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

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SEPTEMBER 1965

Published by APDOW@TU Dublin, 1965

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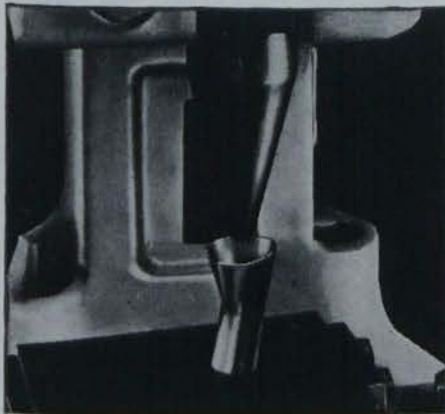
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New Gecal is a special grade of cold-reduced close-grain steel tube, phosphated by a new I.C.I. process against rust and corrosion. It's as good as copper – and better. It's also cheaper. **New Gecal** comes in two grades – Metallized and Plastic Coated. *Every single foot is water tested to a pressure of 200 p.s.i.* It can be bent as easily as copper – connected with compression or capillary fittings in exactly the same way as copper. It is fully interchangeable with copper pipe, but lighter and easier to handle and transport. *Supplies are assured, and prices stable.* **New Gecal** Metallized grade is just over *half the price of copper* – even when copper is at its lowest price. The Plastic Coated grade is only *two thirds the price of copper* – and, because it needs no lagging, can make a big reduction in installation costs. In fact, installation costs can be cut by **as much as 42%**.

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NEW GECAL can be bent as easily as copper and used with *any* copper fitting - capillary or compression - and used in *every* case where copper tube would be. When NEW GECAL plastic coated is used with capillary fittings the plastic sleeve should be cut longitudinally along the tube for about 4". After jointing the sleeve can be replaced and secured by adhesive.



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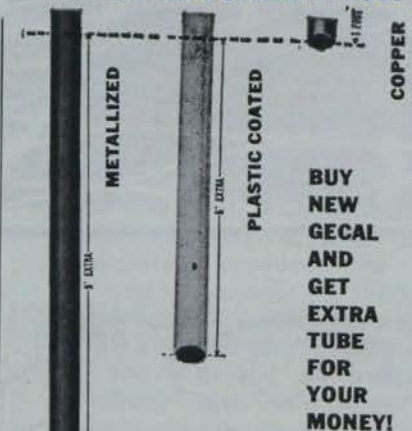
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SAVE OVER £15 ON AN AVERAGE INSTALLATION

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SPECIFICATIONS

NEW GECAL METALLIZED

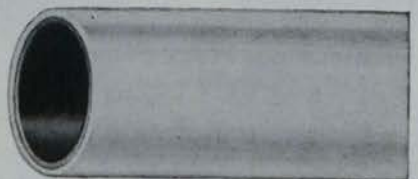
NEW GECAL Metallized Grade is a steel tube, phosphated by a specially developed I.C.I. process for rust resistance, and sprayed with a metal paint to give an attractive finish. It is fully interchangeable with copper pipe and satisfies all the physical and dimensional requirements of BSS 659.

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NEW GECAL Plastic Coated Grade is a rust and corrosion resistant phosphated steel tube, sheathed in an ivory coloured plastic which makes lagging unnecessary when the pipe is used beneath floors or in roof spaces. It is fully interchangeable with copper pipe and satisfies all the physical and dimensional requirements of BSS 659. No painting is necessary - although the plastic coat is an excellent base when painting is desired.

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..... $\frac{3}{4}$ " nom. bore 1/2d per foot



TAKE ADVANTAGE NOW OF THIS SAMPLE OFFER

- Please send me literature with full details of NEW GECAL
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 - (normal price £7.18.4)
 - New Gecal Metallized $\frac{3}{4}$ " for £9
 - (normal price £10)
 - New Gecal Plastic Coated $\frac{1}{2}$ " for £8
 - (normal price £8.15)
 - New Gecal Plastic Coated $\frac{3}{4}$ " for £10
 - (normal price £11.13.4)
- OR
- (400 ft. New Gecal Plastic Coated $\frac{1}{2}$ " } for £26
200 ft. New Gecal Plastic Coated $\frac{3}{4}$ " } £29.3.4)

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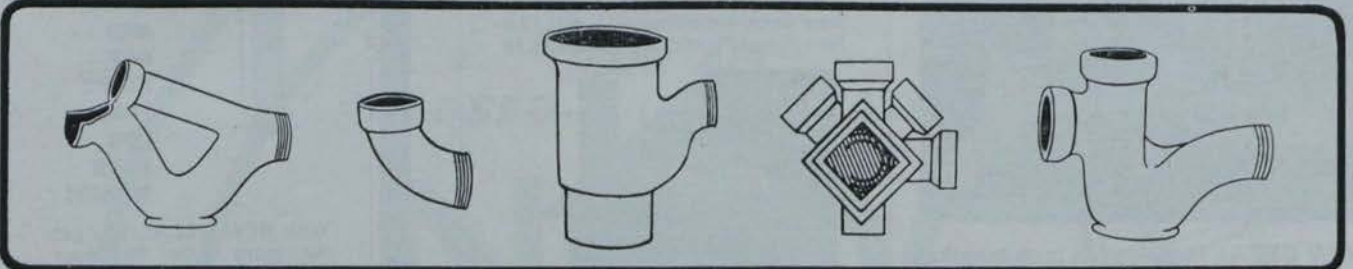
NAME OF COMPANY

ADDRESS

NAME OF USUAL MERCHANT

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ONE OF THE BROCKHOUSE COMPANIES

Irish Shell and B.P. launch training courses

IRISH Shell and B.P. Limited have launched a series of training courses for trade sections associated with the domestic heating market. The courses, believed to be the first of their kind here, are being organised to meet the demand for such a service from the merchant and installing trade.

The new series of training courses began late this month with the first of a series of four lectures for members of the builders providers trade, with special reference to their role in the domestic heating market.

Following this there will be a series of some 24 evening lectures extending through the winter of 1965/66, which is intended for the installing trade with special reference to senior apprentices, although it is open to all comers

Symposium postponed

THE industrial and domestic heating symposium scheduled for this month has been postponed until next year. The symposium (IPHE, May) postponement was announced in a statement from the organisers, the Irish Heating Centre, which added: "In line with the schedule drawn up by the Local Committee, the Heating Centre has assembled a very interesting panel of speakers. Details of the symposium will be issued in good time."

AGA BOILERS AND CENTRAL HEATING



Masser Domestic Appliances Ltd., distributors of Aga Boilers, this month held a reception at the Irish Heating Centre to hear Mr. W. A. Battye, Allied Ironfounders Limited, talk about central heating. Our picture shows (from left): Masser personnel Mr. A. W. Cooke, Mr. E. W. Campbell and Mr. C. Davies.

(Another picture page eight).

trade Topics

among Irish Shell and B.P. appointed installers.

There will be a short series of lectures on elementary mathematics running in parallel with the first few nights of the main course to facilitate those apprentices and others who lack the necessary knowledge of mathematics to appreciate the latter part of the main course.

The course will cover domestic heating design with special sessions devoted to electrical controls, burners, building construction, etc.

IRISH manufacturers in the heating equipment field will be featured on

IRISH AT BUILDING EXHIBITION

the Coras Trachtala stand at the Building Exhibition this year which opens at Olympia, London, on November 17 next for two weeks.

Sanitary ware will also be featured on the CTT stand, which will display the products of 17 Irish firms on a 2,000 sq. ft. stand.

The international look will be stronger than ever at this year's Exhibition. Canada, Ontario, Quebec, Denmark, Finland, Ireland, Ghana, and the Trade Delegation of the U.S.S.R. will participate in the International Section, and in other parts of the Exhibition there will be exhibitions from France, Germany, Spain, Sweden, Belgium and Switzerland.

BROOKS Thomas & Co. Limited (4 Sackville Place, Dublin 1) have been appointed distributors for MARIC automatic flow control valves.

IRISH PLUMBING & HEATING ENGINEER

Vol. 5. No. 6. SEPT., 1965.

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

THIS month sees the inclusion of one of the year's most important special review features, that on domestic oil-fired boilers including air heating systems.

The month also sees W. J. R. Couchman get into his stride with his new column, Talking Shop. The column will form a regular monthly feature in future.

A. L. Townsend continues with part two of our new series based on stage two of his work, "Plumbing."

Trade Topics review the month's news in all sections.

