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

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ENGINEER



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APRIL 1965

Published by ARROW@TU Dublin, 1965

Vol. 5 No. 1

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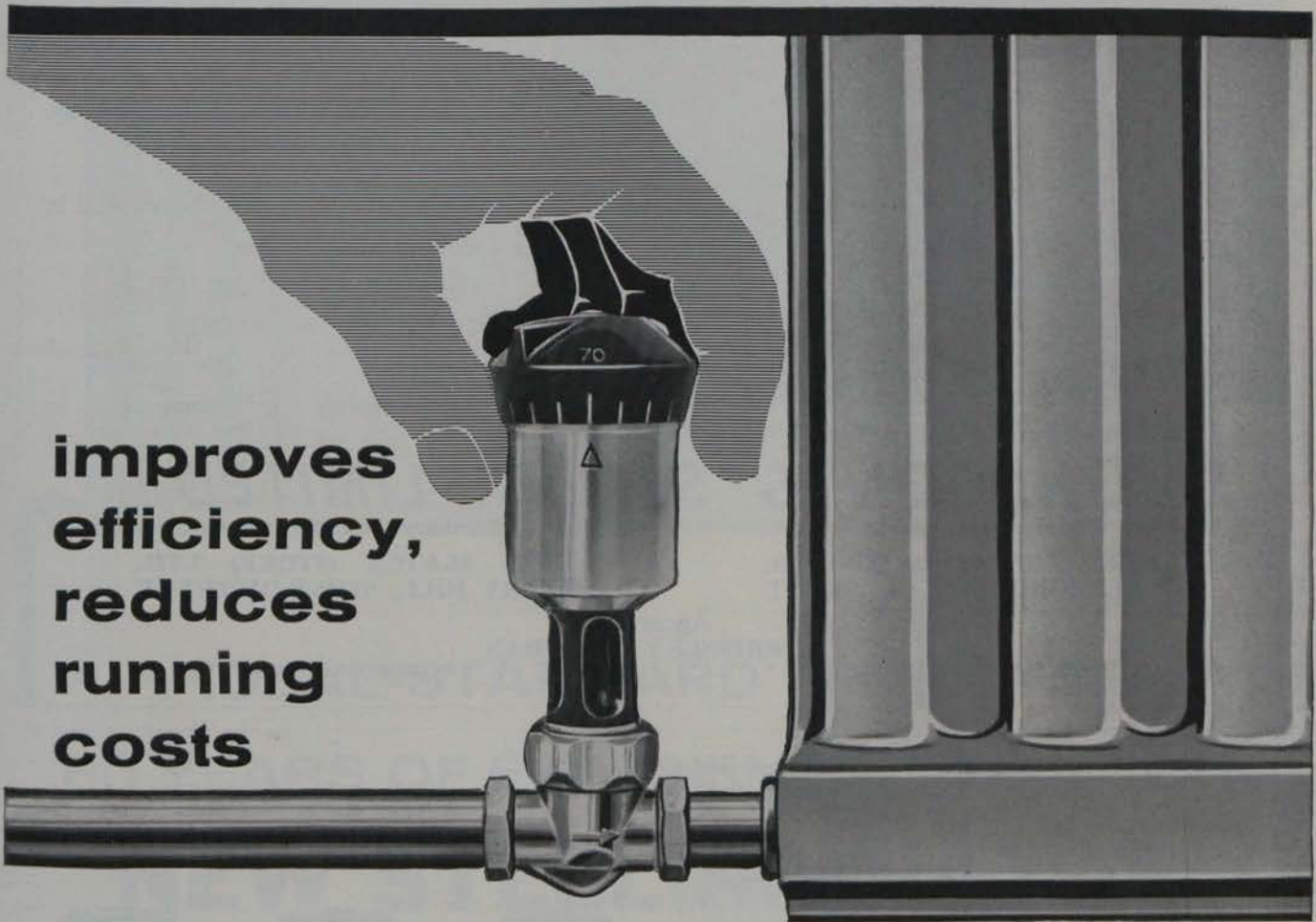


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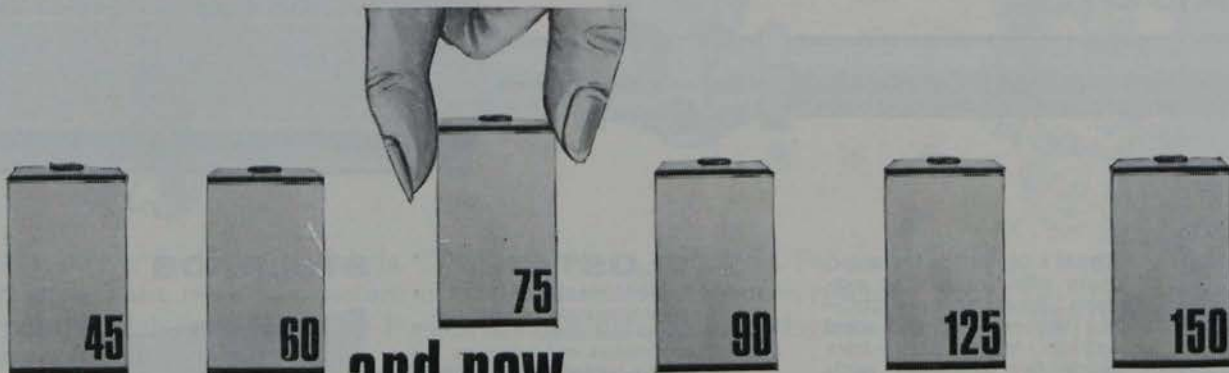
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Two



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H4

Three



● Visitor to Dublin, Mr. R. L. Bayne, Sales Director, Hi-Vee Heating Ltd. (centre), is seen with Mr. R. Beattie, Sales Director Forkin Group (right) and Mr. W. Bell, Sales Representative, Forkin Group, Belfast.

IRISH PLUMBING & HEATING

ENGINEER

Vol. 5. No. 1. APRIL, 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.

trade Topics

THE new domestic tariff for central heating and larger consumptions,

RESULTS OF NEW GAS TARIFF

which brings gas space and water heating within the financial capacity of the smaller householder, is creating an increasing demand for gas central heating in the modern 3 to 4 bedroom house of 1,300 to 1,400 sq. ft. of living area. This was disclosed in the Chairman's speech delivered at the Ordinary Annual General Meeting of the Alliance and Dublin Consumers' Gas Company last month.

In the absence of the Chairman, Professor Pierce F. Purcell, M.Inst.C.E., his speech was read by Mr. James J. Davy, M.A., Director, presiding. "The average cost in such a house varies with households as one would expect, but extracts taken from our records show that the average cost per family equipped with gas selective warm air heating is less than 30/- per week throughout the year, which covers cooking, all winter heating and hot water. Where the central heating is derived from a gas boiler and circulated water, the quantity of heat used tends to be greater and the cost a few shillings more per week," said the speaker.

A point made was that with the use of gas fuel the elimination of chimney flues and solid fuel grates saves money, and if central heating and water heating by gas were incorporated in the basic design, the final cost of new building was likely to be

Ireland one of our most progressive markets

"IRELAND is one of the most progressive markets we are developing," said Mr. Ronald L. Bayne, a director of Hi-Vee Heating Ltd., Carpenders Park, Watford, Herts., on his departure after his recent visit to Dublin.

He disclosed that his Company, one of the principle warm air heating equipment manufacturers in England, has, since establishing a Dublin agency last year, had great success in the Irish market.

Mr. Bayne's latest visit was designed to launch a Spring sales offensive covering the whole of Ireland. This drive will include the opening shortly of a Belfast office.

He has had close consultation with Mr. Robert Beattie, Sales Director of the Forkin Group of Companies in Dublin, and his colleague, Mr. W. Bell of Belfast.

"We anticipate a growth rate of 100 per cent. a year in sales in Ireland," Mr. Bayne concluded.

The Hi-Vee unit is specially designed for heating the home for warm air domestic heating, using a boiler fired by any fuel.

Commenting on the growth of the system, Mr. Beattie, well known for his motor racing interests, said: "My only regret is that we did not have this system in Ireland years before. Nevertheless, we are now rapidly becoming the foremost Company in the field of home heating in Ireland."

This issue sees the conclusion of W. J. R. Couchman's Seven Deadly Sins series for the domestic heating installer. Next month there will be news of an important new series.

I.P.H.E readers visit two of the big international exhibitions—in Milan and Frankfurt—through special reports in this issue.

Our special review features this month deal with (i) Circulators and pumps and (ii) Drying apparatus and ovens.

On page eighteen we give further details of the June issue 1965 Directory of Manufacturers, Agents, Representatives and Distributors. Please read it carefully and note the closing date for receipt of details for entry in the various sections.

Editorial and advertising offices:

Callaghan Chambers, 13/15 Dame Street, Dublin 2. Tel. 56465-6.

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EVERY ONE A LEADER IN ITS FIELD

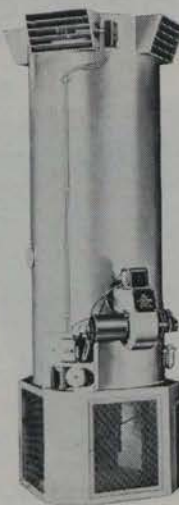
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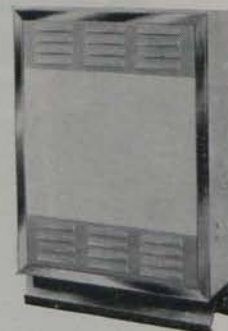
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A completely packaged heating system which can be installed into new or existing houses, the Supermatic has the wall-flame boiler unit, and was designed to be operated with ducted air home-heating while providing warm air and, in the summer, fresh air throughout the house.



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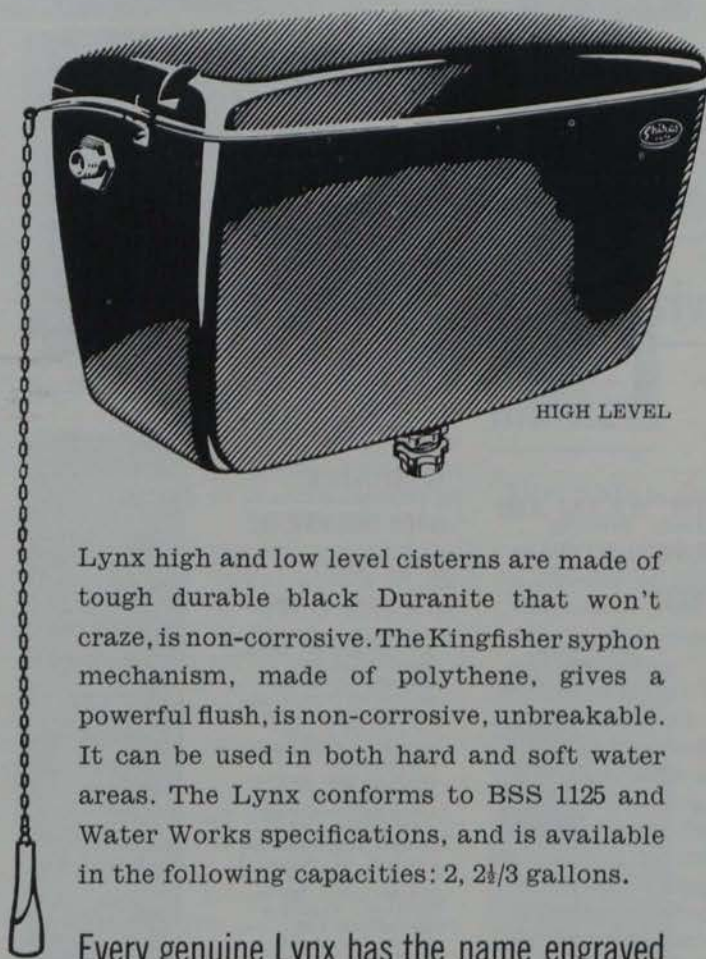
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Every genuine Lynx has the name engraved on the cistern

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

Available from all recognised builders' providers in the Republic.

GOOD LOOKING
The Lynx's clean cut lines are an example of contemporary styling at its very best.

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The Lynx is the easiest to install; the concealed fitting is neat and simple.

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Discreetly quiet with the most dependable mechanism ever.



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the 7 deadly sins of domestic installation

CONCLUSION



LAST month we discussed the influence of flue construction and of wind on natural draught and we continue with some definitions of what a cowl will and will not do.

Cowls may be divided into two classes. There are cowls which will deflect downward air movement, provided it is not at too steep an angle. Perhaps the best known of this class is the louvre pot. Cowls of this type will overcome many downdraught problems, but not all. The second class of cowl will deflect any air movement, even vertical movement. The "H" pot is an example of this class. Cowls of this type do not permit a brush to pass through from below so they should not be used except where absolutely necessary.

There is one condition that no cowl will remedy, fortunately it is fairly rare. This condition is known as terminal pressure, or differential air pressure, and is shown in **Figure 1**.

A house, in the path of a moving air stream, or wind, may be compared to a rock projecting from the bed of a fast moving river. On the upstream side water will be piled against the rock to a level higher than the rest of the stream. Downstream, against the rock, there will be a depression in the water. Air, unlike water, is incompressible, therefore on the "upstream" side of the house pressure will be high, "downstream" pressure will be lower.



Now, if the chimney terminal is in the high pressure zone and the base of the flue communicates with the low pressure zone, then pressure will be relieved by a movement of air down the flue and no cowl on earth will stop it! If it is impossible to extend the flue upwards out of the high pressure zone, it is possible, sometimes,

in these cases, to restore normal conditions by providing an inlet to the base of the flue from the high pressure side of the house, thus assuring the same pressure conditions at both ends of the flue. Care should be taken to ensure that the low pressure side of the house is sealed from the case of the flue. To achieve this it may be necessary to use draught sealing strip on doors or windows. Of course if, after all this, and with the wind in the wrong direction, a door or window is opened on the low pressure side, then there will be an immediate release of pressure down the flue.

Frictional resistance.—A flue is a duct, for the conveyance of gases which generally have relatively little motive force behind them. Restriction in a flue increases resistance, slows the movement of the gases and inevitably reduces updraught. A brick flue should always be parged or rendered inside; this ensures that the horizontal joints or any extruded mortar cannot leave the flue with a rough interior. There are, of course, structural reasons also for parging. The best flue is a straight flue; bends add to resistance; the sharper the bend the greater the resistance will be. Square bends are worst of all, since flue gases move vertically there can never be one square bend in a flue, but always two.

Condensation.—In such a short discussion it is only possible to outline basic principles but no discussion of natural draught would be complete without some reference to condensation. Flue condensation problems are becoming more common with the advent of more efficient appliances.

Whenever solid fuel, oil or gas is burned hydrogen is burned as part of

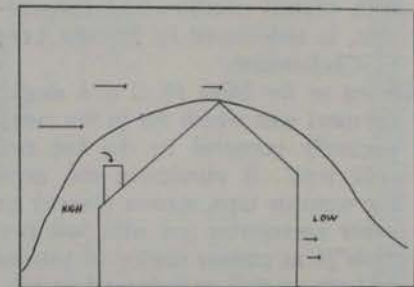


FIG. 1.

the fuel. When hydrogen is burned the product of combustion is H²O—water, in the form of vapour. While the water remains as vapour no harm can result. If the flue gases are diluted with plenty of warm fresh air (as with an open fire), then no harm can result because the vapour is less concentrated. But if the flue gas temperature falls below the dewpoint of the gases, perhaps because the flue is cold and exposed, then the vapour will condense on the walls of the flue. As it condenses various chemical compounds are formed; some of these can be highly corrosive and may well damage the flue.



The remedy? Well, I can hardly say "use less efficient appliances!" Instead, one obvious point is to keep the flue warm, well insulated, or clear of the outside walls or both. Make sure the flue is not too large and, if you still anticipate trouble line the flue with a corrosion-resistance liner of the right size, with a drain at the base of the flue.

Things could be worse. When I was in Sweden recently I heard of the problem they have in some areas—flues blocking completely with ice from condensation!

THIS sparkling and well-informed series was by W. J. R. COUCHMAN. Mr. Couchman maintains close contact with the trade throughout Ireland and is ideally informed to compile this series.

trade Topics

NEW FITTING BY MIRAFL0

A UNIQUE new bath fitting which by a simple dialling action will fill the bath or provide a shower with control overflow and temperature, is announced by Miraflo Ltd., of Cheltenham.

Known as the Mira 10, it is a single, compact unit which fits in the space normally occupied by the hot and cold taps... It eliminates the need for separate taps, shower diverter or other accessories, yet with just two dials gives instant choice of shower or bath as well as independent control over both water flow rate and temperature for either function.

The Mira 10 is the first true mixing unit of its kind, say the manufacturers. The hot and cold supplies are blended within the body of the unit to a temperature governed by the setting of the inner dial. The outer dial acts like a normal tap and controls the rate of flow of the blended water. The important feature is that whatever temperature is chosen remains reasonably constant however much the rate of flow is varied. Conversely, a change in the temperature setting does not noticeably affect the flow rate.

The inner dial also incorporates an ingenious changeover action so that the control features can be instantly switched from bath filling to showering—or vice versa—at will.

Supplied complete with flexible shower riser pipe, rose and all ne-



cessary fittings, the new units method and cost of installation are no different to that of fitting two conventional bath taps. Irish agents are Modern Plant Ltd.

HENRY WILSON & Co. Ltd. have made a further addition to the range of Wilson Wall-

ANOTHER WALL FLAME BOILER

new 75 flame Boilers. The new 75 conforms to the design and styling of the other models in this range (covering outputs from 45,000 to 150,000 B.t.u./hr.), and is available as a standard model or with factory fitted Waterguard controls.

The new boiler is the answer to those "in-between" installations in which the gap between the 60 and the 90 models was too great. As more

Continued page ten.



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

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trade Topics

from page eight.

and more installations demand this output of 75,000 B.t.u./hr., the new boiler will bridge that gap.

The new boiler is styled in the plain faced casing introduced by Wilson in 1963, and incorporates all the technical improvements made to this best-selling range during the last three years. Agent in the Republic is George A. Reid, Esq., 16 Fade St., Dublin.

