H.P. or L.P. hot water and steam pipework systems. Optimum heat transfer from the heating medium is achieved by the specially designed Spiral Tube element.

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"Component" air heater batteries incorporate Spiral Tube elements, utilising steam and L.P. or H.P. hot water as the heating medium. They cater for every practical need by virtue of an exceptional range of standard types and sizes. Individual finned tubes provide facilities for replacement in case of damage.

THE SECRET'S IN THE SPIRAL

The success of Spiral Tube unit heaters and heater batteries lies in the heating elements. These are made from solid drawn copper tube to which a spirally wound, specially designed copper fin is metallically alloyed. The use of copper throughout, together with positive bonding of fin-to-tube, results in optimum heat transfer and maximum operating efficiency.



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Head Office: Watford. *Telephone: 26781/2* · Scotland & Northern Ireland: McCulloch, Morrison & Miller, Glasgow. *Telephone: City 4704/5. Telex: 77714.*

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Available from the Manufacturers

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WOODBRIDGE, SUFFOLK, ENGLAND
Tel: WOODBRIDGE 660.

from page Forty-two

unit heaters, heater batteries and gilled tubing. A fact which impressed exhibition visitors was the company's justifiably proud boast that half of British Rail's engines employ their cooling plants.

Enjoying a major share of the market in the U.K., Girdlestone Pumps Limited (of Woodbridge, Suffolk) featured their range of pumping sets, steam condensate return sets and float switches.

Their steam condensate equipment attracted interest throughout the exhibition and a testimonial on this score was the featuring of a repeat order for the Sunbeam Wolsey factory.

From the extensive Eltron (London) Ltd. range the exhibition featured their special achievements in the field of industrial heating.

Displayed was equipment in the electric oil heaters and electric duct heaters fields.

In the field of draught control Curwen & Newbury Ltd. provided a highly impressive display. Their specialist activities in the matter of industrial and commercial draught inducers was fully exploited. In the same field their draught makers for domestic applications also attracted keen interest.

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MONTHLY SPECIAL REVIEW

INDUSTRIAL AND COMMERCIAL INSULATION

INSULATION MUST BE AIM OF EVERY INSTALLATION

IT is never too late to insulate. Heat lost is money wasted but heat retained is money saved.

All will be aware of the ways heat is lost from a warm surface to its cooler surrounds by conduction, convection and radiation, but not all customers are so convinced as to accept our recommendations.

However, we must continue to try to enlighten these laymen for their own good, in the national fuel conservation interest, and in justification of our claims as responsible engineers.

Have you noticed that all the "Big Boys" use thermal insulation as a matter of course on large scale works? They have to or the otherwise exposed surfaces would produce such a sum of heat loss per annum that the plant would be too costly to run. The point is, what is necessary and good on the big job is proportionately used to advantage on all the smaller ones too. And yet, how many installations can be said to be completed with the economic advantage that thermal insulation offers?

Is it that so many regard insulation as something the customer can have done afterwards? Worse still, is it a case that some just don't know the real value of thermal insulation? The latter is insupportable and unlikely to be found in qualified installers but many of these still seem to regard insulation as an accessory to, rather than an essential, integral part of any really first-class job of heating or hot water supply.

Pipe insulation comes in many forms. It may be blanket material for pipe wrapping or it may be the neater, more convenient pre-formed sectional laggings. These may be of glass fibre, asbestos, or rock wool. Surface finishes may vary according to intended application. Fixing may be by metal strap, gummed overwrap, or simply by stapling.

Each of these offer quick and easy application with ease of removal and replacement in event of pipe repair or extension.

In small, compact hot water systems with dead-leg drain-off the heat losses, incurred through alternate warming and cooling of the draw-off pipes in common use, are measurable but quite insignificant in comparison with the continuing heat losses from primary or secondary circulations.

Secondary circulations to draw-off systems will always repay the cost of insulation. Some may argue that the heat lost from exposed secondary circulations perform a useful job in space heating. On the face of it, this might seem a sound argument, but if the space really needs heating it will need more emissivity than a simple pipe run can offer. Therefore, it would be wiser to minimise the pipe heat losses by insulation and provide other means of heating which could be switched on or off as needed—and used only when needed.

Remember, secondary circulation heat losses are continuous day and night, or at least for all the time the system operates. Whilst, from a space heating point of view, the heat emission would generally be like giving an elephant a raspberry, the mounting fuel cost is nothing like that.