Editorial and advertising offices:
Callaghan Chambers, 13/15
Dame Street, Dublin 2.
Tel. 56465-6.
London: J. T. Robson and
Son Ltd., 30 Fleet Street,
London, E.C.4. Tel.: Fleet
Street 4438.
Belfast: 26 Carnamena
Ave., Belfast 6.
Phone: 643095.

The Irish Plumbing and Heating Engineer.



The heat's on at Ballsbridge

A BIG contract for Unidare infra-red heaters was provided in the heating of the R.D.S. Main Hall for the international gathering of country-women's associations held there this month.

Unidare Limited were called on to heat the hall for the occasion. In all 72 4 Kw. infra-red heaters were used in the installation, which cost in the region of £1,200.

DEMONSTRATION TOUR— Pictured in the Monsell Mitchell Ltd. demonstration caravan prior to departure on its country-wide tour are Mr. D. Jordan, discussing the Thermopak A1 accelerator with Mr. L. Peppard, outdoor representative. The principal items on display also include the Delstar Wall Flame oil-fired boiler, the new Mark II. Capital Radiators, Fibreglass insulation, Danfoss contact equipment, and Venner fire switches, with a comprehensive display in the central heating field.

in brief . . .

MR. K. M. REYNOLDS of Kenneth M. Reynolds Limited, 26 Essex Quay, Dublin 8, has just been appointed the Republic agent for Meynell & Sons Ltd., of Wolverhampton. Mr. Reynolds will cover the Company's products for thermostatic hot and cold water mixing valves, steam-water mixing valves, radiator valves, gate valves and general valves and fittings.

* * *

● UP TO the present 93 group water supply schemes catering for a total of almost 1,000 houses had been completed and a further 229 schemes which would cater for almost 4,500 houses were in progress, said Mr. Brennan, Parliamentary Secretary to the Minister for Local Government, when he opened a new group water supply scheme at Acres, Co. Leitrim, this month.

* * *

FOLLOWING the recent introduction of the Nivotrol visual alarm for tank contents, Van den Bosch Limited (Europa House, Alexandra Road, London, S.W.19) have produced a two-page illustrated leaflet in colour giving full information and technical data on the Nivotrol unit. The Nivotrol is an electrical level warning device for use with fuel oil tanks, which indicates when the content falls below a predetermined level by means of a remote light.

WINTERTIME for COSYWRAP

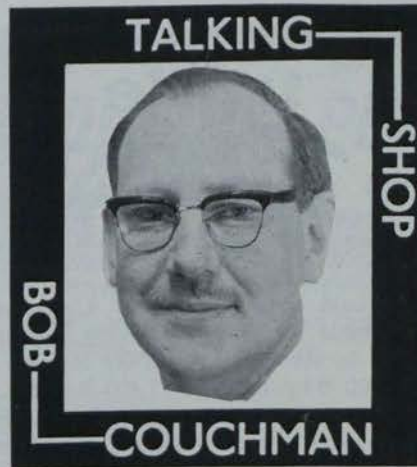
More and more people are comparing fuel bills with the cost of insulation — and Cosywrap's the word these days! Backed by national advertising, your customers know that Cosywrap in the attic really saves on the cost of heating. After last winter, will you have Cosywrap in stock for customers who want heat and thrift? They'll be asking you for it!



BROOKS THOMAS & Co. Ltd.

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Domestic heating: Insulation too often neglected



IN MY capacity as an employee of a major oil company I often find myself (with, I must say, the complete approval of my employers) busily engaged in reducing the amount of fuel that we sell. I hasten to add that this applies only to individual jobs. This work relates to a part of domestic heating that is often sadly neglected, i.e., insulation.

Not long ago I examined an allegedly insulated roof space and found that the mineral fibre that was used was only $\frac{1}{2}$ " thick! No doubt this did some good but this material is so cheap, particularly in relation to present day labour costs, that I just cannot understand how anyone would waste their time laying this depth of insulation. An inch, I think, should be the minimum—2" is more like it—and the householder soon sees his money back in reduced running cost. It seems to me to be sheer insanity to pour heat in at one end of the job only to allow it to disappear at the other end.

Double glazing, of course, is a little more difficult to justify because at present costs seem to be rather high, but I have no doubt that in the fullness of time we will see double glazing fitted here in standard, and therefore cheap units, just as it is fitted in countries like Sweden.

THERE are, however, other ways of reducing heat loss which seem to be almost completely neglected. I am thinking particularly of the tremendous loss that can occur via the open fire-place. Standard heating practice for a living room is to allow for two air changes an hour; so, with a reasonably sized room of, say, 2,000 cubic feet if the air change is greater than 4,000 cubic feet per hour, not only is the system likely to be uneconomical but your heat loss calculations are immediately top-sided. Many open fire places will happily permit the

passage of 10,000 cubic feet of air an hour or even more. All this air has to be heated if the room is ever to be warm and there will be a howling gale coming in from outside via various cracks, windows and what-have you, to keep this state of affairs in being.

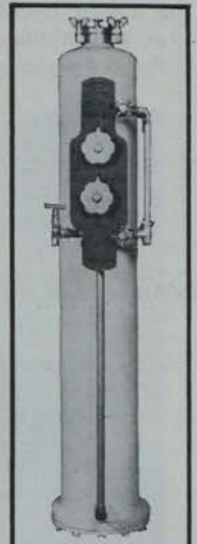
The culprit, of course, is the "throat" above the fireplace. A properly designed "throat" should be 4" to 5" from front to back and even that will easily pass 4,000 cubic feet per hour. There are gadgets, known as "throat" restrictors, and used, I am afraid, far too seldom, which sit on top of the fire back and are designed to reduce the opening area to the absolute minimum. Not only do these save a great deal of fuel by reducing the air change but they actually increase the efficiency of the open fire if it is ever used. So why don't we have more "throat" restrictors?

WHILE on this note of "why don't we," why on earth is life so difficult with copper pipe and fittings? While one can make a good case for the use of compression-type fittings in a roof space, where the use of a blow-lamp can be dangerous, or under floors, there is no doubt that the best looking fitting for visible pipework is a capillary type and yet capillary fittings are in very short supply over here, for some reason.

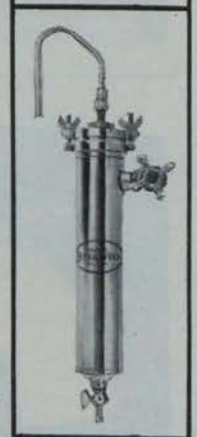
Also, of course, life is made very much more complicated by the fact that there is no single standard gauge of copper tube. The result is that, particularly with sizes 1" and above, there is a risk that the tube will be deformed in the bending machine because it is the wrong gauge. There is a greater risk of leaks due to badly fitting joints and more work and worry all round. When will we get around to standardising this and start putting in better looking systems? Manufacturers and providers please note!

More and more
house-owners want
softened water...
...and filtered water
—so specify
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models

There's a special pleasure in using soft water. The best softeners for all domestic needs are British Berkefeld Mains Softeners filled with 'Amberlite', an extremely high capacity resin, and (most important this) coated inside with plastic for protection against salt corrosion, thus making them 'long-life' models. Easy to instal and maintain. In mild steel with cream cellulose finish. Capacities 650-2,500 gals. between regenerations. Price from £50. ▶



Whenever there's the least doubt about the water supply, a Berkefeld Sterasyl filter is needed. It is the only type fitted with the unique Sterasyl candle, which not only traps water-borne disease germs, but destroys them. Pattern HN (illustrated) is in brass chromium plated, complete with taps and fittings £7.10.0. ▶



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Dept. 244, Cannon Lane, Tonbridge,
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In Dublin: G. Reid, 16 Fade Street,
Tel: 76009.

IRISH Technical and Production Co. Ltd. (25 Upper Mount St., Dublin 2) have recently added to their range of heating equipment the Wesper range of equipment. Wesper are a specialised French manufacturer of central heating equipment, air conditioning equipment and fans.

The Wesper range of products is quite extensive and includes the following radiator valves, both angle and straight type, either chromed or matt finish (large stock held in Dublin at the above address for 12" and 1/4" B.S.P.).

Convactor radiators with 3-speed blower. These radiators can be used as heating convectors when used with a closed circuit hot water system or as dehumidifiers or cooler units when the hot water system is turned off and



MR. A. W. Battye of Allied Ironfounders Ltd., who lectured on the merits of AGA boilers at the Irish Heating Centre reception by Masser Domestic Appliances Ltd. (see page five).

trade Topics

the cold water circulated. Units are available for floor or ceiling mounting in three sizes—17,700 B.t.u./hr., 24,000 B.t.u./hr., and 35,400 B.t.u./hr.; unit heaters which can be operated by hot water or steam and are very silent in operation. A large range of sizes is available from 55,000 B.t.u./hr. to 500,000 B.t.u./hr.