Another development from Henry Wilson & Co. is the redesign of the 35,000 B.t.u./hr. vapourising boiler, the V35. The boiler casing design is now identical to that of the popular standard wallflame range.

* * *

VAN den Bosch Ltd. (Europair House, Alexandra Road, Wimbledon, S.W.19) have introduced the Nivotrol

OIL TANK CONTENT ALARM

visual alarm for oil tank contents. The alarm is operated by its own low temperature heating element which is immersed in the tank. As long as the element is covered with oil, there is no circuit. As soon as the oil falls below the level required, overheating of the element causes the alarm circuit to be made.

The position of the element can be adjusted to give the alarm at any required contents level. The alarm itself is in the form of an extremely neat white plastic face-plate, the same size as standard domestic lighting switches, which can be recessed into the kitchen wall to give visual warning of falling oil content.

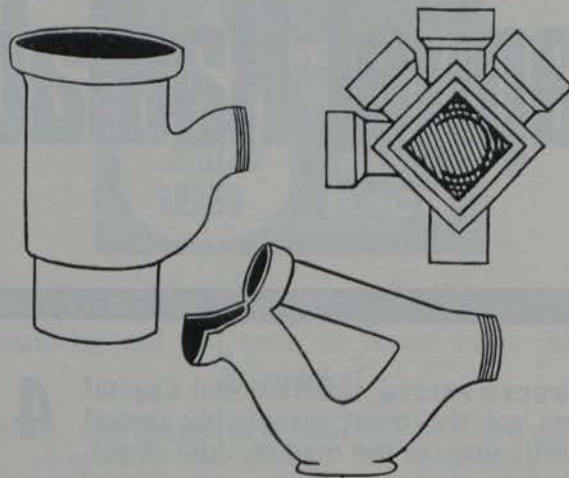
The alarm has extremely low current consumption and is suitable for standard single phase electricity supplies. The Nivotrol can be easily adapted to include an audible alarm circuit.

* * *

HONEYWELL Controls Ltd. have made an increase in price on a limited number of their domestic heating controls. The increase is far from being a general one, and only six items of equipment are, in fact, involved. In some cases the increase is only 5 per cent. approximately.

time proved pipe

and fittings



Time has proved that vitrified clay is the one material that will retain its properties indefinitely. Many alternatives have been tested and have failed. But over the years vitrified clay pipe and fittings have unfailingly resisted the effects of sulphuric acid and all other chemical, corrosive and abrasive attacks. It is unsurpassed for mechanical strength. At our factory there is a long tradition in the manufacturing of vitrified clay sewer pipe and fittings, a tradition which has helped to supply top quality materials for Sewerage schemes, large or small, all over Ireland. We are the only manufacturers of the complete range of sewer pipe and fittings in the Republic.

Available at all leading Builders Providers and Hardware Merchants.

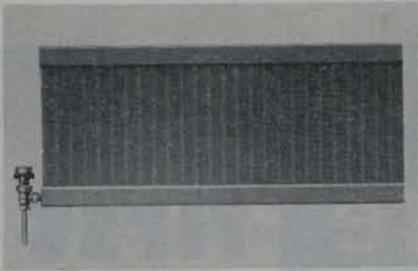
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WILSON HARTNELL



Same heat for half the size

THERMALRAD Convector radiators, when compared with ordinary steel radiators, provide the same heat for half the size. This is the claim of the manufacturers, Thermal Radiators Ltd.

Their compact size offers many practical advantages. The first of these advantages is, of course, that of space saving. However, Thermalrad radiators are not just space-savers. Their water content is one-fifth that of ordinary radiators, which means their initial heat build-up will be quicker and require less fuel. And because Thermalrads are designed primarily as convectors, the warm air circulates much faster and rooms heat up more rapidly.

Thermal Radiators Limited are also the sole distributors to the heating trade of the Ranco thermostatic radiator valve which is highly efficient in controlling the temperature of a radiator to within fine limits, and giving great flexibility in any heating system. Thermalrad agent in Northern Ireland is Mr. G. W. Monson, Monson & Sons, 227 Beersbridge Road, Belfast, 5. In the Republic the agent is Mr. P. J. Moore, Heatavent Supply Co., 379 South Circular Road, Rialto, Dublin.

* * *

A STANDARD model of the recently introduced gas fired boiler, the Auto-gas 65, is available now from Redfyre Limited (one of the Newton Chambers Companies).

Particularly suitable for installation with existing small bore heating systems, this incorporates the Adratrol gas control and an electric thermostat.

Like the small bore unit, this model is designed for simplicity of installation and maintenance. Immediately behind the magnetically closed door, of the cabinet, all the controls are conven-



iently grouped in front of the boiler. Above them a white panel carries the thermostat knob and scale as well as the operating instructions, and gives a neat interior.

With an output of 65,000 B.t.u./hr., this new boiler supports a 30-gallon cylinder with 290 sq. ft. of radiator surfaces, including the linking pipes. The flue offtake is designed for a 5in. internal diameter asbestos cement or metal pipe and the boiler body is drilled and tapped for two 1 1/4 in. B.S.P. connections at each side.

PERFECTION Parts Ltd. (Union Street, London, S.E.1) have introduced a new Autoheat central heating control panel, which is suitable for all types of gas or oil central heating systems. The panel is the result of two years' practical development in the field and incorporates many outstanding features. It is housed in an attractively designed pressed steel case with a black and gold perspex front-plate with white lettering. A four-position selector switch gives the choice of different programmes.

Do It Now!

Details of the 1965 Directory of Manufacturers, Agents, Representatives, and Distributors are given on page eighteen. Please note that the closing date for receipt of Directory material is MAY 1st.



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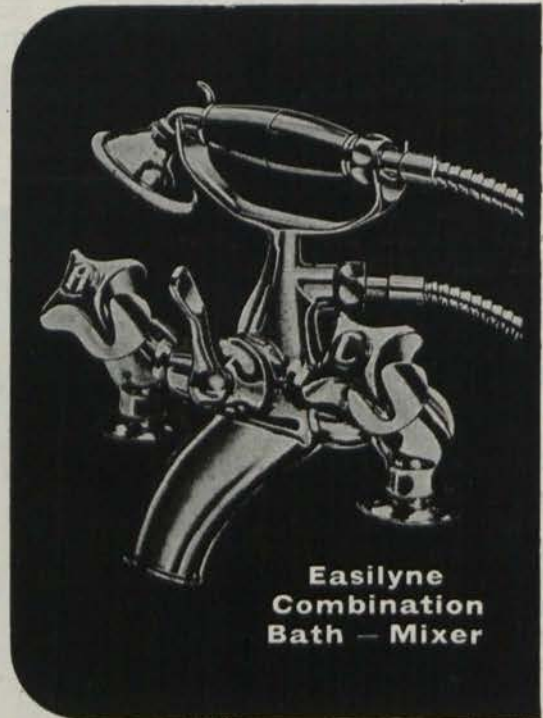
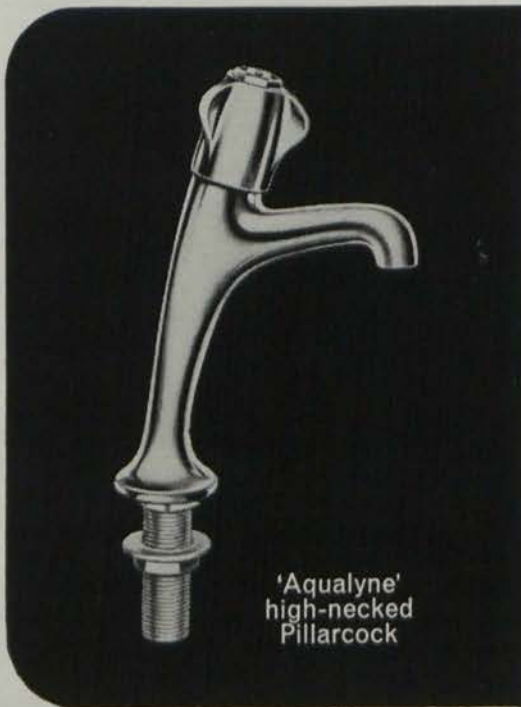
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SANBRA FYFFE LIMITED, CONEX WORKS, SANTRY AVENUE, DUBLIN 9.

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SPECIAL REVIEW

THIS MONTH

CIRCULATORS, PUMPS (including drainage and water pumps and water storage equipment).

LEE, Howl & Co. Ltd. (Tipton, Staffs.) have improved the design and lowered the price of their "Super-Major" double action reciprocating pump. The pump is used for water supply from wells and for general domestic purposes. The improved design of the 1" x 1" (suction and delivery) pump makes a more compact unit achieved by a completely new design of power and of robust construction which includes a new pattern connecting rod adjustable for eccentric wear.

In addition there has been an extension in head from 85 to 100 feet head. These improvements have also enabled a 10 per cent. reduction in price. The output is 275 g.p.h. and the floor space occupied is only 22" x 11". The unit is also available fitted to the top of a water tank for automatic pressurised water supply. This packaged unit is controlled by a switch operated by the pressure in the tank. The pump in addition is available driven by a 75 cc. Suffolk 4-stroke engine.

* * *

THE RANGE of pumps for central heating purposes from Saunder Valve Company Ltd. comprises self-contained electric units in sizes for handling duties up to 1,000 g.p.m.—a scope that embraces most capacities from large country houses to large blocks of flats or offices.

For medium sized dwellings the CCE Hot Water Circulators of Full-way, direct-in-pipeline type, permitting gravity circulation where required, are available in sizes ½" to 4", the smaller pumps having screwed connections, the larger sizes being arranged for flanged fittings. For small bore systems the Safrax Glandless Accelerator is offered in sizes 1" and 1½" for duties up to 16 g.p.m.

* * *

IN THE sump or cellar drainers of the Safran range, the EVB is designed to a moderate price and is of substantial construction for domestic or industrial use. It is suitable for a 2' 6" depth of sump and is fitted with an open bladed impeller capable of

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).

handling solids up to ¾" diameter. A float switch provides automatic control. Model SVB embodies certain refinements and this model is again available in sizes 1" and 1½".

British Steam Specialties Ltd. have been appointed as Distributors for Safran Pumps in the Republic of Ireland and Northern Ireland. They operate from their Dublin and Belfast addresses, 33 Leeson Park, Dublin, and Distillery Street, Belfast.

* * *

TWO LARGER models have been added to the range of Selfette Circulators, making the sizes available, 1", 2", 3", 3"a, 4", and 4"a. Heads up to 20 feet and capacities of 120 g.p.m. are now attainable. Bearing in mind the trend for modern buildings to grow taller, the working pressure has been raised to 100 p.s.i. at 100 degrees C throughout the range, enabling Selfette to accommodate the resultant higher static heads.

Standard materials of construction are cast-iron body, gunmetal impeller and stainless steel shaft. The normal application for the Selfette is as a super silent heating accelerator, although it is often used for low head transfer duties. The delivery period is seven days. The manufacturers are Holden & Brooke Ltd., Sirius Works, Manchester.

* * *

A NEW scaled down version of the well established Opiomatic range of variable central heating pumps marketed by B.S.A. Harford Pumps Ltd., has recently been introduced and is

known as the Opiomatic "Junior." It has been developed to include the smaller installation, and since space is often at a premium, is smaller and more compact than the standard model.

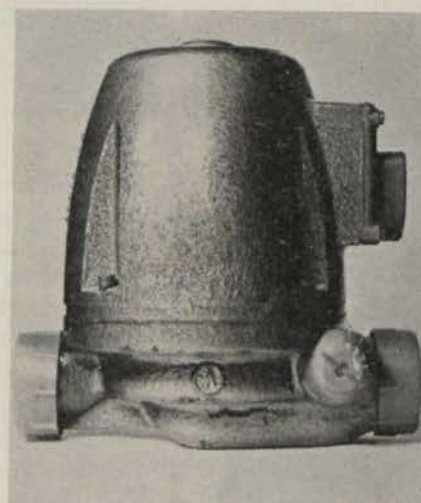
Variation is obtained by the manual operation of a setting device which matches the pump duty to the existing system resistance. A wide selection of duties is available ranging from a minimum of 2.75 ft. head at zero flow and 1 ft. at 12 gal./min. to a maximum of 5.5 ft. at zero flow and 2.5 ft. at 16 gal./min.

A simple plug positioned in the top of the casing may be depressed to serve the dual purpose of venting air trapped within the pump, and should the shaft become jammed, of engaging in a keyway on the shaft which may then be loosened by a screwdriver without recourse to dismantling.

* * *

FROM THE range of International Boilers and Radiators Ltd. we note the Sigmund ThermoPak, a glandless accelerator of simple design specially designed for small bore heating service, and which can be fitted horizon-

Continued page fifteen.

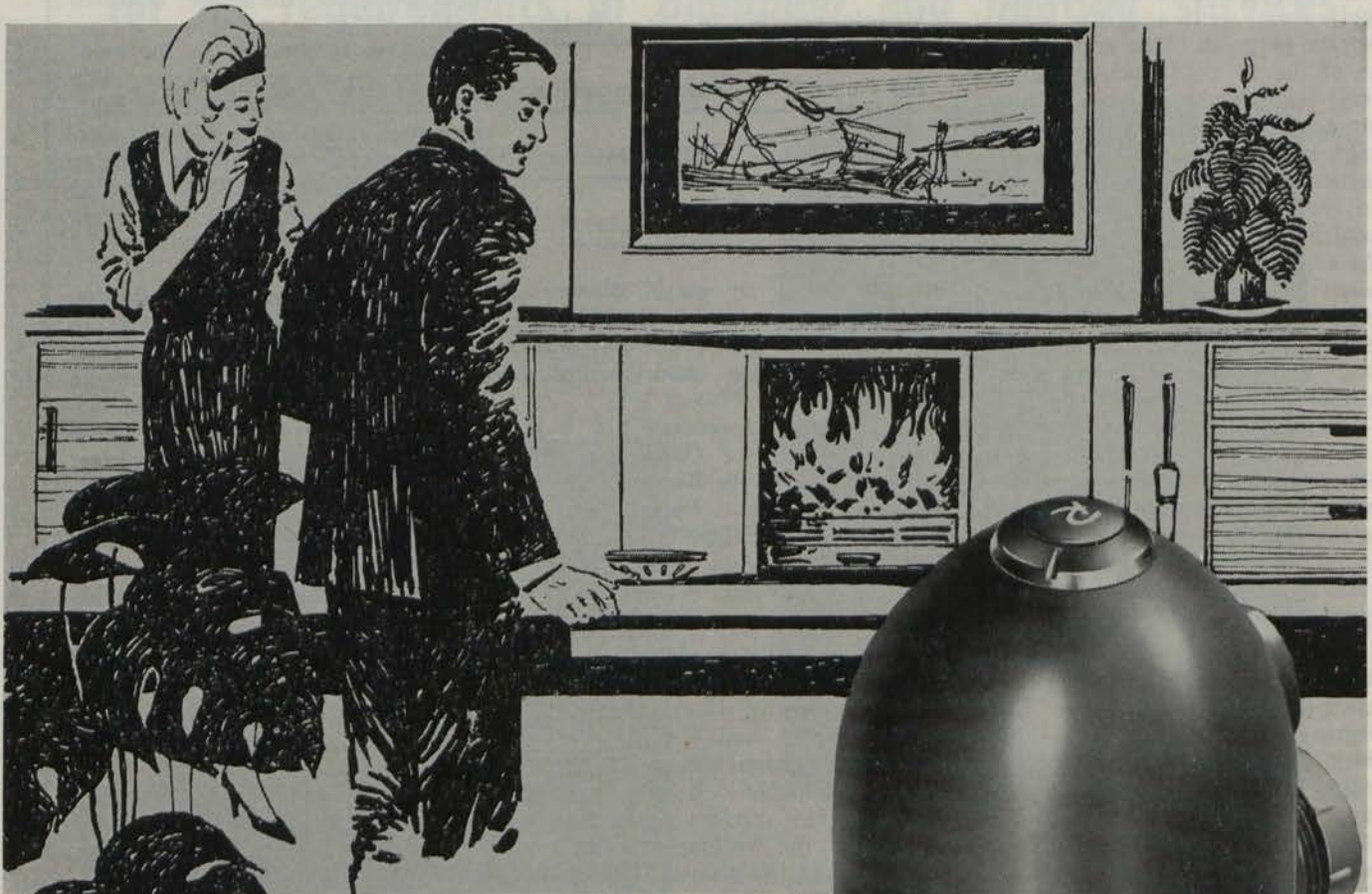


From the comprehensive B.S.A. Harford Pumps Ltd. range—the Opiomatic Junior variable head accelerator.

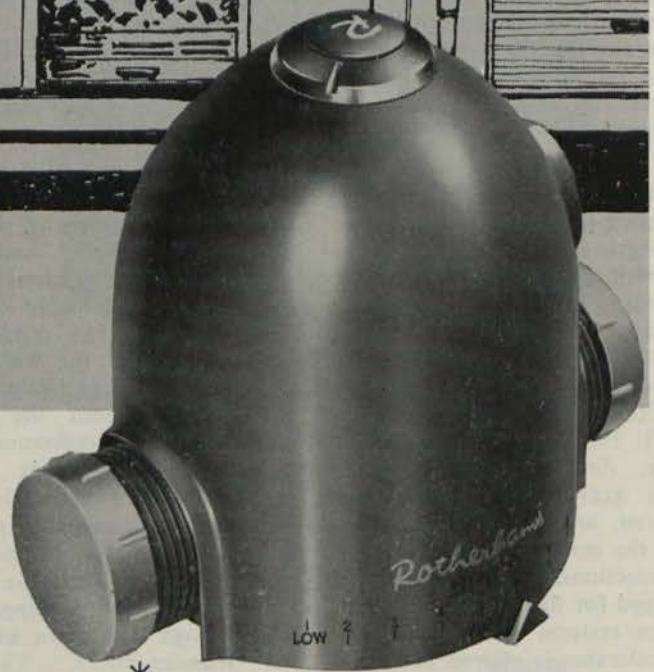
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- Costs less.
- Best value for money.
- Big output — up to 70,000 btu's boiler rating.
- Output variable from either side.
- Smallest pump available.
- Weight only just over 6 lb.
- Can be fitted in minutes.
- No capacitor — simple wiring.
- Operates at any angle.
- Can operate on reduced voltage.
- Couplings $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1".