Among the newer pipe insulants we see the foam plastics and latex foams becoming very popular. One foam plastic material has a polythene outer skin, which serves as an excellent vapour barrier and so sensibly placed that it does well as a medium to prevent condensation troubles on cold water pipes in steam situations. Furthermore, it has ingenious welted meeting edges which simply zip together in application.

Another plastic insulant comes as integral with the copper tube it covers. This is a polythene material of extruded section offering a minimum of contact with the tube—hence a reduced conduction loss tendency, plus adequate air spaces which reduce convection losses very well.

Hot store vessels, no matter what shape or size, should be adequately protected against costly heat losses, no matter where these vessels are used. Strangely, this recommendation seems to find widespread acceptance wherever electric water heating is used. The point at issue is, however, if thermal insulation is good for electrically heated hot water then it is good for any other fuel which might used as well.

Cylinder and rectangular hot store insulating jackets are easily fitted, and as easily removed in repair work. They are not costly and, in any case, it is true to say that their cost will be saved in fuel costs in a surprisingly short time.

Structural insulation relates to wall and ceilings immediately below roof spaces in particular.

Solid walls can be thermally improved by the placing of expanded polystyrene sheets. It is obtainable in various thickness according to degree of insulation required, but the 1/16th in. material is quite adequate, and its effect, for so little outlay, has to be experienced to be believed.

Cavity walls have a better thermal insulation valve than conventional solid ones. But even cavity walls lose considerable amounts of heat. One specialised firm will infit the cavity with a "poly" preparation applied in liquid form with a catalyst. No structural damage is involved.

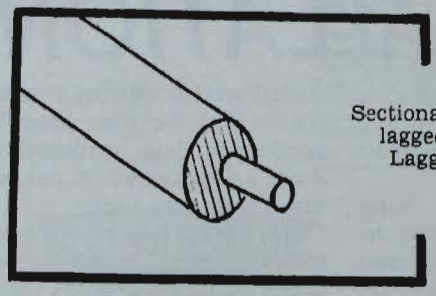
Ceiling insulation falls easily within our ability. Materials are many in kind and varying in price per yard of ceiling covered. The long and short

Continued page forty-seven

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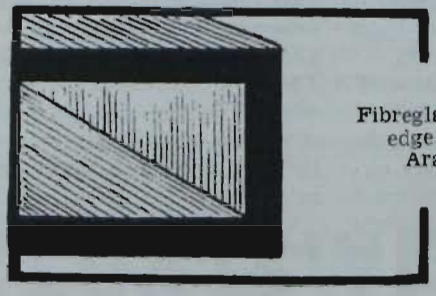
ASK THE PEOPLE WITH EXPERIENCE . . .

ARABOL



Sectional pipe insulation lagged with Arabol Lagging Adhesive 60-89-05

Adhesives



Fibreglass duct liner edge sealed with Aratint V-708

Sealants



Warm air ducting sealed with No. 1291 Duct Sealing Tape

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ARABOL

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et al.: The Irish Plumbing and Heating Engineer, October 1965 (complete i

TWO new products have recently been added to the Arabol range. "Arastix" is a special non-inflammable rubber cement for sticking fibrous insulation materials such as a fibreglass and rock wool to galvanised metal ducting. It has a very long open tack time—something in the order of one hour, and it grips the insulation instantly without any need for shoring or other support. "Arastix" is numbered 1290 on the Arabol range.

No. 1291 Self-Adhesive Duct Sealing Tape is made from an aluminium coloured polythene coated cloth coated with a special heat resistant adhesive and it is intended especially for sealing warm air ducting made from galvanised metal, prefabricated fibreglass or spirally wound plastic coated metal. It can also be used for sealing the joints of P.V.C. film faced or foil faced Thermal Insulation materials.

It is available in various widths on rolls of 55 yards and has been readily accepted by the insulation, heating and ventilation trades as one of the very few purpose made duct sealing tapes available in this country. The Arabol Manufacturing Company Ltd. are at Riverside House, Amwell End, Ware, Herts., and they are represented in this country by Monsell Mitchell & Co. Ltd.

* * *

ADDITIONS to the wide range of products manufactured by the Newalls Insulation and Chemical Co. Ltd. include the Improved Super glass fibre bonded mat and Foamglass cellular glass insulation.