Air conditioning units, cooling units, filters for hot air and air distribution, fans up to 24,000,000 cu. ft. per hour, and a range of valves and regulating equipment are also available.

* * *

AS A result of increasing interest in dual flush cisterns Fordham Pressings Ltd., pioneers of this development with their Eterna dual flush low level cistern, now introduce the Fabula Dual Flush, the first high level cistern with a twin flushing mechanism.

Similar in appearance to the standard Fabula cistern which is firmly es-

tablished in the U.K. and overseas markets, the Dual Flush Fabula is fitted with a special device to enable one or two gallons of water to be flushed at will. By pulling the chain and releasing immediately a one gallon flush is obtained, whilst holding the chain down for a moment longer gives a two gallon flush.

These plastic cisterns have a high gloss, black or white finish, and are light and easy to install, fixing being by four screws direct to the wall. No special plumbing arrangements are required, the dual flush mechanism being entirely self contained in the cistern. Further details can be obtained from the manufacturers.

* * *

TYGADURE Limited are marketing a new gasketing and sealing material under the name

GASKETING, SEALING MATERIAL

Sealpak. The product make-up is pure unsintered PTFE processed into a flexible cord that flows under pressure to form perfect gaskets and seals.

Because of the special construction of the cord the amount of flow is limited, a distinct advantage over other PTFE sealants. Once compressed by a given pressure it forms a strong, reliable seal able to withstand working pressures of 500 p.s.i. and over.

The seal is chemically inert and resistant to extremes of temperature (+250°C to -200°C), seals against steam, oils, acids, gases, solvents, refrigerants, etc.; withstands vibration and is non-toxic. Sealpak seals may be broken at will even after years of service due to the built in non-adhesive properties of PTFE.

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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



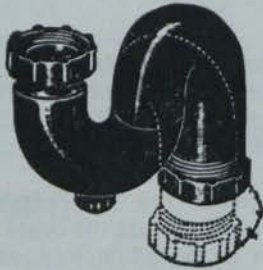
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PRODUCT**

"THE DUBOIS PLASTIC TRAP" (Regd.)

**A NEW
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Provn. Pat. No. 38070/60.

1¼" and 1½" diam. x 1½" seal "S" and "P" BLACK HIGH DENSITY
PLASTIC TRAPS



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Outlets can be turned through 220°.
A two-piece trap at a one-piece price.
Outlet on 'S' trap turned to inlet forms
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Light weight = lower transportation costs.



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- ★ STEADY PRESSURE AT ALL OUTLETS
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- ★ ALL EQUIPMENT ON ONE UNIT

The **MONO** pump

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Telephone: DUBLIN 70843

MP308

plumbing

We continue here
the serialisation of

the author's four-stage work under the general title of

plumbing THIS MONTH:
LEADBURNING (contd.).

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

FLAME characteristics.—Acetylene gas by itself will burn at the nozzle tip and take up atmospheric oxygen in the process. The flame, is however, luminous, sooty, and without a defined 'hot point'. As such it is useless for leadburning, since it will not be hot, stable or clean enough (see Diagram 1, Fig 4).

If you now open the oxygen control valve slightly so that oxygen can pass to mix with the acetylene gas, you will notice that the appearance of the flame changes. It will be stronger, less luminous and sooty, but still ragged. If there is not enough oxygen in proportion to acetylene passing to the nozzle, then the flame will show a white but ragged cone not clearly defined, and surrounded by another, even more ragged whitish cone of incompletely burned acetylene. Such a flame has a carbonizing effect and is called a carbonizing flame.

If you try to use this flame for leadburning, the unburned carbon from the acetylene gas will combine chemically with the cleaned surfaces of the lead to be joined, and will form a skin of lead carbonate. This carbonate will mask the metallic lead and prevent proper fusion.

If you now turn the oxygen control valve a little further until equal proportions of oxygen and acetylene pass to the flame, its character will change again. The new effect is called a **neutral**, or **normal**, flame (Diagram 3, Fig. 4). You will notice that the ragged, pale outer cone will have receded into the whiter inner cone. It is this exact merging of the two cones which indicates that equal amounts of the two gases are present at the flame. The truly neutral flame will show one round-tipped inner cone enveloped in the larger outer flame envelope, which is now quite steady—and hardly visible; so take care where you point it. Complete combustion is taking

place and the flame is hot and clean—just right for leadburning.

If the oxygen control valve is opened still further so that the proportion of oxygen is greater than that of acetylene, the character of the flame will change again, and the well-rounded white cone will take on a sharp, pointed appearance (Diagram 2, Fig. 4). This kind of flame is called an **oxidizing flame**, and burns fiercely because most of the excess oxygen escapes from the flame envelope as unburned oxygen. This combines chemically with the surfaces prepared for leadburning, and forms a non-metallic oxide of lead on them. Again, this oxide formation will prevent the metals from fusing properly, so that the leadburning is made more difficult, if indeed possible at all.

You will see from this that for leadburning to be sound, a **neutral flame must be used**. It is obtained when equal proportions of oxygen and acetylene are admitted to the combustion zone at the blowpipe tip.

SAFETY precautions: Since acetylene gas is highly inflammable and is explosive when mixed with atmospheric air in certain proportions, it is clear that it must be handled with particular care.

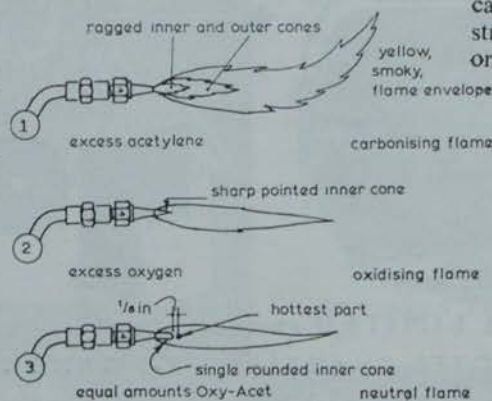


FIG. 4 Flame Characteristics

Practical leadburning techniques: In all forms of leadburning, there are three good points to remember: Preparation, Penetration, Reinforcement.

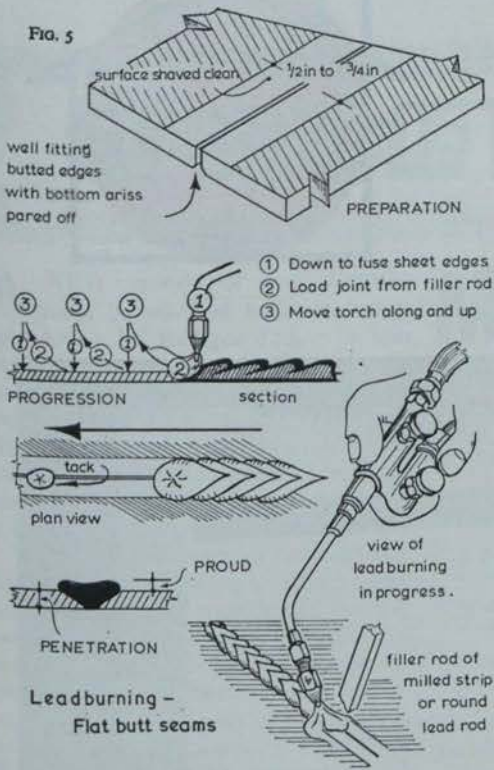
Preparation (Fig. 5) means that you must make sure that the edges of surfaces to be joined fit well, and that the area round the joint is clean. This also applies to all surfaces in contact within the joint area.

Take care in setting out and cutting the lead to be joined, and you will find that you save time when you come to fit edges that are to be close-butted. A sharp shave-hook will make it easier to shave the joint areas and lead filler rods quite clean.

Penetration (Fig. 5) is essential if the joint is to be sound. The joint must fuse right through its thickness if it is to be as strong as the pieces of lead being joined. Good leadburning will therefore show fusion right through to the underside of the sheet lead (except in certain advanced kinds of hollow burning).