Designed for Modern Home Heating
Attractive appearance, silent operation, vibrationless. Simple to install and set. Inexpensive, convenient and reliable — THE IDEAL PUMP.

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tally or vertically so long as the shaft is kept in the horizontal position. It requires no starter or special wiring, the parts are replaceable and interchangeable, units can be entirely dismantled on site. It is also available in all-bronze construction. The sole agents in the Republic of Ireland for the International range are Monsell, Mitchell & Co. Ltd., Pearse St., and Townsend St., Dublin.

* * *

THE ALLEN Gwynnes unchokable sump pump can pass solids and spheres to a diameter of $\frac{3}{4}$ " and has a range of duties from 10 to 50 gallons per min-

SPECIAL REVIEW

from page thirteen.

ute at heads between 25 and 10 feet. The impeller is made of cast-iron and is mounted on a substantial shaft supported in a ball bearing and an oil-impregnated bearing bush. The ball bearing acts as a combined thrust and journal bearing.

The casing is made of cast-iron and is designed to support the complete unit. The delivery branch has a $1\frac{1}{2}$ " B.S.P. female thread. It incorporates a 90 per cent. bend, pointing vertically

upwards. This avoids the need for a separate bend and so reduces the size of sump required. A mechanical ring of spring loaded carbon ring type is provided to prevent leakage along the shaft from the pump casing. A spider type coupling transmits the drive from the motor to the pump.

The motor rating is $\frac{1}{2}$ h.p. when running at a speed of 1,440 r.p.m. A simple float switch controls starting and stopping of the pump motor. This operates from a minimum water level of 4 inches to a maximum of 24 inches. The manufacturers are Allen Gwynnes Pumps Ltd. (Firth Road, Lincoln, England).

* * *

WORTHINGTON - Simpson supply a range of hot water circulators for use in the heating systems of factories, hospitals, office blocks, and other large commercial and public buildings. The present range covers capacities from 5 to 200 g.p.m., and heads up to 60 feet depending upon capacity. Motors supplied are from $\frac{1}{2}$ to 5 B.H.P. single and three-phase. These pumps are available as compact "monobloc" units or in driving head construction for separate motor or V-belt drive. Sleeve bearings are used throughout to ensure quietness in operation.

* * *

THE SCARAB Engineering Company Ltd. (Fulham Road, London, and 40 West Street, Drogheda, Co. Louth) manufacture the only glandless circulating pump in the world made from plastic materials which have been specially developed by Messrs. I.C.C. and tested over long term periods.

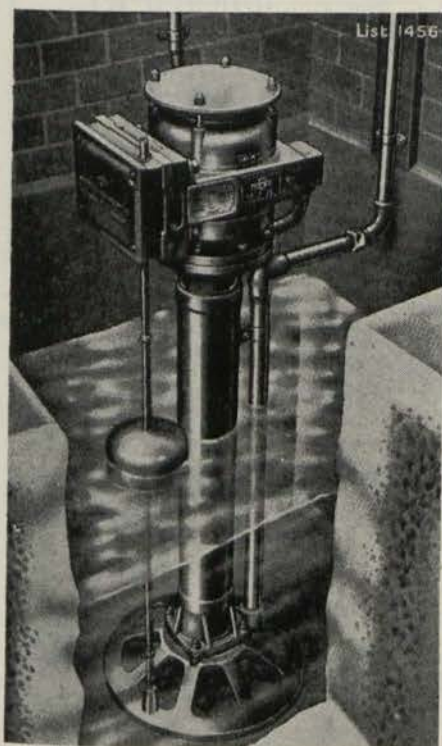
The design also incorporates the spectacular reverse thrust principle which utilizes the developed working forces. The Reverse Thrust enables the usage of a single thrust bearing—easily replaced in the event of wear. It also enables variations of output to be achieved. The manufacturers emphasise that this is the only construction which allows this feature without creating turbulence either in the inlet or outlet flow of the unit.

* * *

VIKING general purpose rotary pumps are suitable for pumping thin or thick liquids in a wide range of applications. Constructed in standard fitted, bronze fitted, steel fitted, or all bronze types, they are adaptable for suction lifts up to 25 feet (depending on breaking point of volatile liquid),

Continued overleaf

MOPUMP SUMP DRAINAGE UNITS



THE $1\frac{1}{4}$ " SUMP PUMP FOR DEALING WITH SEEPAGE AND LEAKAGE WATER IN CELLARS, BOILER HOUSES AND OTHER PREMISES BELOW SEWER LEVEL. THIS DRAINAGE MOPUMP WILL AUTOMATICALLY DRAIN THE SUMP WHEN FULL AND SWITCH OFF WHEN EMPTY.

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For technical information, catalogues, etc., contact Associate Company:

Tylors of Ireland Ltd.

55 Rathgar Avenue

Dublin, 6

Grams: 'Tyland, Dublin.'

Telephone: 904603/4

The Irish Plumbing and Heating Engineer.

SPECIAL REVIEW

from previous page

and for heads of 115 feet or 50 lbs. pressure on non-lubricating liquids, and up to 230 foot heads or 100 lbs. pressure on lubricating liquids.

On viscous liquids, reduced pump speeds and extra operating clearances are required. The exclusive licensee-distributor for the Viking Pump Company, Cedar Falls, Iowa, U.S.A., is Zwicky Ltd. (Slough, Bucks.), who are represented in the Republic by the Heatovent Supply Co. Other Zwicky products include a comprehensive range of hand pumps, Uniplex and Biplex filters, floating suction units, pressure control valves, and the 'V' slot metering valves which accurately control the quantity of fuel oil or other liquid which is discharged by it into a system.

* * *

J.L.C. Pumps and Engineering Co. Ltd. (Oxgate Farm Works, Coles Green Road, London) manufacture direct drive accelerators, and belt driven accelerators. The direct drive units are specifically arranged to combine compactness with minimum noise and complete reliability. Mounted in a pipe line, these units require no special foundation or support.

* * *

NU-WAY Heating Plant Ltd., in order to satisfy the needs of commercial and industrial oil firing systems, offer a comprehensive range of ancillary equipment including "Rotovac" packaged oil pumping and heating units. These pumping and heating units are not built to any set specification as they are tailor made and may be equipped with any desired combination of components to meet the specific requirements of the particular furnace or boiler plant.

These components include pump sets (single or double), Duplex or self clean filters, electric, steam or hot water oil heaters. All components are of high quality and proven reliability under the stresses of industrial operating conditions.

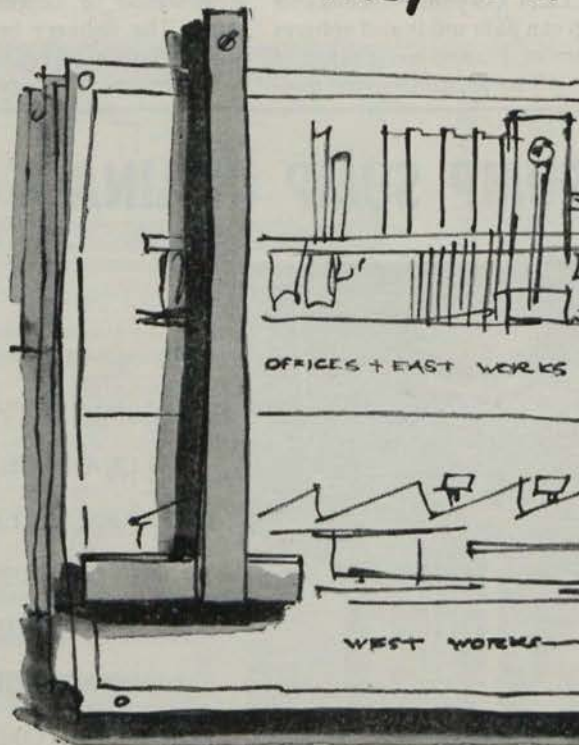
* * *

ROTHERHAMS Ltd., precision engineers, of Coventry, have designed and developed the Spey circulating

SPECIAL REVIEW

Continued page twenty-seven.

"We shall need pumps here, here and here..." they said



"We want Worthington-Simpson's" they said

We offer a comprehensive range of pumps, compressors and heat exchange equipment for heating, ventilating and air-conditioning systems. More than that, we provide service—from plans to commissioning—and maintenance facilities.

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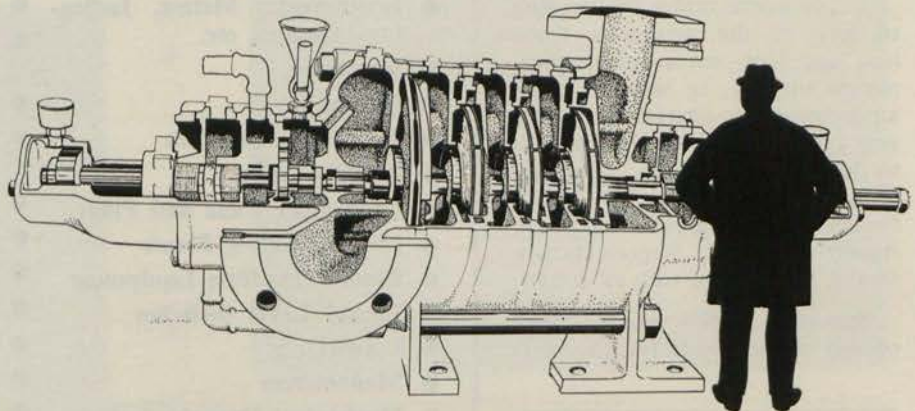
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1965 DIRECTORY

of MANUFACTURERS AGENTS,
REPRESENTATIVES and
DISTRIBUTORS

★ The June 1965 Register of Manufacturers, Agents, Representatives and Distributors of Domestic and Industrial Plumbing, Heating, Air Conditioning, Ventilation and Insulation equipment and materials available in the Republic of Ireland and Northern Ireland is now being prepared. The Directory this year will again be enlarged to accommodate the many additional entries under the various headings.

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

Specimen copies of the 1964 edition are available for checking

Please Note!

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Saturday,
1st May, 1965

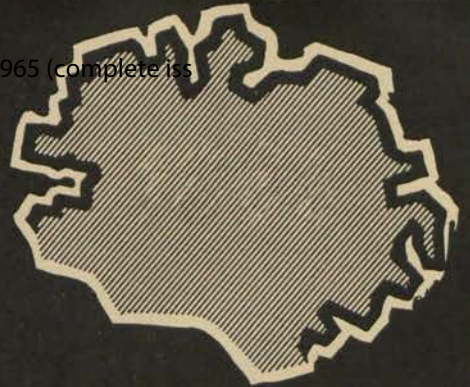
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— LIST NO. 3 —

- Incinerators
- Indicators, Smoke Density
- Injectors, Nozzles, etc.
- Instruments, Meters, Indicators, Gauges, etc.
- Insulation
- Insurance
- Jointing Compounds
- Kitchen Units
- Laboratory Fans and Plant
- Liquid Chilling Plants
- Liquid Handling Equipment
- Liquid Level Switches
- Lubricators
- Manometers
- Mechanical Draught Systems
- Pipe Bending and Threading Equipment
- Pipes, Tubes and Pipe Fittings
- Pipes and Tubes, Plastic
- Pipes and Tubes, Soil and Drain
- Precipitators, Electrostatic
- Pressure Booster Sets
- Pressure Controllers
- Pressurising Equipment
- Pressure Switches
- Pressure Vessels
- Pumps and Circulators
- Pyrometers
- Radiators and Radiant Panels
- Recording Equipment and Recorders
- Refractories
- Refractory Linings
- Refrigeration Plant
- Regulators
- Roofing Copper and Materials
- Roof Drains, Waterheads, Gutters and Outlets
- Roof Units (Ventilation)
- Rust Preventive and Solvents
- Rustproofing
- Scale Remover
- Sealing Compounds
- Separators, Compressed Air, Steam, etc.
- Servomotors, Pneumatic
- Sewage Disposal
- Sight Glasses
- Silencers
- Skirting Board Heating
- Soot Blowers
- Steam Traps
- Stokers
- Strainers
- Tanks and Cylinders
- Taps, Mixers and Shower Units
- Telemetering
- Thermometers, Temperature Indicators, etc.
- Thermostatic Controls
- Time Switches
- Toilet Seats
- Tools
- Traps, Radiator
- Traps, Steam
- Turbines, Steam
- Unions
- Unit Heaters
- Valves
- Valves, Reducing
- Ventilators
- Warmair Curtains
- Waste Disposal Units
- Water Treatment Equipment and Processes
- W.C.s and Urinals
- Welding Plant and Equipment

Northern Ireland monthly review

et al.: The Irish Plumbing and Heating Engineer, April 1965 (complete iss

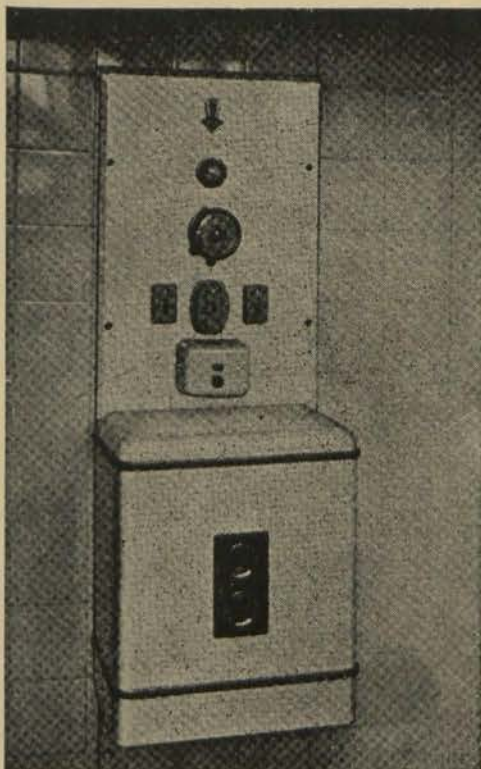


PERKINS

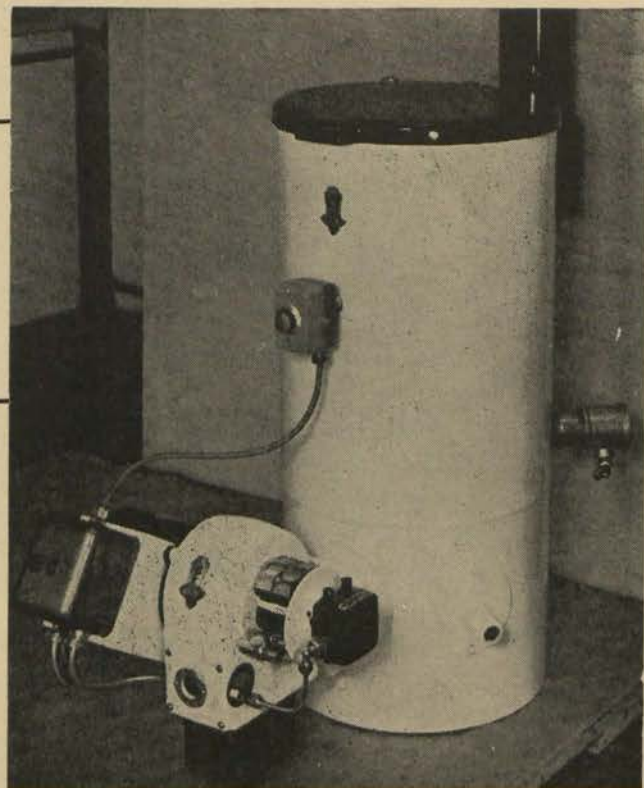
1988 BOILER MODELS IN 1965

PC SERIES—60,000 to 1,000,000 BTU's/hr.

The construction of all Perkins oil fired boilers is from high quality steel and designed exclusively for oil firing. The design incorporates multi-horizontal water tubes arranged spirally, in order to ensure that no combustion heat passes into the flue without having first come into contact with water-wetted, heat transfer surfaces. The boiler is adequately insulated to reduce heat loss to a minimum.



★ Shell Domestic Fuel Oil and BP Domestic are recommended fuels.



Perkins 'Flue-less' Wall-mounted Pressure-Jet 'Mini' Boilers

have outputs of 50/60/80/100 and 150,000 BTU's per hour, and are the most highly efficient, fully automatic boilers available at any price.

Sole N.I. PERKINS Distributors:

ULSTER HEATING CENTRE

90 Cromac Street, Belfast, 7. Telephone: 21449.

Sole Concessionaires for Republic of Ireland:

OIL FIRED HOMES (Ireland) LTD.