The improved Super glass fibre bonded mat is a technical advance achieved through the use of new bonding resin. Designed for thermal insulation of attics, roofs and walls, caravans, tanks and vessels, it is also suitable for use as a noise aborbeat behind perforated panels and as an insulating material to be used in the manufacture of cylinder jackets.

from page forty-five

of thermal insulation is: that whilst it is regarded as an integral part of all large installations, too little attention has been paid to it in the smaller jobs.

This is a situation which we all can put to right by getting to know just what savings in fuel can be made by simply applied insulation, and it is our responsibility to make sure that customers are made aware of the value of thermal insulation too.

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

The new grade of mat incorporates an improved thermo-setting resin as a bonding agent for the glass fibre which makes it more bland and endowes the product with improved resilience and handling characteristics. Packed in stout polythene bags, it is available in thicknesses of 1", 1½", and 2"; in rolls measuring 48", 36", 24", 18", 16" or 12" wide.

The thermal conductivity is 0.26 B.t.u. in/ft. 2h. deg. F. at normal atmospheric temperature. Although the product is mainly for applications in the atmospheric range, the limiting temperature is 450 degrees F.

* * *

FIBREGLASS Ltd. (St. Helens, Lancs.) have announced that from November 1 next they will market an

Continued overleaf

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Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1

extended range of products for the air conditioning and warm air heating fields. The full range will comprise—prefabricated ducting; rigid duct insulation; flexible duct insulation, and flexible duct liner, as well as air filter units.

The first two of these products, prefabricated ducting and rigid duct insulation, are absolutely new. They are in the well-known Fibreglass Crown insulation material, consisting of long fine fibres, completely free from "shot" and coarse fibres. Low weight and low thermal conductivity combine to give highest efficiency.

Prefabricated ducting has been specially designed for the fast expanding field of ducted warm air domestic heating systems, and is also suitable for use in the larger types of systems in offices, factories, etc. Rigid duct insulation has been designed primarily for the air conditioning market, to meet the demand for a rigid vapour-sealed slab for application on large ducting.

Of the other products, Flexible duct insulation was formerly known as Superfine B Fibre and has been extensively used in the air conditioning field. Flexible duct liner was known as Neoprene-coated Superfine B Fibre and is being increasingly used for the lining of ducts for noise attenuation.

* * *

THE Insulation Glazing Association (6 Mount Row, London, W.1) in its publication, "Double Glazing Doubles Comfort," outlines three methods of double glazing. Method one—uses sealed units, with bead fixing, or glazing with approved compound, normal type units or stepped units; or using ready made double-glazed units for insertion in existing rebates.

Method two—using applies sashes. These are frames containing a single sheet of glass. They can be hinged or secured in position on the existing surround either inside or outside according to the window construction. They can be opened or removed easily for ventilation or cleaning. In new houses or where special frames are required, it is essential to consult an architect and/or contractor.

Method three—using coupled sashes. This is for specially designed window frames containing an outer and inner sash arranged so as to open together for ventilation purposes and be quickly separated for cleaning purposes. Windows of this type are not economical if less than about 15 sq. ft. in area.

The first two methods are for double glazing existing windows or glazed doors. The third method is suitable for replacing complete windows as in reconstruction work.

PRODUCT REVIEW

from previous page

THE Association has also published the following pamphlets on the subject: "Insulation Glazing—General Principles"; "Methods of Providing Insulation Glazing to Existing Windows and Doors"; "I.G.A. Glazing Requirements and Procedures for Compression Gasket Glazing"; "Choosing the Right Glass"; and comprehensive guides to manufacturers of factory made hermetically-sealed insulating glazing units.



● **Fibreglass A.W. insulation from Van den Bosch Ltd.**



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An igloo or mud hut ? Not likely. But in case the impossible happens, you can rely on Aerobord to turn client's folly into a haven of comfort. Aerobord, the **versatile** featherlight insulating material that makes civilised places habitable. And clients happy.

FACTS ABOUT AEROBORD: As thermal insulation 1" thickness of Aerobord is equivalent to: 1.2" glass wool, 1.25" cork slab, 1.5" mineral wool, 1.8" softboard, 2.25" vermiculite, 2.5" wood wool cement slab, 3" strawboard, 3.5" asbestos insulating board, 6" vermiculite plaster, 40" brickwork, 50" concrete.