Reinforcement (Fig. 5) simply means that the filler rod deposit, which has been fused into the weld pool formed as the work proceeds, should stand a little above the original thickness of the sheet. When milled lead is fused, or melted, and then allowed to cool, it changes from its milled state to a cast state. Cast lead is not quite as strong in tension as milled sheet lead or extruded lead pipe, and therefore in

order to make the lead-burned joint as strong as the lead it joins, it must have full penetration and be slightly thicker. In other words, the top surface of the finished joint must be a little proud of the surface of the metals joined.



from previous page

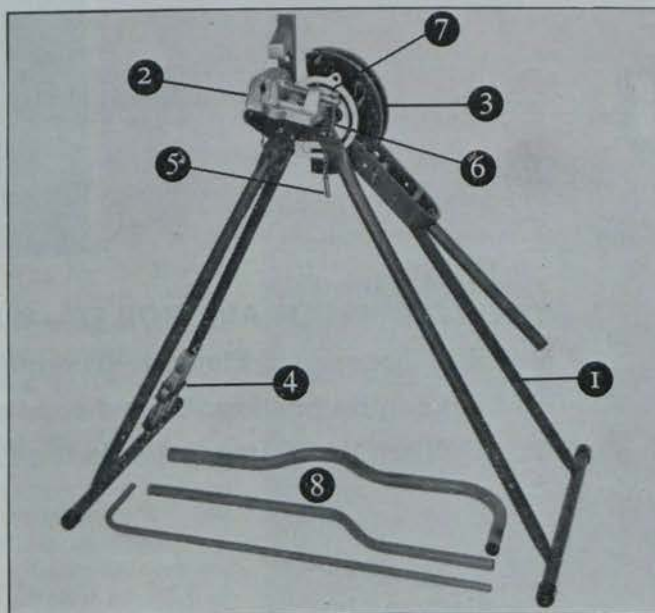
As has been seen, the **adjustment of the flame** is very important, and a neutral flame must be obtained for good leadburning. The temperature of the flame must also be correct and many plumbers have despaired of producing good results simply because they were not using a hot enough flame. It is understandable that a beginner should wish to "go slow" and use a small nozzle size and a small flame. In fact he will learn more easily by starting with a really hot flame and then reducing its size if necessary. The attractive patterns which are so much admired in good leadburned work are made by the natural formation of cooling boundaries round hot molden weld deposits. If the flame is not hot enough the weld pools never become sufficiently molten to flow and form the patterns, and all the blowpipe manipulation in the world will not be able to help.

ANOTHER important factor which is often overlooked is **good stance**. Being comfortable at the bench is quite vital to a learner. It is no good at all being tense and apprehensive—all you need is a certain amount of confidence. Stand comfortably close to your work, and make sure that it is in the best and most convenient position. If necessary, pack it up on blocks so that you do not have to

check these features—

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2. Vice for cutting off, fitting unions, etc.
3. Precision machined Formers in high grade Mechanite.
4. Extruded alloy Guides housed in carrier to prevent damage and loss.
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CAPACITY: GL.2B (illustrated) 1/2" to 1" BS.659 tube.
GL.3B 1/2" to 1 1/2" BS.659 tube.

Machines with standard tools suitable for bending light gauge steel tube with same o.d. as BS.659 copper.

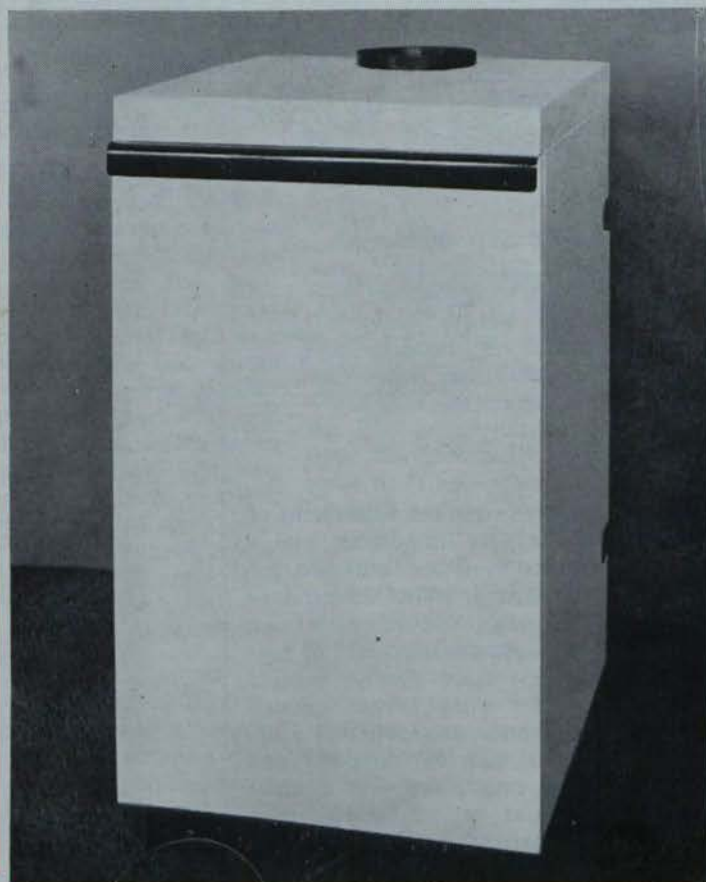
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SPECIAL REVIEW

THIS MONTH

Domestic oil-fired boilers, burners and controls (including warm air heating system).

A NEW version of their Centramatic 35 oil-fired boiler is being introduced by Redfye Ltd. It has been redesigned to simplify maintenance considerably—only two hand tools, a screw-driver and a $\frac{1}{2}$ " spanner are now required for servicing. At the same time the noise level has been further minimised and the boiler's output improved.

The principal changes are in the boiler's internal design, which has been considerably simplified. In the lower section of the boiler the asbestos panel which carries the fan and forms the front of the burner chamber, is set square to the front of the cabinet instead of at an angle. This both makes the fan more accessible and simplified withdrawal of the panel for inspecting the burner pot. At the same time the water tanks connecting the tubes have been made square instead of round. The increased heat exchange area thus achieved raises the boiler's output to 38,000 B.t.u./h.

* * *

THE NEW Ideal-Standard Concord boiler has the high output rate of 70,000 B.t.u./h., and is one of the least expensive products of its kind on the present-day market. It stands 36" high, so that it will fit in with standard size kitchen units. The manufacturers are Ideal-Standard Ltd., Ideal Works, Hull, Yorkshire.

* * *

THE SUPERMATIC oil fired warm air and hot water domestic heating has been introduced to meet the demand for a combined air and water heating unit for domestic dwellings. The heater is fully automatic in operation and one self-contained unit provides air for ducted or for free flow systems, in addition to a constant supply of hot water.

The Supermatic air and water heater is a complete packaged heating system which can be installed into new or existing houses. Once the oil burner is ignited the whole sequence of operation becomes automatic. The operating thermostat can be set to any desired temperature and the unit will maintain the temperature automatically from then on. The unit is avail-

Many developments in field

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).

able in a range of sizes giving 50,000, 64,000, 80,000 and 100,000 B.t.u./h.

Ducts can be installed to carry the warmed air to the various rooms if required, but when the Supermatic heater is installed in a smaller type of house, little or no duct is required. During the summer months the Supermatic unit can be used for ventilation only, in which case, of course, the oil burner is not ignited unless domestic hot water is required. A boiler for domestic hot water is incorporated in some of the models to provide hot water. The manufacturers are Perry Heating Appliances Ltd. (Eastbourne, Sussex).

* * *

MONSELL, Mitchell & Co. Ltd., Dublin, hold agencies for the Delstar Wallflame, Delmore oil-fired boiler, and the Rheem Glow-worm pressure jet unit. The Delstar automatic wall-flame oil-fire boiler by Delmore has ordinary pressure-jet burners which shoot a flame into the centre of the combustion chamber. With the wall-flame burner there is a ring of flame where it will do the most work—right round the wall of the chamber.

This results in a faster heat-up and a much more economical use of fuel. The burner is fed by a small electric motor which spins the oil-distributing tubes and fan. This throws a fuel mixture into the flame. The thermostat control is a graduated switch inside the boiler.

The Rheem Glow-Worm pressure jet unit is oil-fired and suitable for central heating and indirect hot water

supply and is fitted with fully automatic and operating and safety controls. The boiler sections are of the highest quality cast iron. Individual sections are hydrostatically tested to 75 lbs. per sq. in. both before and after assembly. The vertical flue travel forces hot gases to slowly zig-zag past every inch of exposed water backed surface. Asbestos wicking between sections gives air tight seal and prevents expanding rust growth.