6 Harcourt Road, Dublin. Telephone: 54736.

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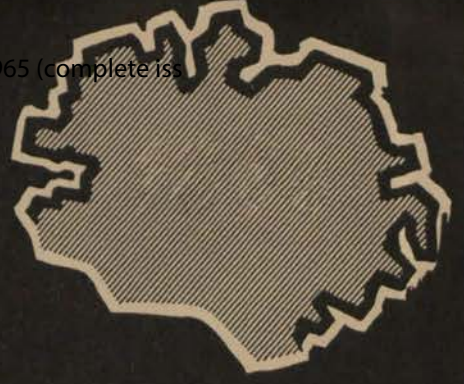
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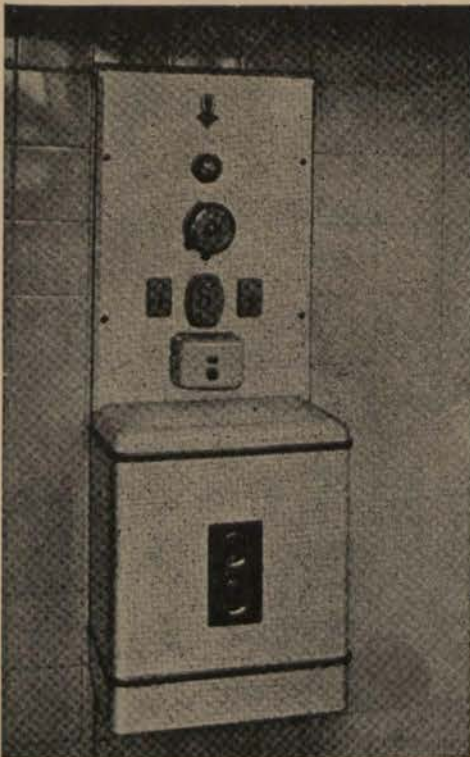
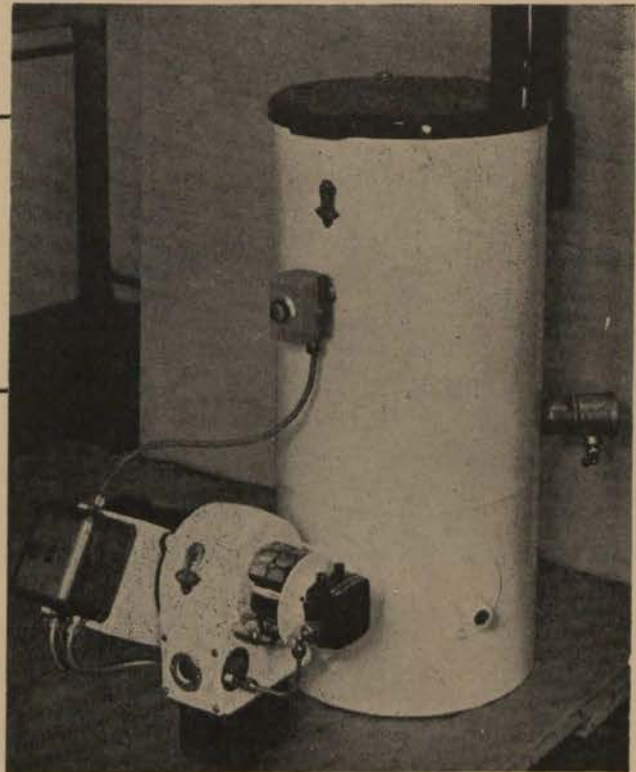


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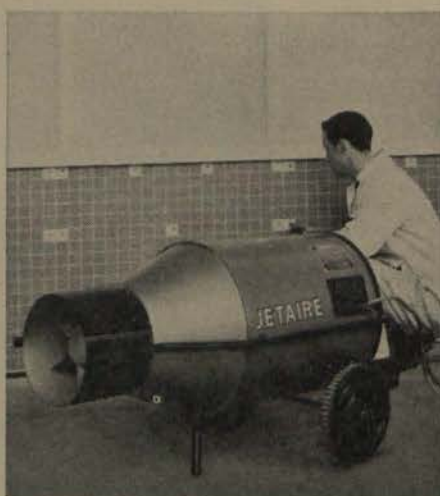
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McMULLANS KOSANGAS LIMITED, 1 UPPER O'CONNELL STREET, DUBLIN 1. TELEPHONE: DUBLIN 40761/4

OSMA Plastics Limited, The Irish Plumbing and Heating Engineer, April 1965 (complete issue)

ANOTHER NEW OSMA FITTING

announced the addition to their building products (Soil and Ventilation Goods) range of the Osma Access Saddle. Injection moulded as a two-piece fitting in P.V.C., access saddle is the only fitting of its kind available anywhere in the world, say the manufacturers.

Designed as a dry-joint "patch-access" fitting for use with straight lengths of Osma 4" diameter P.V.C. pipework, its purpose is to enable plumbers and maintenance engineers to fit an access at any point on an installation either before, during or after the erection of the soil or internal rainwater stack.

Osma have also introduced to their building products (rainwater and industrial pipework) range the Osma PVC roof outlet with domed grating. The fitting is designed specifically to cater for every type of roofing material (no special flashing required) and at the same time the same fitting can be used for both vertical and horizontal applications.

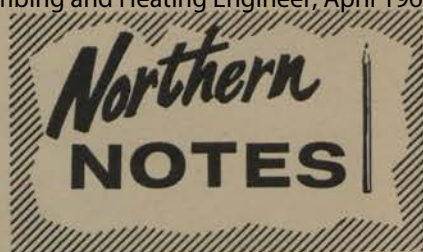
* * *

THE smooth, hard finish and absence of any awkward corners or dirt-collecting cavities

NEW PLASTIC LOW LEVEL CISTERN

are features of the new Valkyrie low-level flushing cistern. Its unobtrusive lines are designed to give a short projection and to blend with bathroom furniture at present on the market. The extra thick case moulding gives a strength and rigidity hitherto unknown in a thermoplastic cistern.

Moulded from Styron toughened



polystyrene by Rolinx Ltd. for Hawk Cisterns Ltd. of Halifax, the Valkyrie needs no external supports; it is simply screwed direct to a wall with the fixing screws, polyethylene washers and Rawlplugs supplied with the cistern.

* * *

FULBORA Limited have now completed the first stage of the new marketing programme

FULBORA APPOINT N.I. STOCKISTS

for the sale of Fulbora rainwater outlets in the U.K. This means they now have stockists covering the whole of the U.K. and Northern Ireland. In addition regional representatives have been appointed to deal with the increasing number of enquiries from architects, surveyors and contractors. Plans are near completion for the second stage, which will mean a series of regional exhibitions and promotions.

Each stockist carries the whole range of Fulbora outlets and is able to meet most requirements immediately ex-stock. To back up the stockist weekly deliveries are made from the foundry.

For a complete list of stockists and a copy of the new Fulbora catalogue and price list write to: Fulbora Ltd., 9A, Central Parade, Hatfield, Herts. (Telephone: Hatfield 5521).

75th anniversary year for merchant firm

STEVENSON and Turner Limited, the leading Northern Ireland merchant firm, is celebrating its 75th year of trading. Its first business was exclusively the manufacture of lead pipe for water, gas and waste services. At the time of the firm's foundation in 1890 principal trading was done with the shipbuilding industry, with a later entry into the field of sanitary fixtures and plumbing requirements.

Now this leading merchant firm is supplying contracts for the building and plumbing industry, housing schemes, multi-storey flats, hospitals, schools and factories. The company's extensive showrooms display all modern equipment and are well known for their useful service to the industry.



● THE whole range of Aspect plastics cisterns is to be marketed by the Universal Asbestos Manufacturing Co. Ltd. (Watford, Hertfordshire). These domestic cisterns had been marketed by the manufacturers, Allied Structural Plastics Ltd., an associate company of U.A.M.

* * *

● ANGLO-NORDIC Burner Products Limited have released a colour movie film showing where and how Wicu pre-insulated copper tube is used both industrially and domestically. The film runs for 14 minutes and Anglo-Nordic will be pleased to arrange for its showing at plumbing and heating engineers' association meetings, etc., through Northern Ireland.

● ESTA Hardware Ltd. (Green Lane, Walsall, Staffs.) have recently published a new leaflet describing and giving prices of their radiator shelves and towel rails. By opening a new Walsall factory Esta have trebled their rad shelf production capacity.

Leonard valves showing



● Pictured at the film show and lecture to architects and heating engineers on Leonard Thermostatic Mixing Valves at the Midland Hotel (IPHE, March), were (from left): Mr. J. Thornton, Special Projects Manager, Walker Crossweller Ltd; Mr. W. McCutcheon, Joint Managing Director, Stevenson & Turner Ltd.; Mr. H. Leonard, Showroom Manager, Stevenson & Turner Ltd.; Mr. W. B. Jefferson, President, Heating & Plumbing Employers' Association; Mr. A. J. Vaughan, Managing Director, Vaughan Heating & Co. Ltd.; Mr. W. Williamson, Associate, McCandless & Barton, Consulting Engineers; Mr. M. H. Joyce, President, Heating Employers' Association; and Mr. A. S. R. Leech, Wm. H. Leech & Son, Technical Agents, Walker Crossweller & Co. Ltd.



**Bill Maginnis
Talking . . .**

DURING the past month Flexaire Ltd. held a trade exhibition in the Midland Hotel, Belfast, when a large gathering attended both evenings to see a comprehensive range of new equipment. From comments I have heard on my rounds everyone was well pleased with what they saw. In passing I would like to say how well everything was so thoroughly organised and in this respect I must congratulate Mr. Allan Leech, partner in the firm of W. H. Leech & Son, Ravenhill Road, Belfast, who are the all-Ireland agents for Flexaire equipment.

It is now my turn to congratulate Mr. Jim Brennan, of W. H. Brennan & Sons, on being elected President of the Northern Ireland Master Plumbers' Association. I am looking forward to meeting quite a few of you at the Royal Ulster Agricultural Show at Balmoral Show Grounds next month. I believe all the major oil companies have taken stands this year. There will, therefore, be quite a bit of heating equipment on view, so we will have to bring our camera along.



While on the subject of oil companies, I see the Lobitos boys have moved in on the site development stuff and I am sure Philip Johnson is delighted, after trying so long without reward.

And now a little tip, boys. I believe a well-known figure in the trade until recently is seriously considering returning to the fold again. At least this was my impression when I spoke to him a few days ago in Newcastle. So, put on your thinking caps!

During the past few months, on my rounds both in the North and South of Ireland, I have been invariably asked what the terms calorific value and thermocouple really mean. So, I thought I should try, as practically as possible, to explain them.

I shall start with the term calorific value and may I say at the outset that the present day popularity of the word is good news for the gas companies, as it is with gas that it is generally associated.

Calorific Value.—This is the amount of heat set free when a given quantity of a fuel is burned completely. In British units the calorific values of gaseous fuels are measured in British thermal units (B.t.u.) per cubic foot. The amount of heat released by burning one cubic foot of gas is quite small so that a larger heat unit called the therm has been defined. A therm is 100,000 B.t.u. Thus one therm of heat is supplied by burning 200 cu.

● At Flexaire Trade Show were (from left) Standing: A. J. Vaughan Managing Director, Vaughan Heating Co., Ltd., Belfast; B. P. Williams, Partner, McCandless & Barton, Consulting Engineers, Belfast; W. Boyd, J. R. W. Murland & Partners, Consulting Engineers, Belfast; E. Clarke, Ministry of Finance, Northern Ireland; J. A. Anderson, Varming & Mulcahy, Consulting Engineers, Belfast; and F. R. McBride, John Kelly Ltd., Belfast.

Seated: A. S. R. Leech, William H. Leech & Son, Irish Agents for Flexaire Limited; R. H. Rex, Sales Manager, Flexaire Limited; L. E. Josling, Managing Director, Flexaire Limited; and H. D. Barrett, Barrett & Agnew, Consulting Engineers, Belfast.

ft. of gas of calorific value 500 B.t.u./cu. ft. The calorific value of a fuel depends upon its chemical composition. The values of this factor for the principal constituents of town gas and also of the fuel gases obtained from various processes are shown below.

	B.t.u./cu. ft.
Carbon monoxide ..	CO 318
Hydrogen, H ₂ ..	320
Methane, CH ₄ ..	1,000
Ethylene, C ₂ H ₄ ..	1,571
Benzene, C ₆ H ₆ ..	3,635
Blue water gas ..	320
Coal gas ..	550
Natural gas ..	1,000
Light petroleum gas ..	900-3,400

I should point out that although the majority of appliances running on gas are quite flexible in use, only slight variations in calorific value can be tolerated by the burners. Gases of higher calorific value require, in general, a larger amount of air for complete combustion.

Thus any alteration in the declared value of the supply necessitates modifications to all the burners. For instance, burners designed to use town gas (calorific value 500 B.t.u./cu. ft.) and those intended for burning propane/butane mixture which are sold under proprietary names, cannot be interchanged. I do trust that this information will be helpful. (As I



● Another group at the Flexaire Show were (from left): Messrs R. Collum, British Steam Specialties Ltd., Belfast; M. Horgan and W. Boyd, Murland and Partners; T. Magowan, Varming & Mulcahy.

Bill Maginnis Talking . . .

am only a boiler manufacturer's representative and not a gas engineer, please don't be too hard on me!).

Thermocouple.—In fact the correct name for this is Thermo Electricity. Heat and electricity are both forms of energy and are often interconnected. When an electric current

flows through an electrical resistance, part of its energy is converted into heat energy. This is, of course, the basis of most kinds of electrical heating and lighting. There are more subtle ways of getting heat (or cold) from electricity. Electricity can be used to carry heat from one place to another. I take heat away from a cold part, making it colder, and transfer the heat to a hot part, making it hotter. The devices which do this are called thermocouples.

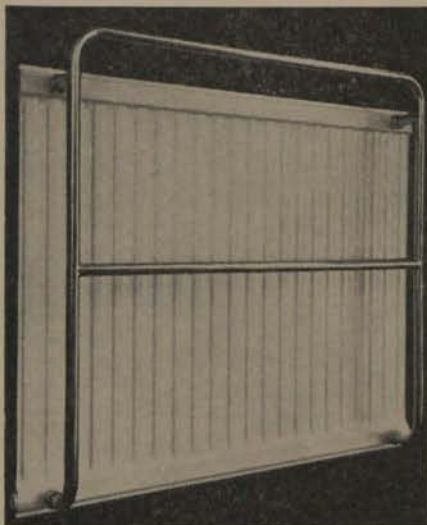
A thermocouple is a pair of junctions, where two different conducting materials are joined together. The junctions may simply be two joins in pieces of wire. One piece of wire of one metal, joined at both ends to both ends of a piece of wire of a different metal, boring a thermocouple.

Its behaviour depends on the two different kinds of metal used. If copper and nickel are joined together and one junction is put in ice, while the other is put in boiling water, an electric current flows through the wire. The difference in temperature between hot and cold junction produces an electric current. This kind of thermocouple is often used to measure temperatures, since, if certain metals

are used, the current depends on the difference in temperature between hot and cold junctions.

An ammeter can be connected into the circuit. Instead of reading the current in amps, the ammeter scale can be calibrated to read the temperature in degrees. Thermocouples are used to measure high temperatures, like, for example, the temperature inside a furnace. The current is called a thermoelectric current. The effect which causes it, discovered in 1821, is called the Seebeck effect after its discoverer. In 1834, the French physicist, Jean Peltier, noticed an effect which was exactly the converse. In the Seebeck effect, a difference in temperature causes an electric current. In the Peltier effect, an electric current causes a difference in temperature. Heat is effectively transferred from one junction to the other.

I could go on in more detail here on the various other applications for thermocouples, such as thermoelectric refrigerators and the use of the thermocouple device to automatically start gas fired boilers, etc., but I have no doubt this is enough for the present and we shall continue in a later issue.



New dryer

HULL Steel Radiators Ltd. announce the introduction of an outstanding new dryer which will shortly be available ex stock.

This latest addition to the Hull Rad range represents a significant advance in the provision of drying facilities. The unique (fully protected) design combines room heating from an adequately sized radiator with generous heated rails for drying. Unlike existing radiator towel rail units, heat transmission from the radiator is not lost when towels or clothing occupy the rails, the heat transmission continuing by convection between the radiator and the articles being dried.

The unit consists of a single panel pressed steel radiator, 29in. high, manufactured to BSS 3528, finished in white stove enamel, with 3/4in. fully chromed heated drying rails. It is wall mounted on exclusive Hull Rad concealed brackets, is easy to install, and requires no unsightly floor supports or connections.

The dryer, for use on closed circuit hot water installations, is available in two sizes, with heating surfaces of 15.72 and 18.98 sq. ft.

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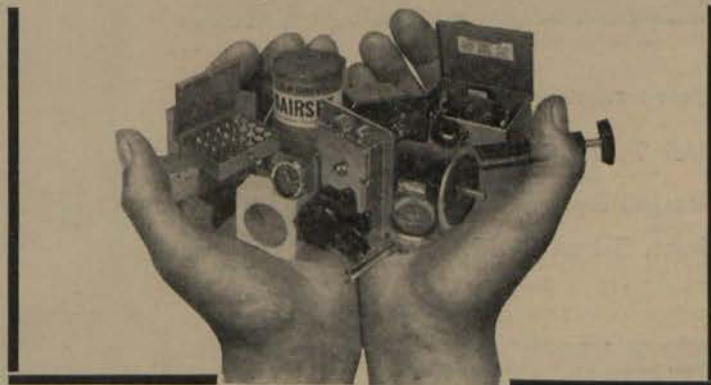
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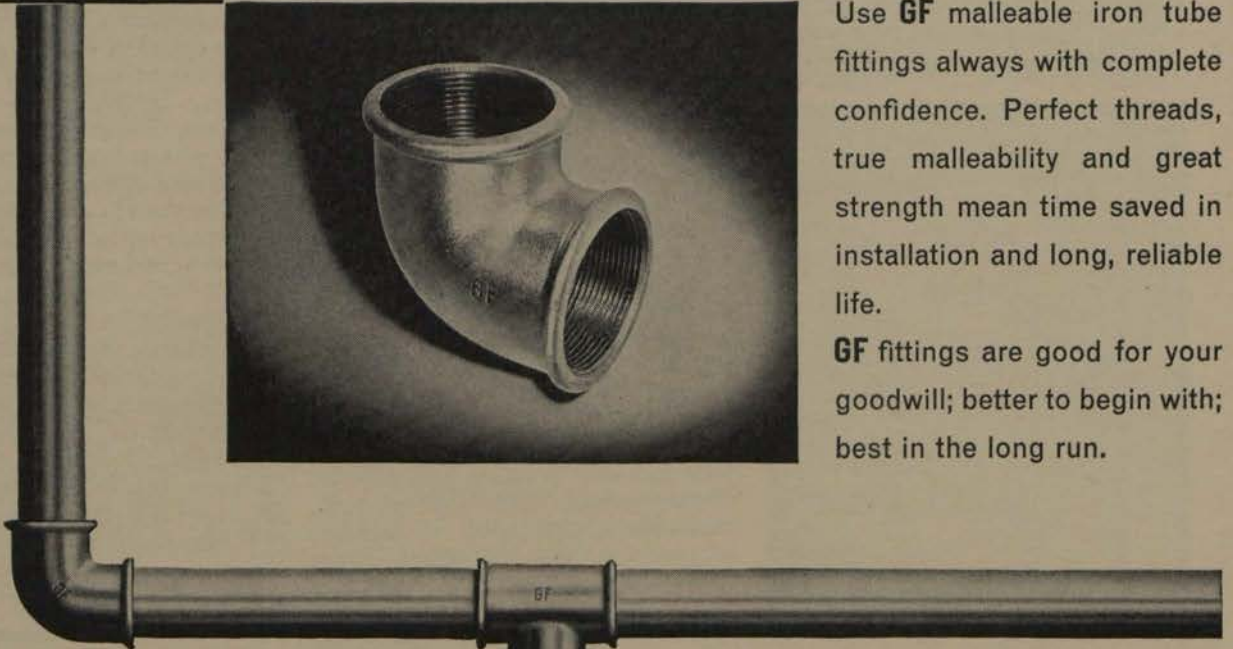
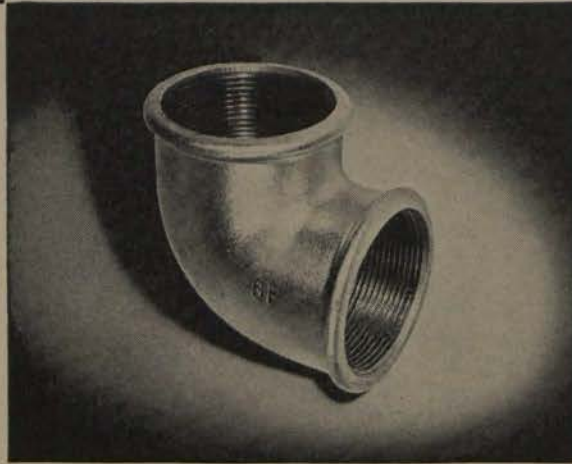