Manufactured in Ireland by

SOUTHERN CHEMICALS LIMITED, ASKEATON

AEROBORD

THE MERITS OF THE FREE STANDING HOT AIR HEATER

ONE of the advancements in heating equipment which is available to the heating industry to-day is the free standing hot air heater.

These heaters are in the form of heat exchangers and may be fired by either solid fuel, oil or gas.

In most of the heaters air is drawn in from the base of the heater after which it passes over the outside of a

By . . .

A SPECIAL CORRESPONDENT

series of tubes; through these tubes pass the hot gases of combustion on their way from the furnace to the stack. Some heaters have two or three banks of tubes similar to what is to be found in the modern shell boiler.

The cold air, which is drawn into the heater, usually passes through some form of filter before or after it passes over the tubes. At the top of the casing are a series of outlet grills which vary in size and number depending on the size and output of the heater.

Size and output of the industrial heaters varies from heaters of 50,000 B.t.u./h. output to heaters of 1,000,000 B.t.u./h.

The heaters are usually delivered from the manufacturers complete for installation with three exceptions: the erection of the chimney, the connecting up to the electrical supply, and finally the supply of fuel whether it be the building of the coal bunker, the connection to the gas main or the fuel oil storage tank.

Air heaters of the type described are the ideal method of heating for workshops, stores, garages, small factory units and even churches, though in the latter case the noise level has to be watched.

If there is building which is subject to high roofs, or the opening and shutting of large doors, there is no other form of heating which will so quickly recover where there has been a substantial and sudden heat loss.

If it is necessary to take heating to isolated or special sections of the works, trunking can be fitted to the outlets and this in turn distributed as required.

Continued overleaf

Instantaneous HOT WATER from steam—without storage

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

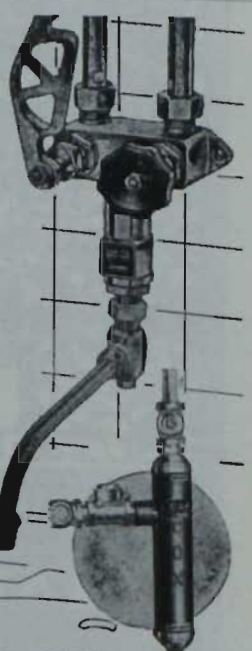
They operate with the highest efficiency at all pressures. Silent, efficient, compact and easy to install, replacing bulky and costly calorifiers.

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

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

COX WATER HEATERS

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Dept. IP.20, 14 Park Lane, Sheffield 10.
Tel.: 64282. Telegrams: "Heaters Sheffield".
Agents:
Halpin & Hayward Ltd., Unity Buildings, 16-17 Lower O'Connell St., DUBLIN. Tel. 43270.
589, Upper Newtownards Road, Knock, Belfast. Tel. Dundonald 3218.



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Building Services Engineering, Vol. 5 [1965], Iss. 7, Art. 1

The intelligent use of dampers in the trunking to control the air velocity also enables the hot air to be taken to office blocks, and the writer knows of small factory units whereby the production works are heated by the main unit and the offices from one outlet of the heater, the air being distributed by trunking and diffusers as just suggested.

ALL heaters are fitted with fully automatic on-off control which is controlled by thermostats of the owner's choice.

While the heaters in themselves are basically the same functionally the various manufacturers' specifications must be closely studied, as in all forms of heating equipment it is in the close examination of the specification that the reason for the large variation in prices can be found.

AIR HEATERS

from previous page

The power of the forced or induced draught or air fan must first be examined as this will determine the "throw" or distribution area of the heater.

Some manufacturers install stainless steel combustion chambers, others use alternative and sometimes special steels.

The distribution of the products of combustion to the atmosphere may cause chimney troubles in difficult sights but this may be overcome as some of the manufacturers fit an induced draught fan.

If the heater is to be oil fired the level at which the oil enters the heater may be important when considering the position of the oil tank. Again this is a point which should be studied when a heater is being selected.

Air heaters are simplicity in themselves and it is usual for the most simple form of combustion equipment to be fitted; however, all equipment of this nature requires servicing and a prospective customer would, of course, be well advised to ensure that servicing would be available.