The Delmore Series 3 domestic and de luxe boilers are extremely quiet in operation and is one of the few oil-fired boilers suitable for installation inside the house. Models are variable in capacities up to 128,000 B.t.u./h. Monsell Mitchell & Co. are also agents for International Capital gas-fired boilers—four models of which have outputs from 35,000 to 100,000 B.t.u./h.

Continued page thirteen.



● The Ideal-Standard boiler.

Thirteen

Stelrad
ELECTY

**THESE
DOORS
COVER
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BIGGEST
ADVANCE
IN
HOME
HEATING
TECHNIQUE
SINCE
MAN
LEARNED
TO
MAKE
FIRE...**

THE NEW STELRAD 50

The Stelrad 50 is a completely new design of boiler for small bore central heating and domestic hot water systems. Output is 50,000 BTU from Oil or Gas firing. The totally new concept provides outstanding advantages for supplier, installer and user. The heart of the Stelrad 50 is a heat exchanger fabricated in high quality stainless steel by forming and argon welding. This revolutionary heat exchanger is highly efficient in offering an extended pick-up surface to the hot gases, all of which surface has water behind it. With this new heat exchanger there are no inaccessible flue passages, the whole surface is easily exposed and can be wiped clean. The remainder of the boiler system is made up of easily front-accessible units which may be quickly fitted or removed. Precision manufacture throughout ensures that all parts of any one boiler will freely interchange with those of any other boiler. Such a system simplifies servicing and rationalises it to the simplest possible replacement technique using a factory-part exchange system along lines well known in the motor-car industry. The Stelrad 50 is supplied as a complete unit, expensive extras are not needed. It is constructed to kitchen modular size with a high grade stoved enamel finish. It has many other revolutionary features. Write for full information to:

**Steel Radiators Ltd.,
Bridge Road, Southall,
Middlesex. Southall 2603**
Also at:
Dalbeattie, Scotland

A NEW Thermostatic Radiator Valve with a revolutionary method of setting the control knob has been introduced by Meynell & Sons Ltd. The valve, known as the "Bestheat," may be fitted to any standard central heating system, and the setting of the control knob is by colour code: blue (cold), yellow (tepid), and red (hot), which is clearly visible by means of prismatic refraction.

* * *

INTERNATIONAL Boilers and Radiators Ltd. have introduced this year Delvectair 40 warm air unit which provides full house heating and hot water for houses about 1,200 ft. The unit has a wider range of control of hot water output and higher hot water output at maximum setting—lower hot water output at minimum setting. It can be controlled down to 2,000 B.t.u./h., and up to 10,000 B.t.u./h. when the burner is set at maximum.

For installation a brick chamber is built in a central position. This does not need to be lined. The minimum required dimensions of the inside of the brick chamber are 2' 3" x 2' 3". The chamber should be built up to first floor level. A door giving access to the boiler is introduced into the

SPECIAL REVIEW

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brick chamber in the hall or kitchen.

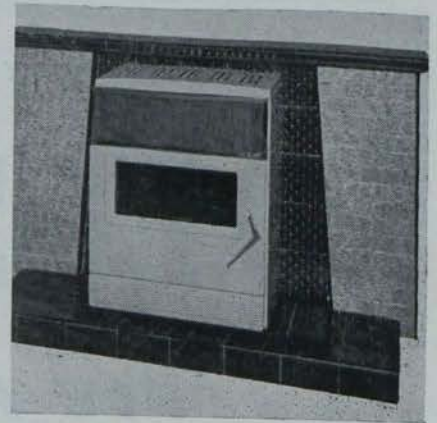
A natural draught pot burner manually controlled with a very high efficiency in the intermediate ranges is part of the unit. Heating is by natural convection through grilles. A radiator can be used to heat an inconveniently situated bedroom on a gravity circuit. The maximum output is 40,000 B.t.u./h. total air and water output; the minimum output is 5,000 B.t.u./h. total air and water output

* * *

POWELL Duffryn's Housewarmers WA-25D and WA-35D of 25,000 and 35,000 B.t.u./h. output, are fully self-contained and supplied ready for connection to ductwork. No flue is required and there is no limitation upon the position where they may be installed. They may be placed vertical, horizontal or inclined, and will fit into any convenient place. Up to five warm air ducts may be led off the unit and the return air intake is made to accommodate a washable air filter.

* * *

CEVE Ltd., who are represented in this country by Orbit Sales Ltd. (47

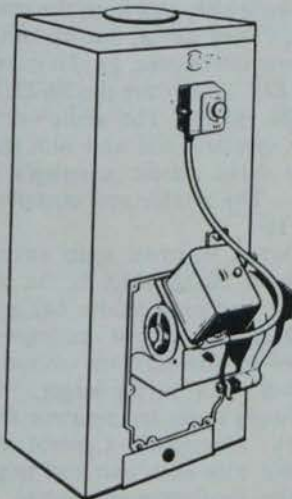


● The Ceve 2150 oil-fired flued convector.

South William Street, Dublin) market an oil fired domestic boiler with an output of 15,000 B.t.u./h. It features a stainless steel vapourising burner guaranteed for ten years, and for the oil control there is A.P.240 WYX with safety trip out device. Extra safety float shuts off the oil flow if the main operating float should fail. A magic pilot produces continuous very low pilot flame.

Continued overleaf

RHEEM/GLOW-WORM HYDRONIC SERIES 'B'



TYPE	OUTPUT B.Th.U's/Hr.	RETAIL PRICE £
3B	50-60,000	108
4B	60-80,000	132
5B	80-100,000	162

RHEEM/GLOW-WORM HEAT TRANSFER SURFACE
Multi-studded flue passages result in high heat transfer values concentrated into a relatively compact space. Stainless steel combustion chamber.

BIGGER PROFIT LESS SERVICING!

Go For Rheem/Glow-Worm B & C Series Oil-Fired Central Heating Boilers

- ★ Unusually Compact
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- ★ Minimum maintenance
- ★ High Efficiencies
- ★ Fully Automatic
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Monsell, Mitchell & Co. Ltd.

Heating and Insulation Division

67-73 Townsend St., Dublin, 2. Telephone: 76282.

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New Automatic Wallflame Oil-fired Boiler

ALL THE ADVANTAGES OF AUTOMATIC OIL-FIRED HEATING.

ALL THE ADVANTAGES OF THE WALLFLAME BURNER SYSTEM.

PLUS THE SLIMMEST, NEATEST, NICEST-LOOKING CABINET YOU'VE SEEN. THAT'S THE DELSTAR.

And the Programmer is included in the price!

• New International PROGRAMMER

This up-to-the-minute control programmes heating and hot water separately. For the user, wonderful economy and convenience. For you, a powerful selling story.

Here are the programmes: 1 ON MORNING AND EVENING
2 ON ALL DAY
3 ON ALL DAY AND NIGHT
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SPECIAL REVIEW

from previous page

The thermostatic top of the control is connected to a bulb which is housed inside the water jacket of the boiler. The oil flow and thus the flame setting snaps to high or pilot when water temperature falls below or rises above the temperature set on the regulator knob. If the capillary or diaphragm is damaged, the control automatically switches to pilot.

The conventional draught regulator is replaced by a combustion air regulator, situated at the air intake and supplying to the burner a pre-set quantity of air regardless of the draught conditions. The flue has a 4" diameter outlet on top and there is a $\frac{3}{8}$ " O.D. gravity feed. There is an overall efficiency of more than 80 per cent.

Ceve Ltd. also manufacture the Thermo-chamber domestic central heating up to 55,000 B.t.u./h. A specially designed convector is situated in a cabinet located in a central position. Grilles are provided in each room and warm air is gently circulated round the house. A special fan has been designed for use with long ducts.

* * *

A NEW range of gas-fired warm air units which can heat the small to medium sized home, flat or bungalow has been introduced by Thomas Potterton Ltd. They are the 20/25, 25/30, and the 40/60. The units—designed with a compact size and slim shape—can be fitted almost anywhere in the house. The smallest unit occupies only 2½ sq. ft.

Potterton Warmair units cover outputs from 20,000 B.t.u./h. to 60,000 B.t.u./h., and each heater has a range of adjustable output ratings—5,000 B.t.u./h. in the smaller models and 10,000 B.t.u./h. in the larger. A new and simple room temperature thermostat by Honeywell Control Ltd. is available with each unit and this gives complete flexibility of control.

* * *

VENT-O-THERM air heating units offer countless possibilities both in their operation and set-up. Two basic units are available—the UT25,

Continued page eighteen.