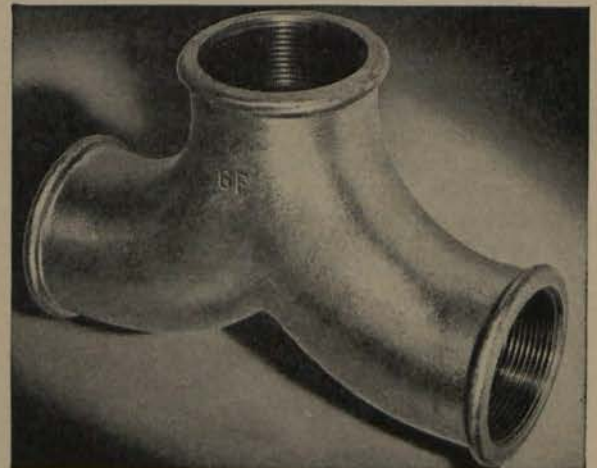
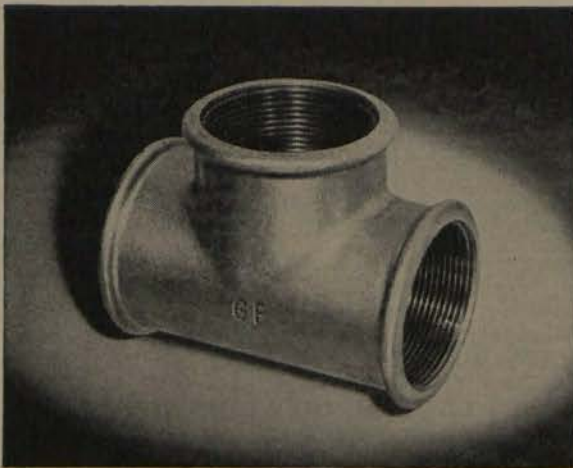
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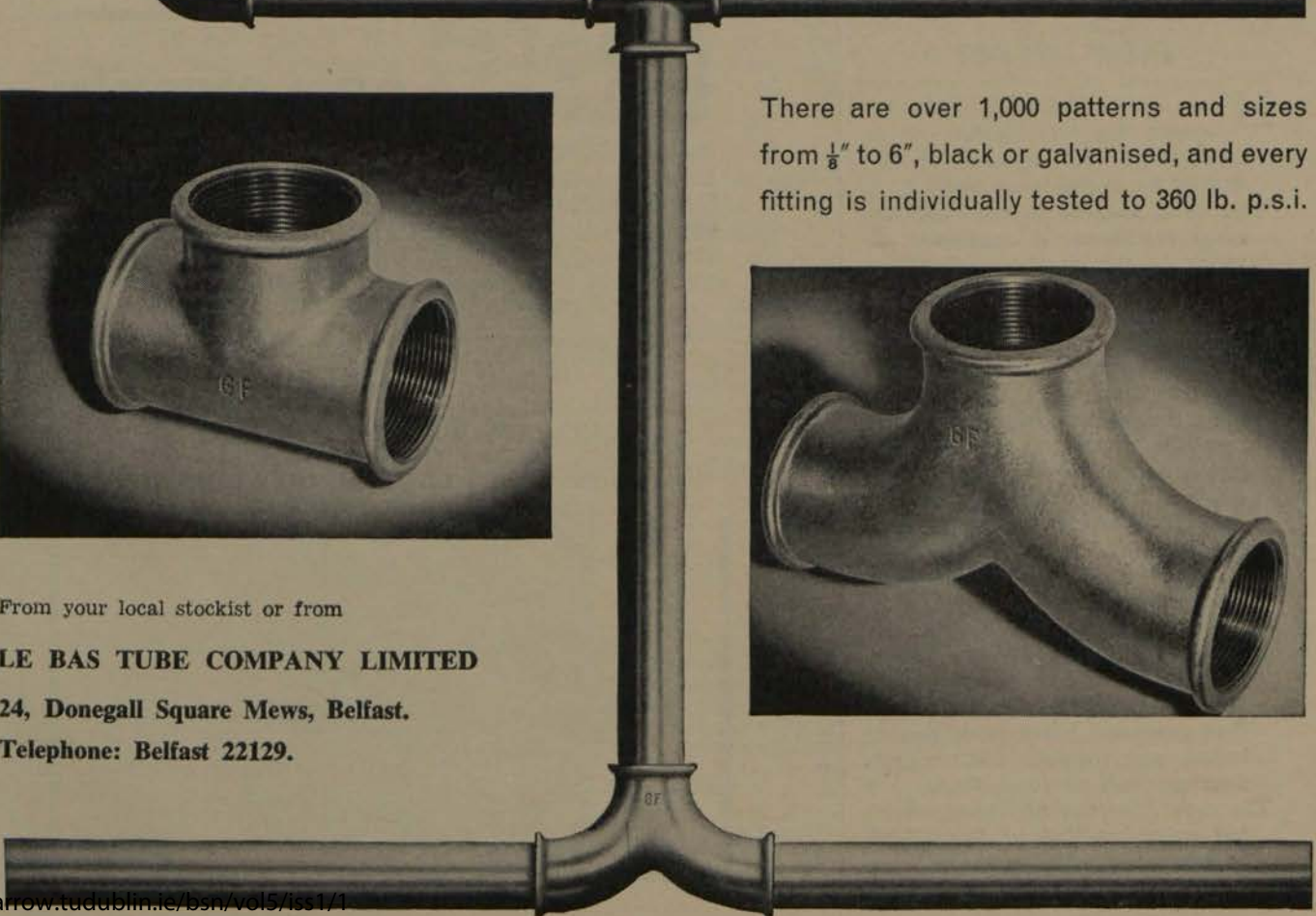


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Taking a look at radiant heating

RADIANT heating solves many of the problems encountered in heating workshops and factories. As floor and ceiling panels, it does not encroach on valuable floor space or provide obstructions along walls. Again, in dusty locations, in woodworking shops, in foundries, etc., the dust problem is not aggravated by convection currents such as occur with convective heaters. Conversely, processes requiring a high degree of freedom from dust, e.g., the printing industry, tend to favour radiant heating.

In buildings with high roofs a very even temperature can be achieved. Many workshops and factories have large doors which are frequently left open and the resulting draughts and high air changes make convection heating unpredictable and uneven. Radiant heating, since it heats the surfaces of the room but not the air, is unaffected by these factors.

This feature of radiant heating frequently leads to considerable fuel economy. A lower air temperature is acceptable for comfort conditions with

this form of heat since heat loss from the body by radiation to surrounding objects is affectively reduced. Also where a small area within a large workshop is to be heated, radiant heating affords the most effective and economical solution.

Architecturally, radiant panels have many advantages. Floor panels are completely concealed and cause no cleaning problems. Ceiling panels are frequently incorporated into the architectural ceiling and a number of manufacturers offer a complete heated ceiling requiring no further finishing. Continuous radiant strip can be used to good effect in many locations.

Apart from physiological consid-

erations there are several well defined advantages associated with radiant heating applied to industrial or semi-industrial occupation. In buildings with a high air change brought about either by design or from the necessity to open doors frequently, it is possible to maintain comfort with lower fuel consumption. As the heat exchange is primarily by direct radiation, a steeper temperature gradient is obtained from floor to roof, and the heat loss by conduction through the roof is thereby minimised.

Radiant heating is often chosen for processes where re-circulation of air by forced convection is undesirable. An example of this would be a clean process such as food manufacture, or precision engineering requiring dust-free conditions. Forced convection may also interfere with the efficient working of dust extract systems, and radiant heating over the actual process plant may be chosen for this reason.

The modern radiant strip installation is specially adapted to present-day factory conditions, reducing the amount of pipe work and valves to a minimum, and without moving parts requiring maintenance. It is lightweight and capable of spanning up to 20' 0" unsupported, providing for considerable adaptability in width and length to provide for varying requirements of heat emission (see Fig. 1 below).

IN the installation shown here Frengerstrip (by Frenger Ceilings Ltd.), the radiant surface panels are formed from pre-coated aluminium (Duralcote by James Booth Aluminium). This provides a permanent finish, free from the need for maintenance. The standard colour of or-

Continued overleaf

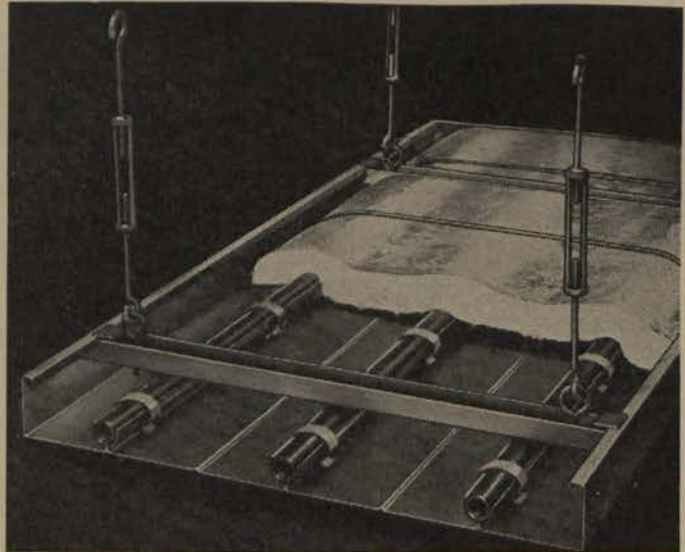


FIG. 1.



FIG. 2—A recently introduced system which makes it possible to position both radiant heating and lighting in one assembly.

from previous page
ange conforms to the specification for emissivity but may be repainted in an alternative colour on site if required.

A further development, incorporating an industrial type troffer lighting unit set flush in the strip, has recently been introduced. This makes it possible to position both radiant heating and lighting in one assembly over the occupant (see Fig. 2: Frenger-Litstrip).

THERE is at present no universally accepted method of calculating the requirements of a structure to be heated with radiant strip. It is generally agreed that heat losses computed as for a convection system will oversize the heating surface (a) because of the higher "equivalent temperature" provided by a radiant system; (b) because of the reduction, with a well-designed system, of vertical temperature gradients. The various methods in use attempt to assess the effects of these for a given building, and to apply reduction factors to a part, or the whole of the convection-system heat loss.

Whatever method is adopted, it is fundamental that the correct design outdoor temperature should be adopted; this will be referred to in the re-printed I.H.V.E. Guide to Current Practice, 1965, to be issued later in the year. The designer might also refer to a specialist contractor for supplying and fixing radiant strip heating.

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SPECIAL REVIEW

from page sixteen.

pump, compact yet powerful, which provides an efficient controlled output, that can be easily adjusted to the requirements of individual systems from the smallest up to full central heating for the average home, e.g., 70,000 B.t.u. boiler rating.

An output control setting lever is situated on both sides of the Spey, thus eliminating fitting restrictions. It can be fitted anywhere and can be installed upright, horizontally or at an angle without affecting efficiency. The Spey measures 5¼" high x 4½" wide (5½" over couplings), and it weighs only just over 6lbs., giving maximum output for its weight and size.

The marketing presentation of the Spey was planned and introduced by a series of regional meetings, when executives from Rotherhams presented the product to Builders' Merchants, etc., within each region. This tour is continuing and visits to Ireland will be taking place towards the end of this month, or the beginning of May, and will precede deliveries of the product.

* * *

A WIDE range of centrifugal pumps are manufactured by Girdlestone Pumps Ltd. (of Woodbridge, Suffolk) in sizes from ¼" to 5", and outputs up to 1,200 g.p.m. They are designed primarily for industrial applications and are manufactured in cast-iron, bronze and stainless steel. Special pumps are available with low nett positive suction head characteristics for Marine water distillation plant, and hot condensate. Such pumps are also extensively used for extraction purposes in industry and in distilleries.

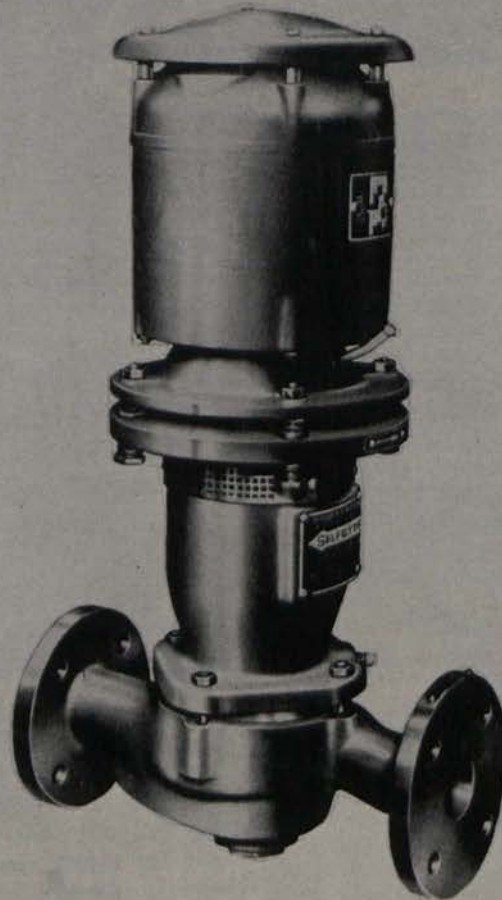
In the plumbing, heating and air conditioning industry pumps are

Continued overleaf



• The Low Suction Head pump, head accelerator.

Selfette Circulator



This well known range of circulators which was specifically designed for the smaller low and medium pressure heating systems and hot water service, has now had the maximum working pressures and temperatures increased to 100 psi and 212°F respectively. The set is super silent and maintenance is simplicity itself. The Selfette is noted for its ease of installation and the small space occupied and the fact that it needs no support other than its own pipe line.

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PRODUCT REVIEW

from previous page

available for chilled water circulation, boosting water supplies, and of particular interest to steam users are their automatic Condense Return Units, made in a wide range of standard and special units designed for customer's requirements. Girdlestone Pumps are represented in Ireland by W. Finucane & Co. (5 Upper Pembroke St., Dublin 2).

* * *

THE STELERATOR circulating pump for small bore heating systems is manufactured by Steel Radiators Ltd. (Stelrad Works, Bridge Road, Southall, Middlesex). The pump casing and impeller are so constructed that the pump operates independent of direction of rotation, thus no inspection window is required.

Other interesting features include the patented stator windings which are insulated by a special enamel process which makes burn-out virtually impossible; a rotor which is permanently immersed in water and enclosed in a stainless steel sheath, having a speed of 2,820 r.p.m. with an input of 20w.

* * *

H. R. HOLFELD Ltd. (Merville Road, Stillorgan, Dublin) advise us of a number of their extremely interesting products. The Loewe Silenta-V Variable Head Accelerator covers performance characteristics up to 22 g.p.m. and 10.5 ft. The motor will not suffer damage even when locked and it does not therefore require a protective switch. All models are suitable for water temperatures up to 250 degrees F., system pressures up to 85 p.s.i., and can be used on either single phase 220 V. or three phase 380 V. 50 cycle AC supply. The low speed of 1,450 r.p.m. guarantees silent running and high starting torque.

The Loewe Pomona 2, Pomona 3, and Pomona 4 self-priming, all purpose centrifugal pumps have been designed for a wide range of applications and are available with different prime movers.

All Loewe Pomona pumps are automatic self-priming under all circumstances down to a depth of 26 ft., and once filled with liquid for initial starting up, they are always ready for operation. There are no priming or non-return valves in the pump which might stick or clog. A special field of application of the Pomona Pump is the

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"BELL" TYPE "D" BACKBOILER shown here with the SUPAHEAT 4D underdraught fire.



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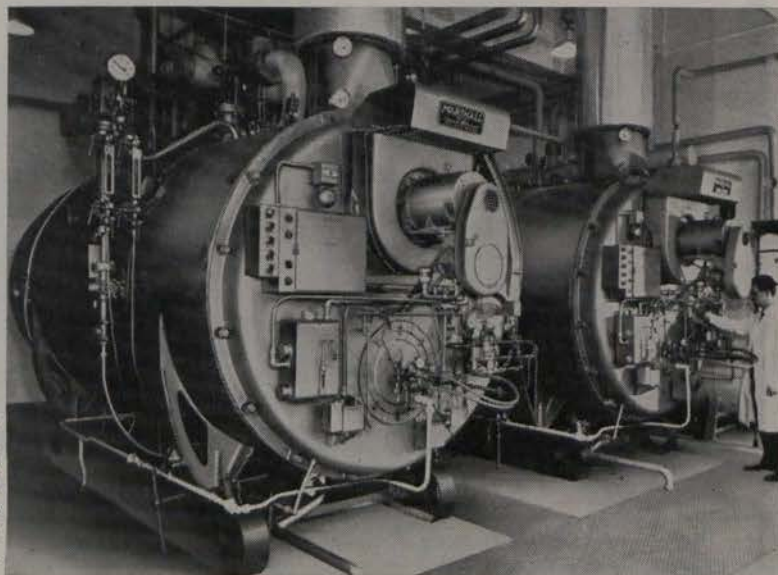
trade
Topics

MARSHALL AT SPRING SHOW

MARSHALL Sons and Company Limited (Gainsborough, Lincs.), who manufacture a standard range of automatic fire-tube boilers with ratings from 520 to 24,150 lb. steam/hour and equivalent B.t.u. outputs, will be showing a CB 50 rated at 1,725 lb. steam/hour at the R.D.S. Spring Show next month.