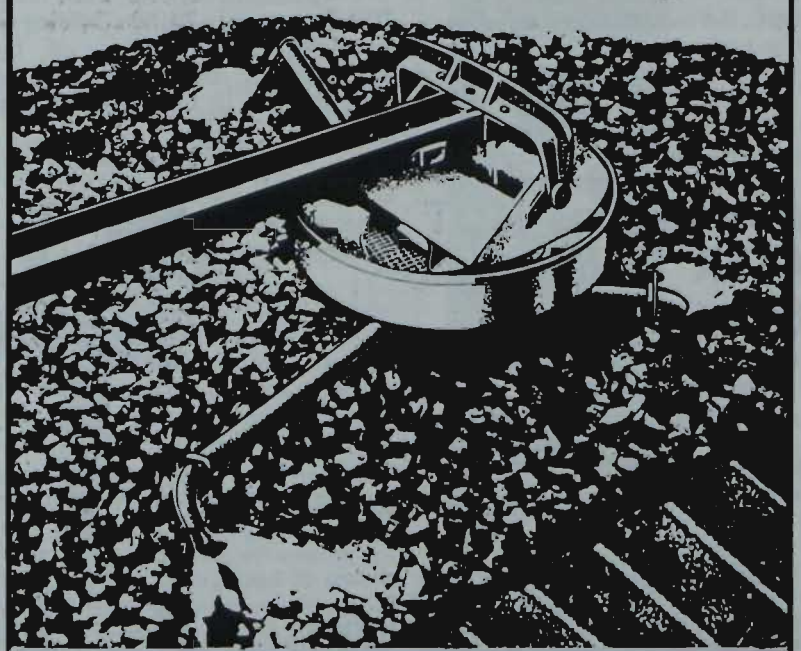
It is usual for a service of this nature to be provided by the more reputable manufacturers. An annual contract may be signed during which the installation will be visited once or twice a year, particularly in the off-heating season. The combustion equipment will be examined and re-set if necessary, the tubes will be cleaned, electrical controls checked, and the heater generally overhauled to its ex-works efficiency, which will be at least 80%.

There appears to be a general attitude of fear by the heating trade towards air heaters, believed to be due to the fact that their installation does not take up a large amount of labour and that so few materials are required, and maybe more so because it is thought that the profit margin is not sufficient, but is this the case?

A contractor can order a heater, and the trade discounts are no less than is usually granted for equally priced equipment, and have it installed, in the case of a simple installation within at the most two days. Servicing being automatically carried out by the manufacturer, the contractor is free from his responsibilities immediately he completes his installation.

This in itself means that there is a quick turn round in jobs, little or no labour costs are involved and the profit is shared over a large number of contracts.

For the smaller contractor the installation of air heaters could prove a most profitable sideline and there are so many places which require heating and are devoid of any form, and it is highly probable that these concerns would spend money on this form of heating whereas they would not lay out the capital on a more normal type of installation.

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Harper

oil-fired boilers

installed for long life, reliability & efficiency

A Harper Meehanite 300,000 Oil-fired boiler is now heating Ballygowran House, Maynooth, Co. Kildare.



This installation is one more illustration of the growing popularity of Harper Meehanite Boilers with heating engineers all over Europe. To the many advantages of Harper Meehanite boilers the following are now added.

1	Every section is guaranteed for five years.
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3	Boilers available for quick delivery. — P. MacFarlane Belfast 32002; W. Finucane Dublin 63634

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which came first?

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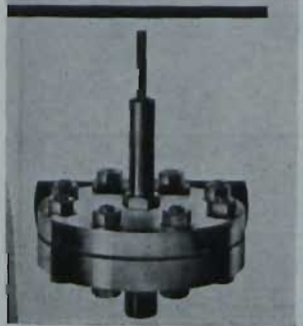
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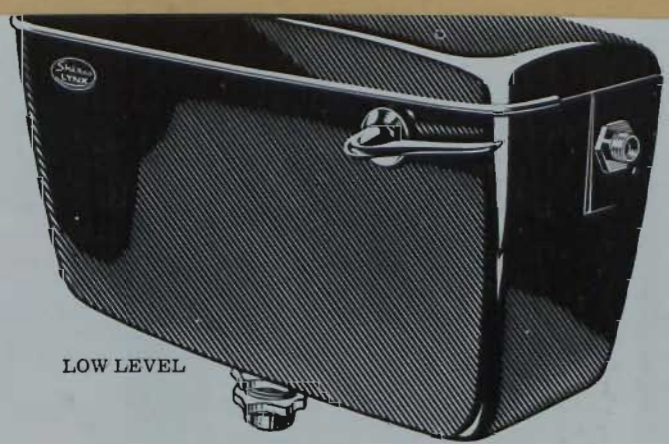
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craze, is non-corrosive. The Kingfisher siphon mechanism, made of polythene, gives a powerful flush, is non-corrosive, unbreakable. It can be used in both hard and soft water areas. The Lynx conforms to BSS 1125 and Water Works specifications.