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. . . contact Esso . . . experts in warmth. Homes, Hotels, Offices, Factories the world over depend on Esso fuel oil for safe, dependable, economical heat. The unparalleled efficiency of oil-fired central heating has made it an essential part of new buildings—industrial and domestic—even at the drawing board stage. Consult the Esso technical adviser—service is free and there is no obligation.

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TELEPHONE: 881661

rated at 100,000 B.t.u./h., and the large UT50.

* * *

VENT-O-THERM units may either be connected to a channel system or may be used for direct discharge. In the latter case no conduits are needed for conveyance of the warm air to the place where it is wanted. Direct discharge of part of the air and transfer of the remainder to another area via conduit is also possible. The units may be arranged in series if desired.

Details of the Vent-O-Therm combined heating and ventilation system are available from Monsell, Mitchell & Co. Ltd., Heating and Insulating Division, 67-73 Townsend St., Dublin, or the Company's offices, 162/164 Pearse St., Dublin.

* * *

THE most successful boiler they have ever introduced, claim Quadrant Engineers, is the new Buderus P 22 and P 32 range. The greatly expanded stock range held in Dublin has helped, but the unique features of the boiler itself has been the major reason, they report.

The P 22 and P 32 ranges extend

SPECIAL REVIEW

from page sixteen

up to 420,000 B.t.u./h., above which the P 40 range, familiar to many in the trade, comes in, and this is also stocked in large numbers in Dublin.

For the larger installations up to about 3,000,000 B.t.u./h., increased turnover has caused Quadrant Engineers to install a Telex system so that orders and enquiries can be transmitted in moments by direct dialled line between Dublin and the Wetzlar head office of Buderus.

The new 92 series provides engineers for the first time with a Buderus cast iron boiler of outputs up to 7,500,000 B.t.u./h. While sectional boilers of this enormous output are not frequently needed, this may have been in the past because they were not available. Much less expensive than steel boilers of the same output, they can now be quoted on quick delivery. Details on these and all Buderus boilers is available from Quadrant Engineers, 167 Strand Road, Sandymount, Dublin 4.



● The Haleyon model warm air heater.

SPECIAL REVIEW

Continued page twenty-seven

Sound Boiler Buderus! . .



and we have hundreds here in Dublin . . . you won't be stuck with a sticky delivery if you use our stocks to stack away those quick needed-next-week jobs . . . pick a Buderus . . .

(Even the biggest is quickest by Telex . . . a direct link to Buderus in Germany)

. . . and the same goes for steel column radiators . . . thousands . . . all sizes ready for taking . . . ask Jimmy . . . he's the business.

Telephone: 693940 and 693943.

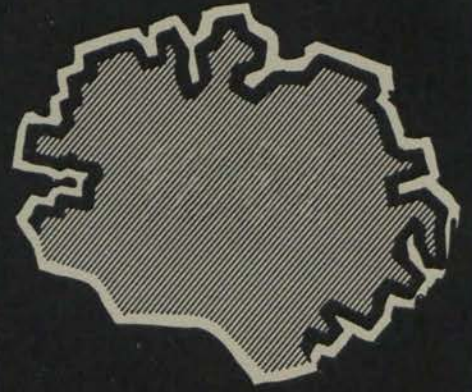
Telegrams: Quadrant, Dublin. Telex: Dublin 5283.

QUADRANT ENGINEERS

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



Northern Ireland monthly review



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**'Yes
pitch fibre
was
specified'**

The Temple System offers

Building Tolerance
The 'O' ring joint allows for plus or minus 1½"

Heat Resistance
Withstands continuous discharge of boiling water

Speed
Light weight and fabricated units speed up installation

Efficiency
Pitch fibre pipe; Polypropylene fittings: both non-corrodible and non-electrolytic

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

The Temple system for multi-storey 6" soil pipes speeds up the building operation dramatically. The Neoprene 'O' ring joint allows for building tolerances of plus or minus 1½". Pitch fibre pipes are exceptionally light, and can be sawn, drilled or grooved on site using only hand tools—more speed, less cost, fewer labour charges.

Write to Temple Tubes for technical literature and learn about the unique fabrication and design service, the Neoprene 'O' ring joint and the Temple 'push-on' W.C. connector

Temple Tubes

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Northern NOTES



THE new Stelrad 50 brings a new approach to the design of oil and gas fired boilers for small bore central heating and domestic hot water systems. There has been some 75 per cent. reduction in weight compared with other boilers which means that the Stelrad 50 can be sent out completely assembled in its protective packing and that it can be easily handled by one man.

The new boiler also uses a unique stainless steel heat exchanger which has enormous advantages for cleaning and servicing, and further, the whole of its surface is in contact with the water which increases efficiency and reduces thermal inertia. Considerable attention has been paid to ease of servicing.

Automatic clock control and accelerator pump are built-in and the degree of automation can be arranged without interference with internal wiring to meet any requirement. The boiler has unique safety protection devices.

In the gas-fired version of the Stelrad 50 controls comply with B.S. requirements. There is also full protection against flame failure; specially designed condense collecting ring; while burner ring and control valve assembly are designed for quick and easy renewal.

WAVERLEY Engineering Company Ltd. (Hyde St., Winchester, Hampshire) offer a completely new concept in industrial burners. The combustion head fitted to Waverley oil burners ensures a fully controlled, pulsation-free flame which gives completely smooth starts and stops even under sub-normal or adverse conditions. A region of low pressure is created in advance of the flame front, which completely stabilises the flame in a constant position relative to the head and eliminate fluctuation, pulsation and rumble. This feature makes the Waverley series of oil burners ideal for practically all makes of boilers and furnaces, including flue tube and

The oil-fired version uses the new and highly successful low pressure vapourising burner providing on/off operation. The Stelrad 50 is available with 50,000 B.t.u. output—either gas or oil fired; other sizes will follow.

* * *

A RECENT addition to the Harcostar range is a 4-gallon (actual) polypropylene cistern. This cistern is now available for use as an expansion tank or storage tank for central heating systems. This means that the Harcostar cistern sizes are 4, 15, 20, 25, 40 and 50 gallon (actual).

The backing plate supplied with each cistern is now plastic-coated, providing a smooth, rust-proof finish.

The newly-completed Harcostar factory at Huntingdon, now in full operation, is producing the polyethylene cisterns on the largest blow-moulding machine in Europe.

* * *

ANGLO-NORDIC Burner Products Ltd. (74 London Road, Kingston-on-Thames, Surrey)

NORDIC INTRODUCE SUNSTRAND

has introduced the Swedish-made Sunstrand water circulating unit. The new circulating unit comprises the following features: combined rotation indicator and patent manual starting device; variable capacity; compact and reliable construction; two year guarantee; precision manufacture; and full self-purging.

Sunstrand have designed and are

ATTENDED INSTITUTE OF FUEL LECTURE

A POINT well made by Mr. J. S. Kennedy (Managing Director, J. Kelly Ltd.). At a recent Institute of Fuel lecture were (from left): Messrs. E. McBride, Secretary; F. Wilkinson, Marketing Director, National Coal Board; Mr. Kennedy; Lord Robens, Chairman, N.C.B., and F. H. Harris, Chief Engineer.

precision manufacturing a centrifugal water circulating pump operating on the wet rotor principle. Shaft seals are eliminated, resulting in a drop in drag, together with the problems relating to seal wear and the weeping of packing boxes. The rotor is immersed in water, but the stator windings are protected by a thin stainless steel tube. To avoid the risk of distortion, attributable to expansion and contraction, the tube is not clamped but allowed to float freely between the front and rear end frames.

The Sunstrand pump is supplied in one basic design, having a motor running at 2850 r.p.m. A unique design feature (patent pending) enables the pump to be used to give six different pumping characteristics, thus enabling

Continued overleaf

White-Rodgers appoint N.I. agents

WHITE-Rodgers Ltd. (75, South Western Rd., Twickenham, Midsex) have announced the appointment of Calvert Electric Co. Ltd. (21 Ormeau Avenue, Belfast 2) as their agents for White-Rodgers Elec-

tric Heat Controls for Northern Ireland.

Calvert Electric Co. Ltd. will stock the complete range of White-Rodgers Electric Heat Thermostats, Silent Relays, etc., to give prompt delivery and service to the trade.

The Irish Plumbing and Heating Engineer.



SIR W. H. Bailey & Company Limited (Patricroft, Manchester) have recently added two new valves to their

from previous page

the unit to be sized for each individual system.