Marshall CB boilers are four pass horizontal fire-tube units with a single furnace forming the first pass and the other three passes above and at the side of it. A reduction in the cross sectional area of each pass

● Marshall boilers in action at the new Potez Aerospace factory.



maintains a high flue gas velocity which promotes optimum heat transfer and minimises soot deposits.

The forced draught design which gives high combustion efficiency and quick response to load demands, eliminates the necessity for tall expensive chimneys. The caseless fan

and air compressor operate from the same motor, cutting running and maintenance costs and ensuring a low noise level.

Front and rear doors are either hinged or davited to swing open exposing tubes and fire-side surfaces.

Continued page thirty-four.



● Our picture shows (from left): Messrs B. Bracken, Thermal (I), Ltd.; F. J. Rolt, F. H. Biddle Ltd.; C. F. Mann, F. H. Biddle Ltd.; and J. L. Higginson, Thermal (I), Ltd.

Dublin exhibition of Biddle equipment

OVER 120 guests, including Architects, Consultants and Heating Contractors, attended a private exhibition of heating equipment manufactured by F. H. Biddle, Ltd., at the Shelbourne Hotel last month. The exhibition was held in conjunction with Thermal (Ireland) Ltd., Biddle Agents for the Republic of Ireland, and featured the "Warmline" (New type) and the new U.C. series "Forceflo" Convectors with particular reference to noise control.

Thermal (Ireland) Ltd. are now carrying up to £6,000 worth of "Biddle" equipment in Dublin stock, including "Uniflow" Unit Heaters and the new "U" series "Forceflo" convectors. Present at the function was Mr. B. Bracken, newly appointed Sales Representative for Thermal (I) Ltd.

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.

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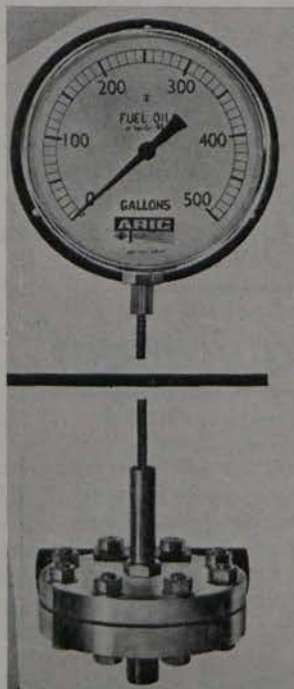
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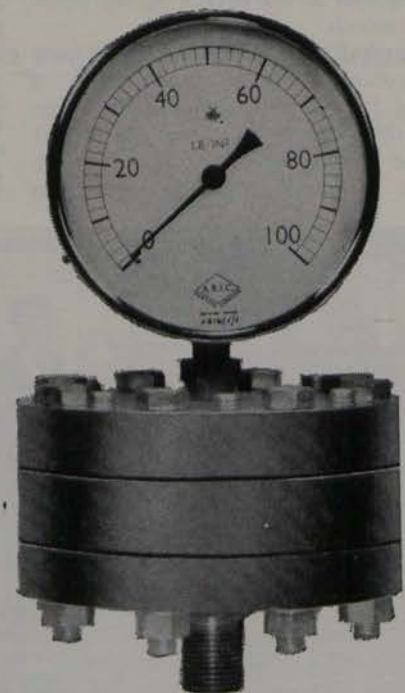
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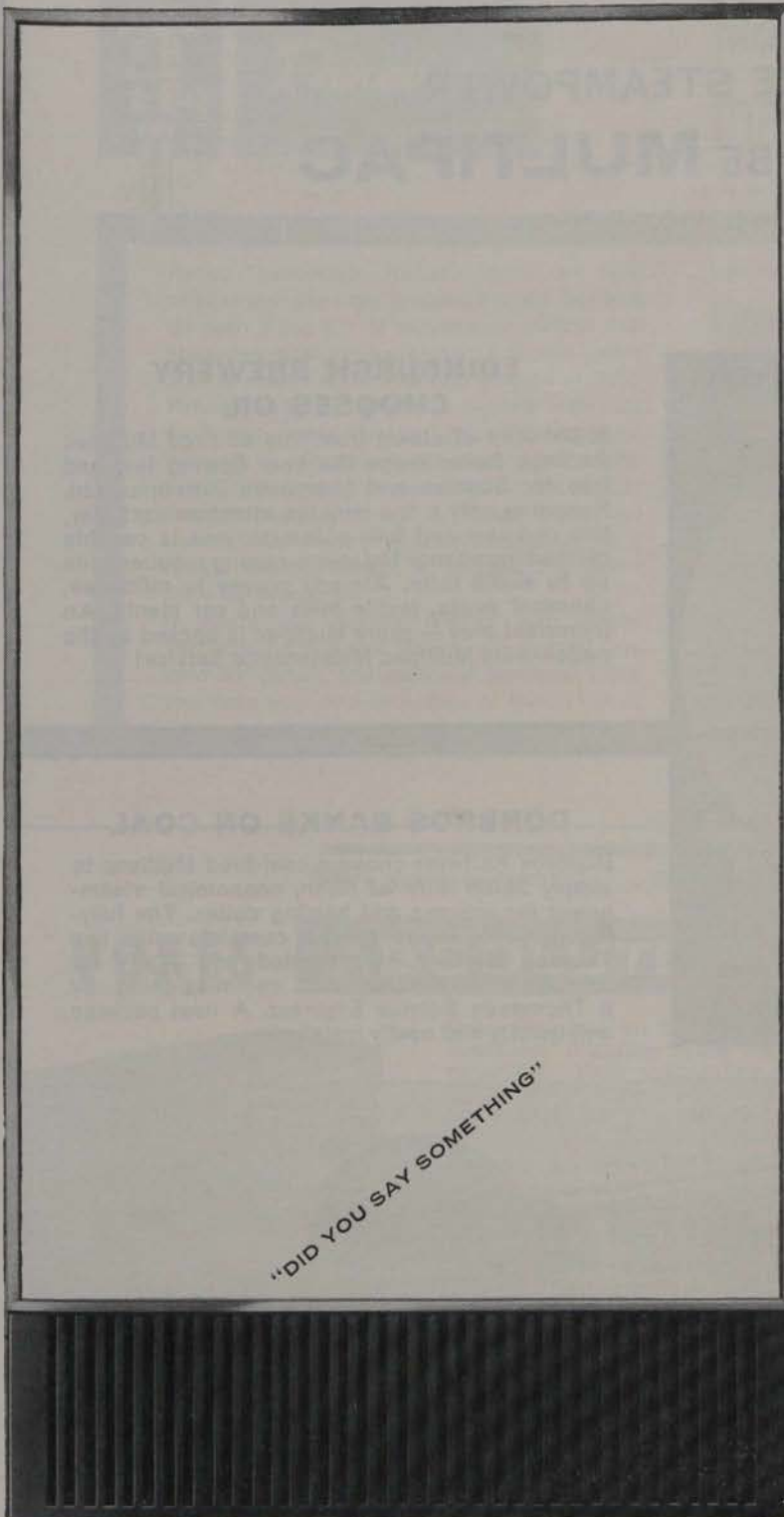
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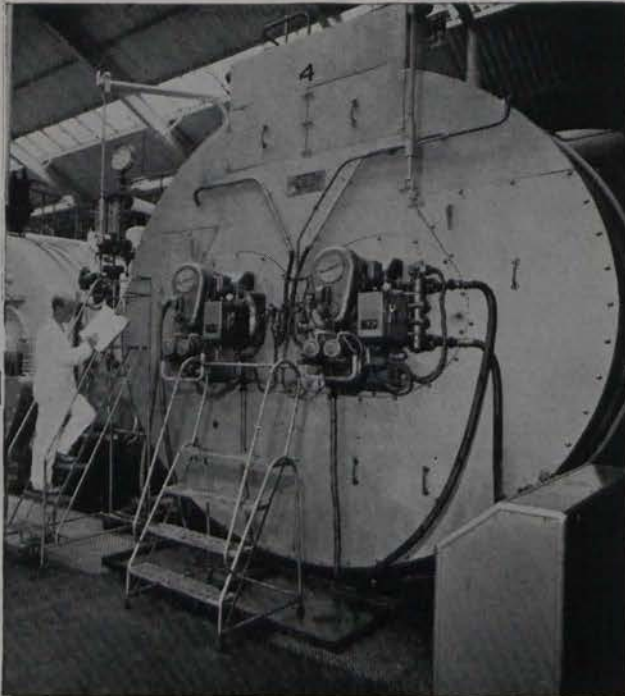
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30,000 lb/hr of steam from this oil-fired Multipac Package Boiler keeps the beer flowing fast and free for Scottish and Newcastle Breweries Ltd. Requiring only a few minutes attention each day, this compact and fully-automatic unit is capable of handling 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!



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.**



Makes a small claim
that's pretty BIG!

Ranco Thermostatic Radiator Valves are quite small in size and price (under £4 retail). But they do such a big job of temperature control they absolutely slash central heating fuel bills (easily 20% or more). Adjustable over a range of 30°F, Ranco Valves automatically regulate individual room warmth and comfort. Temperatures are kept just right . . . without any overheating that wastes fuel. Something your clients will cheer about! Another cheering thought . . . Ranco Valves can be fitted to any type of radiator. No special kind of central heating system is required. So there's hope for everyone!

If you're not already familiar with Ranco Thermostatic Radiator Valves, we suggest you send for details and technical literature. Once you make your own evaluation of Ranco Valves

you and your clients will be sold on them.



Thermal Radiators Limited • Falcon House • Woodley Reading • Berks • Telephone Sonning 2621

IRISH REPRESENTATIVES:

Heatavent Supply Co. (Mr. P. J. Noone)
379 South Circular Road • Rialto • Dublin 8 • Eire
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227 Beersbridge Road • Belfast 5 • N. Ireland

Where purity is essential . . . install

VOKES 'ABSOLUTE' AIR FILTERS



1. Vokes High Temperature 'Absolute' filter. To withstand temperatures up to 1000° F.

2. Vokes 'UNIPAK' system, available in many different sizes for a wide range of air volumes.

3. The methylene blue test rig at Henley Park, headquarters of the Vokes Group.

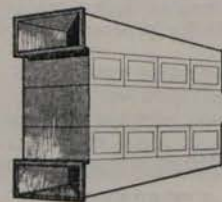
Vokes 'Absolute' air filters were developed for use in nuclear energy applications where inefficient filtration could lead to hazardous conditions for both equipment and personnel. Their outstanding performance (99.95% efficiency against particles in the 0.1-0.5 micron range) has quickly led to their adoption by laboratories, food processing plants, etc.—In fact, wherever a need for super efficiency filtration exists. For further information please write for catalogue HJ.

Variants of the 'Absolute' filter include High Temperature High Humidity, and Acid Resistant types—all with a guaranteed efficiency of 99.99% against sub-micronic particles. 'Absolute' filters are available as canister types using an all welded canister assembled between headers, and Vokes can also supply 'UNIPAK' systems for housing several panels in easily-serviced, space-saving units.

Vokes 'Absolute' filters are tested in accordance with BSS.2831 on a methylene blue test rig. Every filter is subjected to a stream of air containing particles of methylene blue 'dust' ranging in size from 0.1 to 0.5 microns, and rejected if its efficiency is less than 99.95%. Vokes is the only British company to guarantee minimum performance figures in this way and Vokes filters are therefore widely used in all applications which require scientific filtration.



1.



2.



3.

Comprehensive literature covering all Vokes filters is available on request from the Sole Agents:

THE LEINSTER ENGINEERING CO. LTD.

VOKES



trade Topics

from page twenty-nine.

The entire refractory swings clear in the rear head for ease of maintenance. Under normal operating conditions fire-tubes only require cleaning once a year.

Marshall CB boilers are designed to burn any grade of fuel oil or gas. Before leaving the factory every boiler is fully tested under simulated site conditions and guaranteed to operate at a fuel to steam efficiency of 85 per cent. Irish agents are Thermal (I.) Ltd.

* * *

MR. S. MURPHY (71, Slieve Rua Drive, Stillorgan, Co. Dublin) has

DOHMSEAL AGENT IS APPOINTED

been appointed sole agent in Ireland for "Dohmseal" refractory coating. This preparation protects refractory brickworks, linings in furnaces and boilers heated by hard fuels, fuel oil or gas, against slag attack, heat erosion, carbon build-up, flyash abrasion, spalling and chemical attack.

Four different grades of Dohmseal are available. Each grade functions with a definite range of temperatures for a specification recommended ap-



● At the exhibition were (from left): Messrs B. G. Daly; Myles R. McDonauld (N.E.T., Arklow); and Mr. W. Bond, Joint Managing Director Elliott Process Automation Ltd.

plication. Application is done by dipping the brick in the Dohmseal or by coating the brick with a brush. It is supplied ready for immediate use.

The four grades available are: Standard grade, 700°C--1200°C; Zircon HT. grade, 1200°C--1650°C; Super Z grade, 300°--1550°C; Super S grade, 1200°C--1700°C. The manufacturers are Mellor Mineral Mills Ltd. (Stoke-on-Trent).

* * *

A SPECIAL sub-committee has been set up by the Engineering and Scientific Association of

COMMITTEE TO STUDY ATTENDANCE

Ireland to enquire into ways of stopping the falling off in attendance of members at Association meetings.

In the Association's annual report and journal an aeditorial notes that attendance figures at the meetings have declined from an average of 23 in 1958 to 15 last year. It adds: "If this decline continues there is the possibility that the invited guest will be faced with perhaps half-a-dozen or less . . . Obviously your

SUCCESSFUL ELLIOTT AUTOMATION EXHIBITION

ELLIOTT-Automation last month presented the first major exhibition and symposium on automation to be held in Ireland. The Minister for Transport and Power, Mr. Childers, opened the exhibition, while Mr. W. Bond, Joint Managing Director of Elliott Process Automation Ltd., was present to receive him and conduct him round the exhibits.

The exhibition consisted of controls and instruments designed for use in a wide variety of automatic systems. In selecting these, particular consideration was given to the development of Irish industry in relation to the Second Programme of Economic Expansion.

The symposium was based on specialised films and papers presented by Elliott's experts. Subjects covered included power station instrumentation, boiler instrumentation, chemical and oil refining, fertilizer production, application of modern measuring and control techniques to food production, temperature control in buildings, bulk handling techniques, on-line analytical instruments, automatic control valves and, last but by no means least, digital computer applications.

The display of products, together with the discussion of their application and integration into control systems for specific industries, provided an excellent opportunity for consideration of the special needs of the industrial engineer in Ireland.

Council could not under such circumstances approach lecturers with confidence and the standard of papers would decline."

The editorial reports that the Association's financial position is "less serious." However, for the first time in

Continued page thirty-six

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 (2¼"—8") for large volumes of hot water for process hot water supplies.