Every genuine Lynx has the name engraved on the cistern

Other Shires products are the Uni-Lynx close-coupled suite, cistern fittings, plastic flushpipes and the Polyfloat cistern float.

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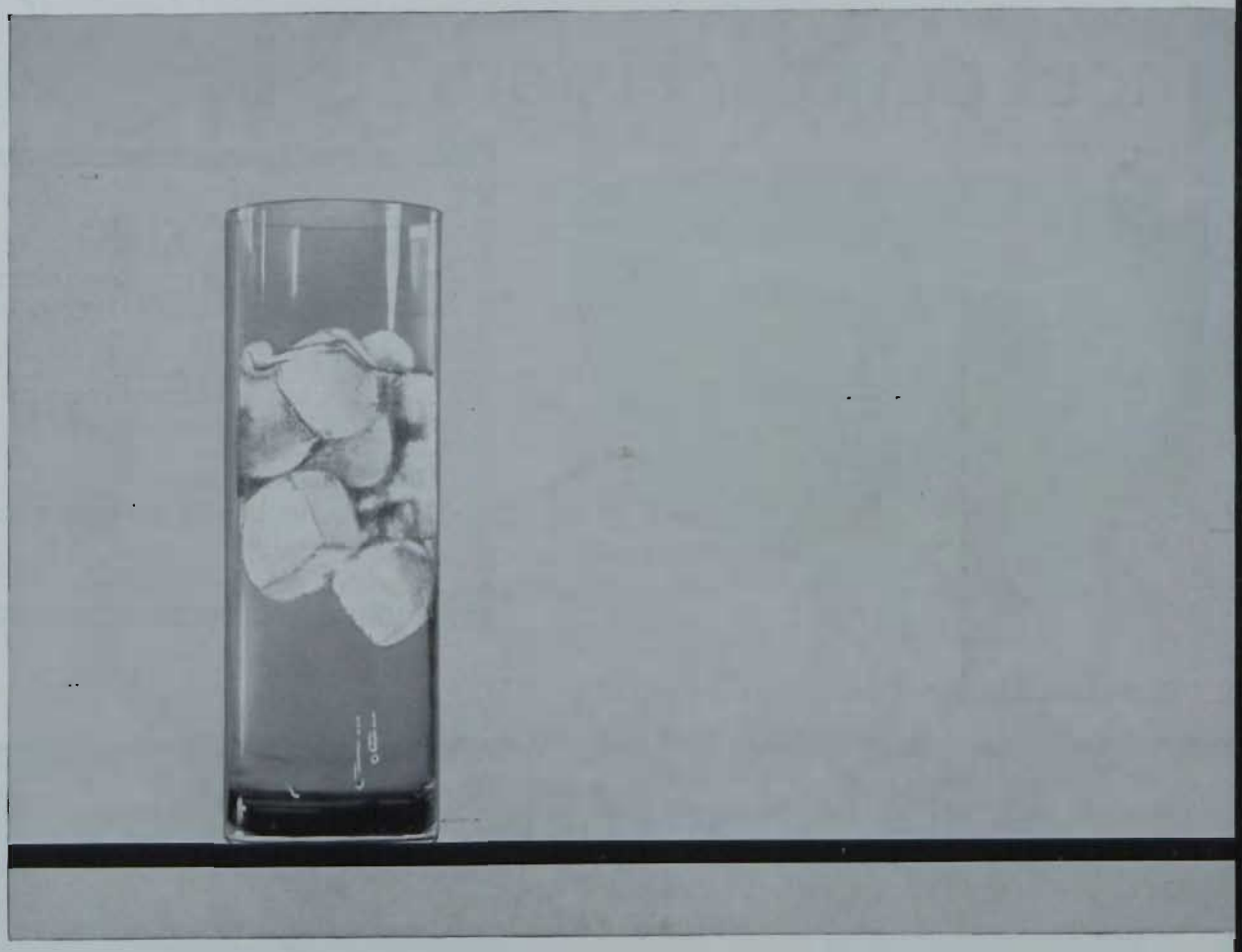
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