The different duties are obtained by fitting a varying number of shims between the pump housing and the motor head, which has the effect of altering the position of the impeller in the impeller chamber. This method of varying the capacity has many advantages, but the chief is that it does provide a means of altering the characteristics to suit a particular circuit without causing turbulence or eddies within the impeller chamber which can result in excessive noise and side-thrust on the impeller causing wear of the shaft bearings.

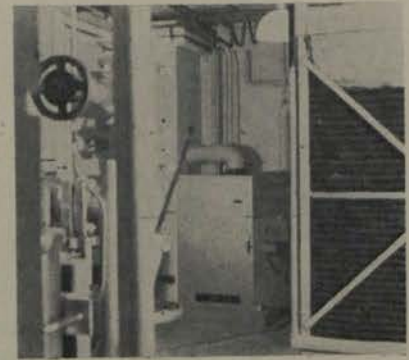
already comprehensive range of Relief Valves. Both valves are constructed in bronze and are of the enclosed spring type, with male inlet and female side outlet. They are suitable for pressures up to 350 p.s.i. and a wide selection of springs is available to ensure that a high performance is maintained at all settings.

* * *

B.S.A. Harford Pumps Limited—the marketing company for all B.S.A. central heating equipment—will in future trade under the name of B.S.A. Harford Heating Limited. The manufacturing arm of the company adopted this same name earlier this year. Both the marketing and manufacturing activities are under the management of Mr. H. E. Hassett, as Managing Director, and Mr. R. Harrison, as Sales Director.

* * *

RADIATION have developed a new radiant that glows all over even when the room is warm and the gas has been turned down to a third of its full rate. On their new medium-priced Radabeam 800 this high luminosity is maintained over all three box-type radiants and not, as with many other fires, only in selected radiants. Successor to the popular



Boiler at Work—in a 'fridge'

A Potterton Diplomat 150,000 B.t.u./h. gas-fired boiler has been installed in a meat processing factory in Bolton, to defrost the refrigeration plant. The refrigerators work at temperatures of down to minus 20°F. and defrosting takes place three times every twenty-four hours.

Rado-Vecta 887, the Radabeam is especially suitable for fitting to tall-aspect fireplaces. The unit has a nominal rating of 16,000 B.t.u./hr., claims 62 per cent. efficiency under optimum conditions and provides rather more radiant than convected heat.

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Sewage Plant

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By



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

INDUSTRIAL HEATING

PART ONE

IRRESPECTIVE of the type of building to be heated, be it school, church or factory, the basic calculations are the same but as would be expected there are certain adjustments to be made to suit the use to which the premises are to be put.

Over the years standards have been produced and the most common is "Guide To Current Practice" issued by the Institution of Heating and Ventilating Engineers.

In calculating the heating requirements it is essential to know the following:—

- (1) The size of a building.
- (2) Complete details of its construction.
- (3) The siting of the building.
- (4) The use to which it is to be put.
- (5) The standard of heating required.
- (6) The nature of or type of heating system preferred.

Firstly, the internal temperature has to be settled so that the temperature will give comfort to the inhabitants and, of course, this varies as to whether the persons concerned are just sitting as in a lecture room or carrying out manual work. It is also necessary to assume an outside temperature, and this of course should be based on a minimum and for most calculations it is assumed to be 30°F.

INTERNAL temperatures are usually measured at ground level or at the most head height, and there should never be a major difference between these two temperatures, at the most 5°F. will ensure comfortable conditions.

When the workers are engaged in manual or heavy work such as in factories the air temperature is usually required to be 55°F., while in offices 65°F. is the standard, though there has been a tendency of late, particularly with the large number of open plan constructions taking place, to call for a temperature of 70°F. in office accommodation.

If the latter temperature is used, the degree of humidity, number of air changes and the number of occupants must be studied or the atmosphere may become "Fuggy."

For example the standard air changes recommended for factories are as follows:—

Mean-Height.	Space Per Person. Per Cubic Foot.	Min. Fresh Air Required. Per Hour.	Min. Air Changes Per Hour to be met. by Heating System.
14'	400	3½	2½
17'	490	3¼	2
20'	570	2¾	1½
25'	710	2¼	1½
30'	860	1¾	1½

For smaller industrial and domestic premises the air changes are usually as follows:—

AIR CHANGES PER HOUR:

Living Rooms	1—1½
Bedrooms	1½
Bedsitting Rooms ..	1½—2
Churches	2
Assembly Halls	1½
Classrooms	2
Dining Rooms	2
General Offices	2
Private	1½—2
Shops	2
Hospital Wards	3
Hotel Bedroom	1—1½
Stores	½
Cloakroom	2

If a building is to be warmed it should be remembered that heat is lost from the building in two ways. Firstly through the opening of doors and windows heat is constantly being lost but the major source of loss is through walls, floors, and in most cases particularly the roof.

THE amount of loss depends on the nature of the construction of the walls, floors and roof. For example it is natural to assume that the thicker and

the more dense the material used in the walls the less heat will be lost through the wall. In addition the greater the temperature inside the building and the less the outside temperature the greater the heat loss will be.

Heat transmission is also affected by air velocity, as air movement over any surface increases the heat transmission either into or away from that surface.

The first criterion in assessing heat losses is to decide the temperature which is required inside the building. For general guidance the following temperatures are usually specified in this country.

INDUSTRIAL

Average Inside Temperatures.

Churches	60°F
Assembly Halls	60°F
Classrooms	62°F
Gymnasia	55°F
Shops	60°F
Hotel Dining Rooms ..	60°F
Hotel Bedrooms	50°F
Offices	65°F
Theatres	60°F
Hospital Wards	65°F

FLATS AND RESIDENCES

Average Inside Temperatures.

Living Rooms	65°F
Bedrooms	55°F
Kitchen	55°F
Bathroom	65°F
Hall	65°F
Dining Room	65°F

Having decided the inside temperature we have next to decide what the outside temperature is likely to be and as said earlier we assume the most severe conditions that is 30°F.

The next step is to accurately measure the area of all the surfaces,

Continued overleaf

The Irish Plumbing and Heating Engineer.

for example walls, floors, windows, ceilings, etc., and take note of the materials used in their construction.

Having obtained the necessary information regarding all exposed surfaces, it is necessary to calculate the heat transmission through them and this involves the use of a mysterious figure known as the co-efficient of transmission which is indicated by the letter "U."

The definition of the co-efficient of transmission "U" is the amount of

ference book to reference book but the above figures are a fair indication. It should, however, be pointed out that we stated earlier that heat transmission was affected by air velocity so that in cases where very accurate calculations have to be made it is usual to take into account the aspect of the area or surface on which the heat loss is being calculated.

If in the case of an outside wall, that wall was, shall we say, facing south and at the same time in a shel-

$$168 \times 35 \times .34 = 1999 \text{ B.T.H.U./h}^2.$$

The total area of glass is: $6 \times 4 = 24 \text{ sq. ft.}$ The heat transmission is therefore: $24 \times 35 \times 1.0 = 840 \text{ B.T.H.U./h}^2.$

The total heat requirements of the room is therefore the sum of these heat losses that 4.452 B.T.H.U./h².

It should be remembered that the above illustration is of course one which reduces the problem of heat loss calculations to the most simple form and in fact some people may say

from previous page

INDUSTRIAL HEATING TODAY

heat in B.T.L.U. which is transmitted per hour per square foot of the material as used in the building, for a difference of 1°F between the air on the inside and outside of the building.

Thus the heat loss per hour through any surface is denoted by the square foot area multiplied by the co-efficient multiplied by the temperature difference on either side of that surface.

Over the years various authorities have conducted series of experiments to evaluate these transmission factors and examples of which are as follows:—

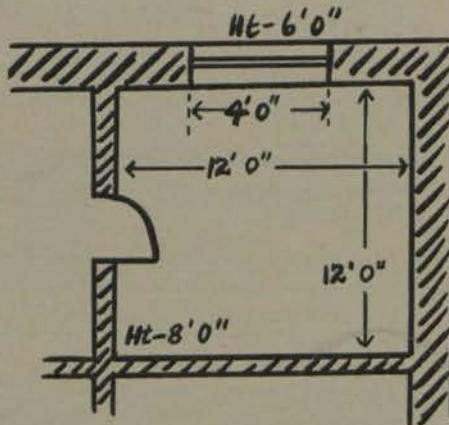
TRANSMISSION FACTORS

Material and Construction.	"U"
Brick Walls:	
9" thick	0.472
9" with ½" plaster	0.445
18" thick	0.308
18" with ½" plaster	0.297
11" cavity plastered	0.34
15½" do.	0.29
Concrete:	
6" thick	0.54
6" thick with ½" plaster	0.506
8" thick	0.468
8" thick with ½" plaster	0.442
12" thick	0.359
12" thick with ½" plaster	0.353
Glass:	
Single Windows	1.00
Double Windows	0.48
Solid Wood Floors:	
1" thick	0.556
1¼" thick	0.445
1½" thick	0.401
Concrete Floor	0.200
Wood Block on concrete	0.150
Slate or Tiled Roof (Sarked)	0.350
Corrugated Asbestos Roof	1.400
Corrugated Asbestos Roof (insd)	0.500

The factors vary slightly from re-

tered position, then the figure will be reduced and conversely if the same wall was in an exposed position facing north, then the "U" factor would be increased.