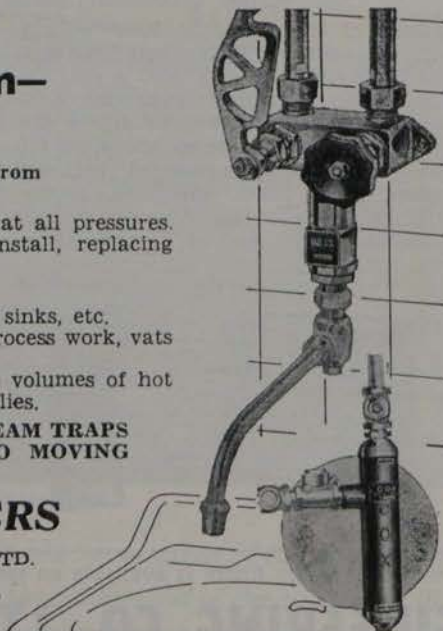
**NO TIME LAG - NO STORAGE - NO STEAM TRAPS
NO LOSS OF CONDENSATION - NO MOVING
PARTS TO GO WRONG**

COX WATER HEATERS

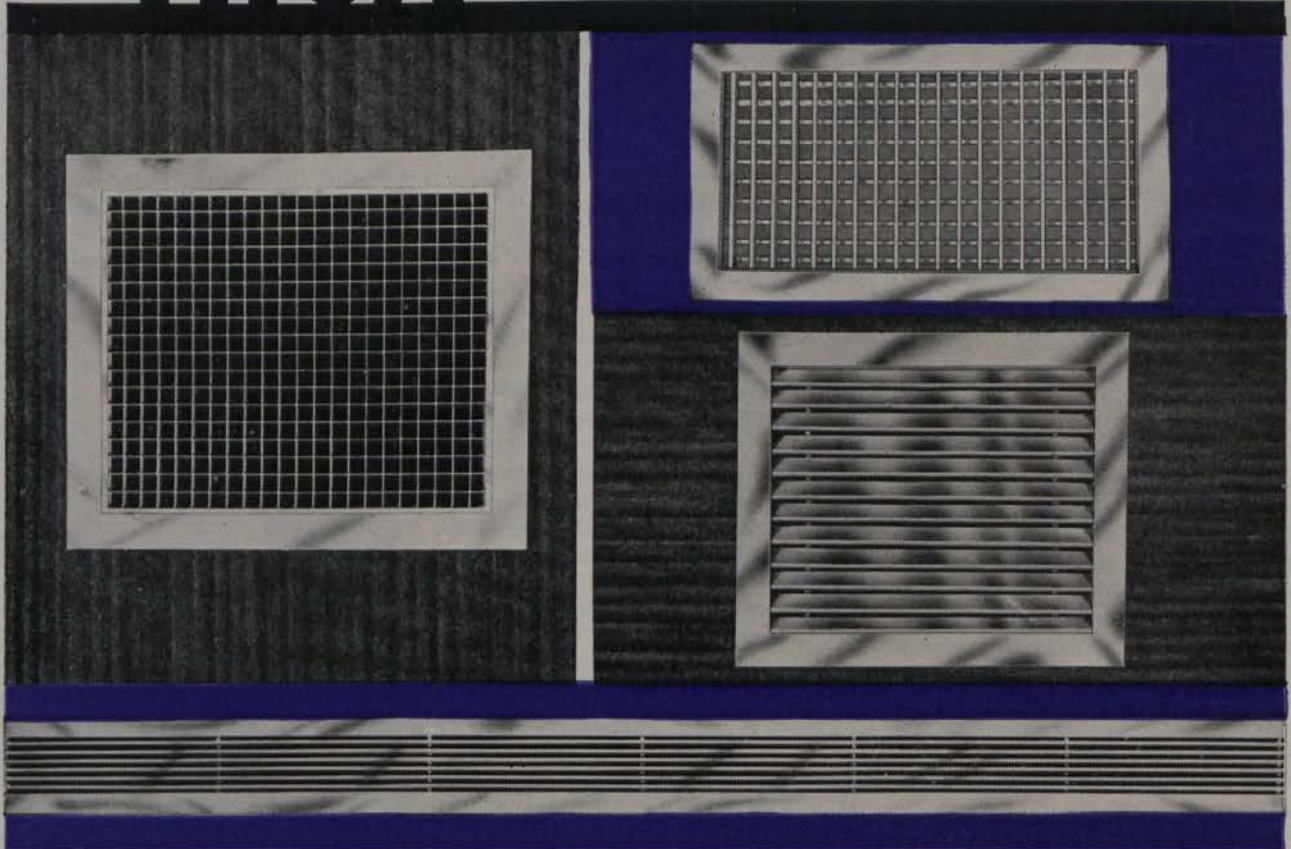
Manufactured by COX ENGINEERING CO. LTD.
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Tel.: 82483. Telegrams: "Heaters Sheffield"

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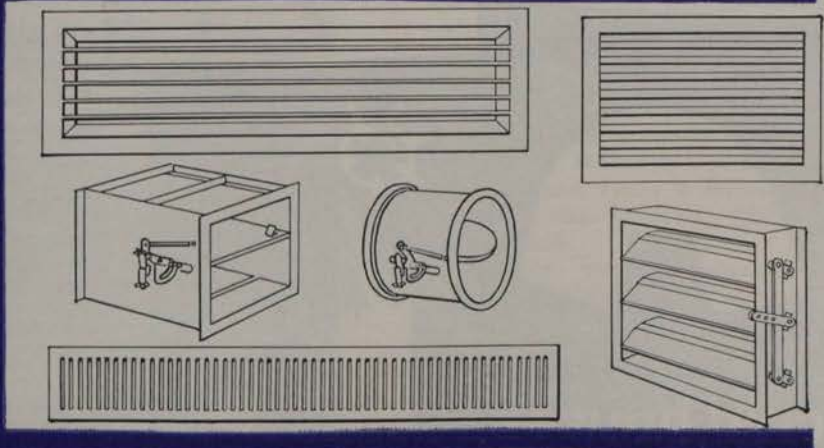
TROX *air distribution equipment*



EXTRUDED ALUMINIUM GRILLES WITH SECRET FASTENING

Manufactured from solid extrusions, TROX high quality aluminium registers and grilles feature the unique TROX secret fastening device. Their fine finish and elegant design enhance the architectural merit of any modern building, while their performance versatility enables the most critical air distribution requirements to be fulfilled.

Every item in the comprehensive range of TROX equipment is a well designed, high quality product. TROX technical facilities are available to offer recommendations for all special requirements.



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Thirty-five



trade Topics

From page thirty-four

the history of the over 100 strong Association a slight deficit is shown in the annual report.

"It is hoped that this will be a passing phase which will right itself during the next twelve months," notes the report. Members are urged in the report, to keep their subscriptions—they have not been raised since the Association was founded—up to date. Last year twelve new members joined the Association.

* * *

AN entirely new range of boilers and heaters containing many new and interesting features

NEW PAXMAN BOILERS RANGE has been announced by Davey, Paxman & Co., Ltd., of Colchester.

To be known as the Paxman Autonomic, the boilers have outputs ranging from 1,500 lb./hr. to 6,000 lb./hr., and the heaters capacities from 500,000 B.t.u./hr. to 5,000,000 B.t.u./hr. The smaller units in the range are capable of passing through an ordinary 3' x 6' 6" doorway, yet each one has an output far superior to that of any other contemporary unit of considerable greater size.

Although revolutionary in concept,

the new Paxman Autonomic is at the same time a development along well-established and well-proven lines. This point is an important one. The heaters are, in fact, conventional cylindrical shell heaters of three pass wetback construction and the boilers of two pass wetback construction with a single pass smokebox economiser incorporated in the packaged unit providing an overall efficiency normally expected from a three pass boiler.

The features of the new range include the following:—Low price; small and compact in size; absolute minimum of servicing; quiet in operation; light foundation weight; oil-fired versions are capable of burning oil fuel up to 3,500 secs. Redwood No. 1.

In addition, the steam boilers offer very rapid steam-raising from cold—about eight minutes—comparable with that formerly achieved only in a shell type boiler.

Constructed for standard working pressures of 65, 95 and 140 p.s.i.g., the new range of heaters is available in four sizes of frame, the difference between one frame size and another being in the number of tubes fitted.

A spokesman for the Company said that they would be marketing the new range throughout the whole of Ireland.

* * *

THE WANSON Company Ltd. (7, Elstree Way, Borehamwood, Herts.) recently announced

COMPACT INDUSTRIAL BOILER a further expansion in their range of products with the Thermobloc hot

water boiler.

This unit has been developed over many years and is widely used in


Europe. Designed specifically for industrial central heating systems, it can equally well be used for supplying hot water in factories, canteens, cloak-rooms, or for any installation requiring a constant supply of hot water. Four basic sizes are available: G.R.40, 120,000 to 200,000 B.t.u./hr.; G.R.60, 200,000 to 280,000 B.t.u./hr.; G.R.80, 280,000 to 360,000 B.t.u./hr., and G.R.125, rated at 500,000 B.t.u./hr. Overall height of the smallest model is 49 in., and 78 in. for the largest model, making a compact unit for their rating.

Based on a vertical smoke tube design, the Thermobloc water boiler has a refractory lined combustion chamber. The combustion chamber design and smoke tube arrangement permit the use of the standard oil, or gas-burning units which are used on Thermobloc Universal air heaters.

Irish agents are Forfix (L.) Ltd. (55 Mary St., Dublin).



● The Paxman Model 30E with covers removed.



cold houses

& hot houses

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 6th annual Convention and Exhibition of Heating, Air Conditioning, Refrigeration and Sanitary equipment was held last month in Milan at the huge Fiera.

The first overall impression was of immense space. Corridors between exhibits were almost as wide as the stands, and although the floor-to-ceiling height of each of the four exhibition halls was considerable, there was not the feeling of wasted Olympian heights associated with Hevac.

This comparison is probably unfair, since the various buildings in Milan were only completed between 1959 and 1961, and the entire Fiera Campanaria area is specifically devoted to the Milanese perpetuation of exhibitions, Trade fairs and general mardi gras.

In fact, the Milan exhibition boasts approximately 100,000 sq. ft. floor area (ground floor only), of which about one half is taken up with stands. There are 630 stand spaces, and these were taken up by 250 exhibitors. Apparently many aspiring exhibitors had to be refused this year, although plans are ready for further extensions of space in 1966. In 1964, 49,000 visitors were recorded, which is coincidentally close to the 43,000 visitors claimed for Hevac, 1964. A further coincidence lies in the same number of exhibitors (250 at Hevac, 1964), and there the similarity ends, since the 250 exhibitors at Olympia took up 90,000 square feet of net stand space.

1 THE EXHIBITIONS

ALLAN CAVINDER gives an eye witness account of the 6th Milan Heating, Air Conditioning, Refrigeration and Sanitary Equipment Exhibition.

OVERALL IMPRESSION OF IMMENSE SPACE

SO much for space—what about the exhibitors?

A plethora of air conditioning units. The writer's count indicated 43 different makes of unit, mainly the packaged room conditioner type, but including several large tonnage industrial plants. Familiar names were Carrier, Dunham-Bush, Trane and York. Running a close second came 34 different makes of oil burner—again of all types, but primarily pressure-jet, with a few L.P. and M.P. air burners, and apparently only one wall-flame burner which, naturally enough, formed part of a boiler-burner unit. Emphasis seems to have been placed on aesthetics in this battle of the burners, and first thoughts of Daleks or Japanese motor cycles were inevitably disproved. This aim for "shape," however, has encouraged re-thinking in the working design of the units, so that the traditional arrangement of the motor at right-angles to

the burner-tube is being replaced by a totally "in-line" assembly.

Controls and instrumentation were well represented (31 exhibits, including American-Standard, Billman, Danfoss, Honeywell, Landis & Gyr, Samson and Satchwell), as also were radiators, with 30 different makes on view. One was surprised to see so many cast-iron models, and the comparatively poor standard of some of the pressed steel types, but with so many makes to inspect and criticise, this is probably understandable. What was surprising to the writer, however, was the dearth of convectors, and possibly there is room for an export drive by some of the U.K. manufacturers in this field.

DOMESTIC boilers (29) and industrial boilers (also 29) made one feel at home, particularly with the Powermatic and Steambloc so well shown. Baths, basins and Bogs were also well to the fore, and naturally so, since this aspect of building services is specifically included in the exhibition.

Similarly, warm air units, mainly oil-fired, took plenty of space, and it was pleasing to see the Liescotherm and the Wanson units well displayed.

Oddly enough, grilles and diffusers were surprisingly few and far between, and consisted almost entirely of such familiar names as Anemostat, Titus, Trox, Waterloo, and the Hart & Cooley and Tuttle & Bailey range shown on the Europair (Van den Bosch) stand.

Insulation was also sparsely represented, the main names again being recognisable—Armstrong Cork, Gustin and Bacon, and Owens-Corning Fiberglas. Independent air filters of all kinds received little prominence, either. The Aeromac-Europair elec-

Continued overleaf

● Pictured here on the Van den Bosch Europair Stand at the Exhibition is our (bearded) Milan correspondent, Mr. Allan Cavinder. Mr. Cavinder has recently been appointed General Manager of Van den Bosch Ltd. in the U.K.



tronic filter was one of two such types displayed, and washable and throw-away filters and filter media were again largely the concern of the Europair stand.

Frenger ceilings were shown by Zent-Frenger of Milan, and among 23 fan exhibitors it was possible to see Sturtevant, Tootal and Vent-Axia.

Fuel display was surprisingly limited to one exhibitor—Centro Combustibili Solidi. Other types of product on view were Coils, Dust Collectors, Domestic Heaters (mainly derosene), Domestic Water Heaters, Tools and Fixing methods, Valves and Fittings, Ducting and accessories, Pumps and Unit Heaters.

IF the products on display at an exhibition of this sort are indicative of the type of installation predominant in that particular country, then one could draw the conclusion that Italy is primarily concerned with air-conditioning, and that "warm-air" as we know it in the U.K. for domestic purposes is hardly developed. Domestic requirements seem to be largely met by a/c room units, or alternatively by small-bore radiator installations or independent kerosene heaters. Refrigeration seems well developed, as one would expect in a land with such enviable conditions of climate, particularly in the South. Zanussi is a name to be reckoned with in the

Impressions of Milan

from previous page

domestic refrigerator market, not just in Italy but also throughout Europe, which absorbs 65 per cent. of its production. It is perhaps of interest to note that Hoovers have recently completed an agreement with Zanussi to supply five refrigerator models for the British market.

Along with the exhibition was a multi-lingual Convention on Air Conditioning. This was divided into five sections, as follows:—

1. The present state and new trends in air conditioning plants and refrigerations equipment. Eleven speakers in this session included Mario Constantino (humidity), Gian Felice Bertolini (some considerations on the flexibility of induction type installations), and Albert Van Beveren (diffusion of air in conditioning plants).
2. Air conditioning and transport: Sea, Air, Road and Rail. Three speakers, including Signor Vergani on "Air Conditioning the TSS 'Oceanic.'"
3. New air-conditioning plants in 1964. Five speakers on this subject.
4. Air conditioning in special rooms, particularly hospitals. This sub-

ject was dealt with by seven speakers, including our own Mr. J. H. R. Hampson of Dagenham (late Steensen, Varming and Mulcahy, Edinburgh), who spoke on "Air Conditioning installations in operating theatres."

5. Air conditioning in industrial buildings. This final session had three speakers, amongst them being Dr. Marc Herman of the Aeromac-Europair group who spoke on "Electrostatic filters in industrial plants."

UNFORTUNATELY, instantaneous translations were made only in Italian French and German, so one was particularly attentive to Mr. Hampson! This regrettable omission of our mother tongue may well be a reflection on the meagre support we in the U.K. offered this venture.

Finally, two comments on the exhibition which one trusts will impress the organisers of Hevac, 1966. How pleasant to have cloakrooms and eliminate this dragging around of mackintoshes and personal impedimenta, and how agreeable to be able to sit down and relax worn feet as the larynx is lubricated!

Thanks For Asking...



Yes, we have almost every size of cast iron heating boiler you need . . . in stock . . .

and STEEL COLUMN RADIATORS, too

(phone Jimmy — he can maybe get them out same day) in all sizes and number of sections.

Telephone 693940 and 693943. Telegrams Quadrant Dublin.

QUADRANT ENGINEERS

167 STRAND ROAD, MERRION GATES, SANDYMOUNT, DUBLIN 4.



Sole Agents for BUDERUS Boilers and Radiators

SURELY few of the 190,000 visitors who filed through the huge Frankfurt fairground during the eight days of the International Sanitary and Heating Technique Exhibition there would hardly disagree with the exhibition official who told me: "This is one of the world's most 'inclusive' exhibitions."

Think of it—a total of 738 exhibitors, including the 106 from abroad, spread over 75,000 square meters of Frankfurt am Main exhibition ground.

While there was a definite language barrier to be overcome, the organisation and presentation of the exhibition could hardly be faulted. Full marks to the organisers for the highly successful general presentation of the exhibition, the presence of practically all producers of market significance and the clear organisation of the separate technical branches into the nine exhibition halls.

On the whole both visitors and exhibitors alike seemed pleased. A poll taken among the German exhibitors on the eve of closure showed 93.2 per cent. satisfied with the general course of business.



● A view of exhibits in the section devoted to the sanitary field.

2 THE EXHIBITIONS

An I.P.H.E. correspondent reports from the International Sanitary & Heating Technique Exhibition in Frankfurt this month.

FRANKFURT'S BIG — 738 EXHIBITORS — EXHIBITION

HOWEVER, not quite so pleased were the exhibitors from outside the Federal Republic. Here the corresponding figure was 77.2 per cent., which, nonetheless, represents a notable achievement.

Heating technique constituted the most extensive sector. Three of the halls were occupied by exhibits under this heading with a fourth housing a special display on gas heating technique.

For instance, in the field of heating alone, in the narrowest meaning of this designation, more than 180



● Inside—738 exhibitors and 75,000 square meters of exhibition ground.

German and foreign firms were represented.

There was also a good coverage of the sanitary field with many innovations in installation design and the wide range of fixtures shown.

HERE I should mention that while touring the hall devoted to exhibitors of pipes and pipe fittings one of the leading German firms there expressed interest in establishing links with the market here.

Agents and merchants interested in handling the range of pipe clamps, hose connections and jointing pieces manufactured by Rasmussen G.M.B.H. under the brand name Norma should write direct to the firm at Frankfurt A.M.—Fechenheim, Willmannstrasse 6, West Germany.

The items of particular relevance to Irish markets I noted as follows:—

- (a) Hans Grohe KG., Friedrid Grohe, Grohe Thermostat;
- (b) Rankewerk (baths, etc.);
- (c) Hackettal (Wicu-Thermo Tube);
- (d) Strebelwerk (Radiators and Boilers);
- (e) Dr. Todoroff ('Konus' Boilers);
- (f) Grebauer & Lehrner (Herz-Ag Radiator Valves);
- (g) Kosmos (Valves, etc.);
- (h) Buderus (Boilers and Sanitary Ware);
- (i) Loewe-Pumpenfabrik (Pumps);
- (j) Dansk Stoker & Varmekedel Kompagni (Boilers-Industrial).

HEATERS—CENTRAL HEATING— THE MARKET IS YOURS

Agencies available over all Ireland (32 Counties) for Irish manufactured Heating appliances. Please apply in confidence, giving full particulars of present organisation, heating installation and service experience, trade reference, etc., to **Box No. 33, Irish Plumbing and Heating Engineer, 13/15 Dame Street, Dublin, 2.**

Thirty-nine



MONTHLY SPECIAL REVIEW

DRYING APPARATUS AND OVENS

Efficient heat supply is a principal objective

DRYING in a broad sense encompasses the removal of water and occasionally other liquids from gases, solids or liquids. The more common usage of the word confines the meaning principally to the removal of water or solvent from solids by the thermal means. The term de-humidification is that applied to the drying of gases and distillation of liquids.

The main object of a dryer is the removal of water from wet material. It is usually more economical to use mechanical means, if possible, to separate as much water as is practicable from the solid materials before drying begins or dehydration. The mechanical means used are filtration, screening, pressing, centrifuging, etc. Settling takes much longer, but requires less power and capital outlay, thus making the removal of the water cheaper.

MECHANISM of Drying: When the solid dries, two fundamental operations take place: the transfer of heat to evaporate the liquid and the transfer of mass as vapour and internal liquid. These two operations or processes take place simultaneously.

In any commercial drying problem a principal objective is to supply the required heat in the most efficient manner. So heat transfer may occur by conduction, convection or radiation or by any combination of all three. The various types of industrial dryers may be shown to differ fundamentally in respect of the method used for transferring heat to the solid; generally heat must flow first to the outer surface of the solid and then into the interior. An exception is drying with high frequency electrical currents where heat is produced or generated within the solid, producing a higher temperature at the interior than at the surface and consequently causing heat to flow from inside the

solid to the outer surface.

Mass transfer in drying occurs as liquid or vapour flow, or both, within the solid and as vapour flow from the external wet surfaces. The nature of liquid concentration gradients in solids during drying depends on the mechanism of internal liquid flow and this mechanism in turn depends to a large extent upon the physical and chemical characteristics of the solid being dried.

Drying Time—Determination: In most drying problems it is necessary to obtain the drying time of a particular material. The three general methods used are listed in order of preference:—

- (a) Conduct test in a laboratory dryer simulating conditions in the commercial machine or obtain performance data directly from the commercial machines.
- (b) If the specific material is not available, obtain drying data on similar material by either of the above methods.
- (c) Estimate drying time from the theoretical equations.

Drying Methods and Equipment: Drying systems are sometimes classified according to the method of heat transfer that is employed, since the entire problem of drying resolves itself into individual problems of heat transfer and the thermodynamics of air and water vapour. The methods of heat transfer are radiation, convection and conduction. Many types of dryers have been built on these principles for different purposes.

THE selection of dryers is usually a compromise between mechanical design, heat efficiency, quality and product loss. A systematic procedure is often justified when selecting a dryer for a given purpose; such a procedure will consist of:—

- (a) Survey of suitable dryer.
- (b) Preliminary cost estimates of various types:
 - (i) Initial investment;
 - (ii) Operating cost.
- (c) Drying tests should be conducted in prototype or laboratory units of the most promising equipment available.
- (d) Summary of tests to evaluate quality and samples of the dried product.

RADIANT Drying: Radiating surfaces heated by steam, electrically or other means afford a good method of heat distribution and control. Radiant heating sets up convection currents and so in low temperature dries only about one-third to one half of the total. Heat for evaporation is actually supplied to the material by radiation. At high temperatures the relation output increases rapidly, according to fourth power law. The total radiation may be computed by equations and tables, as found in approved guide and data books. Generally fins and irregular surfaces do not increase radiation, hence the area to be used in calculations is the area of smooth surface envelope enclosing the radiating elements. A certain amount of air circulation is required through a radiant dryer in order to carry off vapour or radiant heat from infra red lamps which have been accepted by certain industries as practicable for their specific industries. Proof of successful application is found in the drying of lacquers.



BOTH THIS MONTH'S
SPECIAL REVIEW
ARTICLES WERE
COMPILED BY J. L.
FITZGERALD, B.Sc.

DRYING APPARATUS AND OVENS

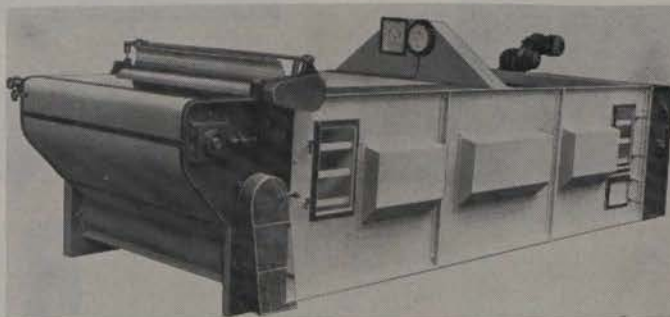
from previous page

Conduction Drying: Drums or drying rolls and immersion heaters are examples of the direct contact method. The most important factor is close contact of the material with the heating surface. Agitation is sometimes required to prevent overheating and to increase uniformity.

Convection Drying: The general type convection dryer is composed of an air conditioning system, material handling system, and the housing for the dryer. The source of heat is the heated air or other gases circulated in the dryer. The rotary type dryer is of the cylindrical drum type and it can be heated directly or indirectly. The air circulation may be parallel or counterflow; a variation is the rotation laire type dryer, which introduces the air beneath the flights, thus securing very close contact. Other convection dryers are those of both types such as the Cabinet and compartment dryers. Finally it should be mentioned that special safety features must be designed into the dryer to safeguard against failure of the drying cycles. Such precautions are, e.g., an air flow failure switch located in the exhaust duct, which should shut off the exhaust fan and the supply fan as well or the heating coil, and finally sound an alarm bell in the event of air pressure in the exhaust duct.

LASTLY, to mention other types of dryers available, are tunnel dryers, which can be of the continuous type; spray dryers are used generally in production of dried milk, coffee, soaps, detergents, etc.

Freeze Drying: Freeze drying is well known to-day, especially in the frozen foods field and in the pharmaceutical field, with particular reference to drying blood plasma and penicillin, since the products are extremely heat resistive. There are other systems of drying but space does not allow us to describe these but mention them; drying in superheated vapour atmospheres, flash drying, agitated bed drying, etc.



The new Davidson drier.

New two-stage drier from Davidson

THIS compact, versatile two-stage drier, introduced by Davidson & Co. Limited (Sirocco Engineering Works, Belfast) offers important advantages for the drying of grain crops, grass seed and cattle feeding products. The unit—it has a substantially increased output over previous types—is the latest in the range of Sirocco endless chain pressure driers.

The associated air heater can be arranged for oil or solid fuel firing and completely automatic oil-fired heat exchangers are also available. Steam heaters can be fitted when necessary.

Davidson's agents in the Republic are E. C. Handcock Ltd. (17, Fleet Street, Dublin, 2).

Kosangas for use in Drying Ovens

Propane Gas is now accepted as an ideal fuel for firing fixed or continuous Stoving Ovens. **KOSANGAS** is particularly useful where critical temperatures and exact finish are necessary.

Panel Units are specially designed to provide upward or downward infra-red radiation and may be used with a horizontal conveyor. An even temperature (max. 650°F) is available over whole panel area; this enables large objects painted in pastel shades to be dried to an even colour all over. The products of combustion are discharged from top of each panel into heated zone and add a useful convection component. The panel units can be assembled to any angle for oven building purposes.

Drying Ovens, suited for firing with **KOSANGAS**, use the circulated air principle. They also are finely adjustable to give accurate temperatures and finish.

Continental drying apparatus of many types for other special applications are available.

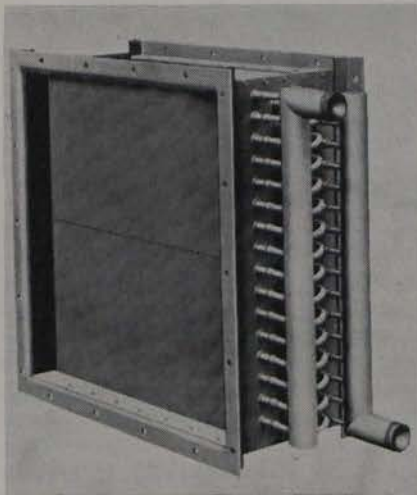
All this equipment is stocked by **KOSANGAS** and demonstrations will be gladly arranged.

Why pay more for your fuel than you need to?

Compare these gas prices. Normal retail prices of Kosangas are only: 73 lb. Propane... 45/-; 24 lb. Propane... 17/-; 11 lb. Propane... 11/-.



trade Topics



● One of the new Matthews & Yates air heaters with four passes of tubes for use with low, medium or high temperature hot water.

New air heater range

A range of new Cyclone plate-finned air heaters suitable for heating, air conditioning and process heating installations has been introduced by Matthews & Yates Ltd. (Swinton, Manchester). Two basic versions are available, one designed for use with low, medium or high temperature hot water, and the other for use with steam at pressures up to 100 lb./sq. in.

Both versions are manufactured in 121 standard sizes, ranging, in 6 in. increments, from 12 in. x 12 in. to 72 in. x 72 in., thus giving a very wide range of duties. Larger capacity heaters of any size are obtained by building up standard units vertically and horizontally.

The heaters can be supplied with copper or aluminium finned tubes. The cheaper, aluminium finned units are for use in atmospheres free from corrosive fumes and have been designed to give the same outputs as the equivalent copper finned units. All heaters are steam tested to a pressure of 100 lb./sq. in. and hydraulically tested to 800 lb./sq. in. before despatch. Heaters can be tested to 1000 lb./sq. in. if required.

DON'T RISK MEN'S LIVES

In the interests of public safety, the E.S.B. has statutory authority to prohibit the erection of buildings and structures within twenty-five yards on either side of the E.S.B. lines. Should such buildings be necessary, the Board should be given, in writing, two months notice of such intention in order that the feasibility of such buildings may be investigated.

The Board has also issued repeated warnings to farmers and other operators of special equipment to exercise care in the use of high machinery near E.S.B. lines.

The ignoring of such regulations and warnings has caused a number of accidents, and in the last five years six of these accidents were fatal.

When work becomes necessary adjacent to E.S.B. lines, local E.S.B. staff will, in the interests of public safety, make arrangements so that the work can be done in safety.

PROTECT LIFE

STAY CLEAR OF ELECTRIC POWER LINES

a review of heating costs

We continue here serialisation
of a paper presented by
Mr. T. Illingworth, A.M.I.H.V.E.,
A.M.I.E.E., F.I.E.S., to the inaugural
meeting of the Irish Sub-Committee
of the Institution
of heating and ventilating engineers.

THE hour degree method of average load estimation is therefore considered more flexible in application than the degree day, and it is proposed to revise the figures originally based on records from Greenwich Observatory and the practice of design on a minimum outside temperature of 32° in accordance with meteorological data available for this country and present design practice of designing on a minimum of 30° with a 35° rise. For this purpose, and for general work on heating, a Synthetic Year has been compiled based on the data published by the School of Cosmic Physics, Dublin Institute of Advanced Studies, and is made up of the data available for those months during the past ten years whose temperature record most closely approximates a monthly mean from 1906-1935. The variations of the Synthetic Year from the Average are as follows:—

January, =.4; February, =.9;
March, Nil; April, =.3; May, =.1;
June, Nil; July, =.1; August, +1.1;
September, Nil; October, =.3; November, +.7; and December, +.5.

APART from temperature, the record also gives relative data regarding barometric pressure, wind direction and speed, cloud, precipitation, duration of sunshine and solar radiation, together with humidity, and thus forms a comprehensive record of meteorological data applicable to heating problems.

The average temperature between the middle of September and the middle of October, i.e., the standard heating season, is, according to the data available from the Synthetic Year, 45.86 degrees, representing an average load of 54.7% for day heating, based on a maximum performance of 65° inside with 30° outside, i.e., a 35° rise.

It is noted that on the above basis, the theoretical load requirement for providing heating in offices occupied from 9 a.m. to 5 p.m. five days per

week, excluding the heating up period is equivalent to the operation of the heating system at a load equivalent to the design heat loss for a period of 744 hours per annum.

These figures provide the basis for the practical calculation of the average load and fuel consumption on heating systems, but it must be borne in mind that a considerable variation can take place between the same months of different years and between the total heat requirements from year to year due to variations in the average temperature.

In January, 1963, the requirement for heating, based on hour degree calculations was 28.75% greater than the normal requirements for this month based on the Synthetic Year whilst the relevant figures for the particularly mild November experienced last year showed a reduction in the theoretical heat demand of 10.5%.

If it were possible or desirable to design a heating system which could provide the precise amount of heat required only during the hours of occupation with instant heating up, and a plant efficiency of 100%, i.e., with the characteristics of a lighting installation, then the practical requirement for heating would be equal to the theoretical requirements calculated on the hour degree basis, but in practice it is necessary to provide in addition for the time required to reach the designed temperature after the starting up of the heating system, to make allowance for the efficiency of the plant and to provide for any standby losses such as occur in the case of boilers banked overnight.

THE ratio between the theoretical heat input required per annum during the hours of occupation to maintain the required temperature and the actual heat input as represented by the calorific value of the fuel burnt or electricity used over the period of the heating season is a direct indica-

tion of the performance efficiency of the heating system.

The heating up time of the system is the time that elapses from the starting up of the system until the required internal temperature has been attained and, in the case of L.P.H.W. installations, is dependent upon the boiler power available, the water equivalent of the system, the average heat emission during this period and time required to raise the temperature of the air in the building.

THE water equivalent of an L.P.H.W. system is the weight of water in the installation plus the mass of metal in radiators and pipework multiplied by the specific heat of the metal, all of which has to be raised to the operating temperature to obtain the required heat emission. The weight and contents of heating mains and branches will depend upon the design and layout of each particular installation, and must be calculated individually for each case. The water equivalent of radiators varies from 1.125 lbs. per square foot of radiator surface in the case of steel radiators and cast iron radiators of the multi-column type to 3 lbs. per square foot in the case of older type radiators. The water equivalent of boilers averages 360 lbs. per 100,000 B.t.u. capacity.

With the above data it is possible to estimate the water equivalent for any particular system and it is noted that whereas in the case of a greenhouse heating system with 4" pipes the water equivalent is 5.39 lbs. per square foot, in a well designed system using pump circulation and modern small water content radiators a figure of 3.5 can be achieved without excessive pipe resistance.

The heating up time for any system can be calculated by equating the boiler output during that time to the water equivalent multiplied by the temperature rise of the water plus the

Continued overleaf

Forty-three

Heating costs

from previous page

average heat emission from radiators and pipework during the period. This is expressed by the formula:—

$$Bx = 45\% E + (We \times Tr).$$

B = the available output per hour from the boiler,

x = the heating up time,

E = the designed emission from the radiators,

We = the water equivalent in lbs.,

Tr = the temperature rise of the water required.

Applying the above formula to practice it is noted that in the case of an installation in which the boiler output is only just equivalent to the heat emission the time required to attain 100 degree rise in water temperature from cold would be 3.8 hours at full load. If a margin of 25% is allowed on boiler capacity, this will drop to 3.14 hours: at 33% boiler margin the time falls to 1.62 hours. If a 100% margin were available on boiler power the heating up time would be reduced to 1.35 hours. From the above, it would appear provident to allow for a 50% boiler margin to provide reasonably rapid heating up and this is borne out by practical experience, the tendency in modern design being to provide ample boiler power for this purpose.

IN calculating the heating up time for practical purposes allowance should be made for the reduction of average boiler output to 50% during the starting up time, i.e., the time taken for the boiler to reach full output. For oil burning and semi-automatic anthracite, coal or turf burning installations the starting up time can be taken as 15 minutes, but in the case of hand fired installations this can be from 30 to 45 minutes, and the heating up time should be extended by 50% of this period.

As the average output for day heating is only 54.7% of the maximum it is not necessary to raise the system temperature the full 100° except in cold weather. To provide an output of 54.7% in the case of a radiator system the water temperature would be about 63° above room temperature. The average load during heating up might, therefore, be taken as 63% of full load for this period as the heating up time will remain constant throughout the season, the plant

being started at the same time each day under a time switch or manual control. In practice plant is started up at 7 a.m. to provide heating in buildings occupied by 9 a.m., and in severe weather design temperatures are not obtained until the buildings have been in occupation for some time. This is allowed for by the office act which stipulates that the mandatory minimum temperature of 63° shall be attained within one hour after the commencement of work.

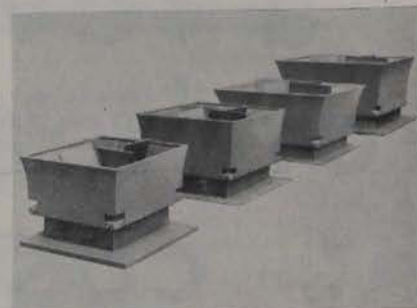
On LPHW installations, using hand fired boilers, it is necessary to bank overnight and experience shows that the consumption of fuel for this purpose represents an additional 20% of that used during the heating up and occupational periods.

IN addition to the time taken to reach the required system operating temperature, there is the time taken to heat the air in the room so that the necessary air temperature is reached. The heating of the air in the room during the heating-up period is dependent upon the rate of air change and the convection component of the heat emission during this period. Assuming that 80% of the heat emission is by convection as in the case of an average radiator system, then, provided that the air change during the heating-up period does not exceed 36% of that allowed for in the heat loss calculations, i.e., 30% of the average heat emission during this period, then the air will have reached the required temperature by the time that the heating up period has been completed.

It is, therefore, obvious that it is necessary that the air change should be kept at a minimum during this time. In the case of systems dependent chiefly upon radiation as in the case of ceiling panels, where only one-third of the heat emission is by con-

Kennedy Hall

THE Kennedy Memorial Hall in Dublin will be heated by high-pressure hot water from a central boilerhouse, with warm-air inlets and outlets (probably inward at side walls and out at ceiling level). Design of these and of the attendant ducting is being specially studied to eliminate both "ventilation hum" and sound leakage in from outside.



● Typhoon upward-discharge units.

Development in ventilator design

A MAJOR breakthrough in powered ventilator design has been achieved by making the non-return shutters conform to the vortex pattern of air as it leaves a fan.

This is what makes the new powered range of Hurricane and Typhoon ventilators, announced by Colt Ventilation & Heating Ltd., economical to install—the smaller number of ventilators needed cuts capital costs, wiring, maintenance and running costs.

The Typhoon upward-discharge units, pictured here, for part of the new range, cut dramatically the number of ventilators needed for an installation because they can handle up to twice the capacity of a standard unit of previously comparable size.

vection, the rate of heating up will be considerably slower than in the case of radiator systems with their higher percentage of convection, and in the case of convectors designed for forced air circulation, the heating up time of the air will be reduced to a minimum. From the above it seems reasonable to allow a heating-up period of 2½ hours and on this basis it is possible to calculate the actual heat output of the system by adding the equivalent full load heating up time to the equivalent full load operating time.

Applying the average plant efficiency to the total heat requirements estimated on the above basis, the total heat input per annum can be calculated allowing for the standby losses in the case of hand-fired systems banked overnight, and the resultant heat requirements converted into fuel costs based on the calorific value of fuel and the cost per unit, i.e., gallons or tons.

Next month we will continue with an example of load calculation.

Forty-four

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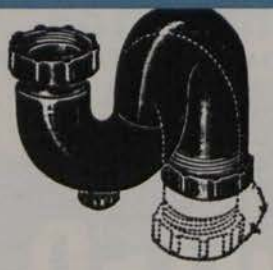
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