As a most simple example of the calculations let us take a sample room as below:—



We will assume that a temperature of 65° is required and that the adjoining rooms are also to be kept at the same temperature.

Assuming two air changes per air hour, the cubic contents of the room being 1152 cu. ft.: Since 0.02 B.T.H.U. is required to raise 1 cu. ft., through 1°F the total heat required is equal to:

$$2304 \times (65-30) \times 0.02 = 1613 \text{ B.t.u./hr.}$$

THE next point to consider is the heat loss through the structure, since the inner walls, floor and ceiling will have an equal temperature on either side of them there will be no heat loss in this direction; this leaves only the outside walls and the windows.

The total area of brickwork is: $(12 \times 8) + (12 \times 8) - (6 \times 4)$ and the heat transmission is:

that they are over simplified.

For really accurate calculations there are no short cuts and any student who embarks on taking out heat losses to an inflexible formulae will eventually become unstuck and he will then have to revert to the well tried and established method of basic calculations.

(TO BE CONTINUED)

in brief . . .

AN INTERESTING fixing device—the Fischer cable saddle—is the latest fixing device to be produced by Messrs. Artur Fischer of W. Germany and now available from Messrs. Herzbi Ltd., 57, Lordship Park, London N.16. This device has specifically been produced for users of saddle clips.

The saddle, produced from nylon 6, consists of two parts—the base and the cap. The base is completely fixed to the wall with only the one screw by the usual method. The pipe, etc., is then set into the base, after which the cap is put over the cable and base and snapped into position. For a run of more than one pipe there is no requirement to fix the second saddle, as the bases can be locked together by a special built in locking method.

* * *

ASCOT Gas Water Heaters Ltd. have produced a new consumer broadsheet covering their range of instantaneous sink water heaters, the G510, G515 and G525 series. Also included in easy-to-read tables are details of the thermal input, measurements, output and hot water temperatures obtained for each appliance, with their metric equivalents.

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serves all industries with best
quality lowest priced bottled gas



Jetaire Heater



Kosangas Tanker



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- *Kosangas* technicians can provide guidance on any industrial fuel problem without obligation.
- *Kosangas* offer a HIRE SERVICE for certain equipment.

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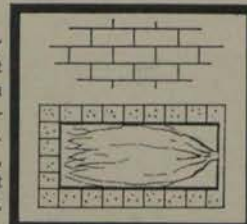
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The A.P. GREEN GUIDE TO REFRACTORY MAINTENANCE



PROTECTION

1 Use SAIRSET refractory cement for laying-up all types of firebrick. Protect new and existing brickwork with a coating of SAIRSET. Seal cracks—reduce risk of spalling and slag attack. SAIRSET is available in $\frac{1}{2}$ cwt., 1 cwt., and 2 cwt. drums ready mixed. It should be in your maintenance store.



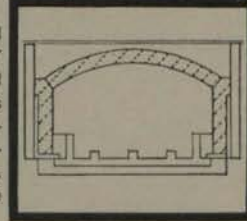
REPAIRS

2 Repair damaged walls with HYBOND plastic refractory. Can be used for small gaps or the complete wall or arch. For extreme temperatures use HIGH ALUMINA PLASTIC. HYBOND is delivered in 1 cwt. cartons sliced ready for ramming-in.



RE-LINING

3 Avoid intricate brickwork and special shapes by lining with KAST-SET refractory concrete. Simply mix and pour. When an insulating refractory is required for furnaces use KAST-O-LITE. Monolithic linings are economical on fuel and simplify maintenance. A. P. Green refractory concretes are sold in 1 cwt. bags.



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A. P. Green Refractories Limited
York House, Wembley

Tel: DILIGENCE 0455 Telegrams: GREENCO WEMBLEY Telex: 262755

SPECIAL REVIEW *from page eighteen.*

FOR those whose clients agree to use Esso oil-fired domestic central heating the advantages of a completely new scheme of facilities are available.

One of the big attractions of this well planned scheme is the Esso Consultancy and Design Service. It offers on a countrywide basis through professional independent consultants expert and impartial advice to the householder in establishing the heating requirements of the house and in choosing the most suitable system; provision of heating design layout and specification together with providing competitive tenders from reliable contractors; supervision during installation of the system; and final inspection on completion to ensure customer satisfaction.

Another important feature is the no-deposit Esso Personal Loan Scheme for approved applicants.

The Esso scheme also features a budget payment scheme to facilitate the householder by spreading fuel bills over twelve equal monthly payments by bank order or by cheque.

* * *

INTERNATIONAL Boilers and Radiators Limited announce that they are to simplify the Delmore range of oil-fired boilers by the exclusion of the towel rail on the De Luxe models.

Boilers will be stocked throughout the range in the domestic and domestic electric version.

* * *

THE new Unidare wallflame boiler



● The new Stelrad 50.
(See report on page twenty-one)

—the first of its kind to be manufactured in Ireland—embodies many key features.

The automatic wallflame, which features a built in stabiliser, has already been reviewed by IPHE. The boiler (60,000 B.t.u./h.) has an efficiency rating of 82 per cent.

The new boiler is, Unidare point

out, equally effective with their skirting heating system.

HENRY Wilson & Co. Ltd.—this year the company celebrates its 125th anniversary—announce a further addition to the range of Wilson Wallflame 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./h., and is available as a standard model or with factory fitted Waterguard controls.

The new boiler is the answer to

continued overleaf



on spares and after-sales service
—from **Wilson's** of course

Wilson Wallflame boilers were used in more domestic central heating installations than any other boiler of their type.

Wilson radiators are the first to have a guaranteed heat emission figure for every size—figure calculated independently by H.V.R.A. at Bracknell, using B.S. 3528:1962.

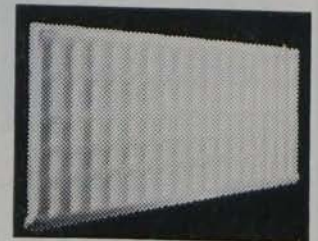
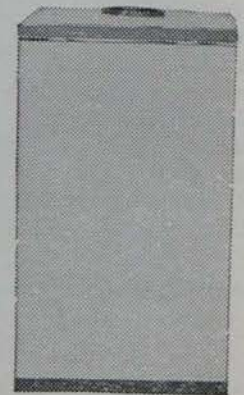
Wilson equipment is dependable, popular and easy to fit.

TO BACK IT UP WE HAVE NOW ESTABLISHED A SPARES AND AFTER-SALES SERVICE NETWORK THROUGHOUT THE COUNTRY. FULL STOCKS OF SPARES ARE READILY AVAILABLE. FULL-TIME WILSON SERVICE ENGINEERS ARE BASED IN ALL AREAS.

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For details of products, lists of stockists and further information, please write or telephone:



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Makers of Heating Equipment Since 1840

P.O. Box No. 6, Kirkby, Liverpool

Telephone Simonswood 3541

Twenty-seven

those "in-between" installations in which the gap between the 60 and 90 models was too great. As more and more installations demand this output of 75,000 B.t.u./h., 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.

An interesting development is the fact that the Wilson Waterguard control system is proving most popular with installers and the majority of Wilson boilers fitted carry this inexpensive control by request.

To cope with the heat load of an increasing number of smaller houses, Henry Wilson & Co. have redesigned the 35,000 B.t.u./h. vapourising boiler, the V35, which has a short drum vapourising burner, is semi-automatic, and can be supplied either white or cream. The flue offtake size is 5" to suit 4" B.S. flue pipe. The height is 30" by 20" wide, and has a depth of 23".

SPECIAL REVIEW

from previous page

UNIDARE skirting heating replaces the traditional wooden skirting board, and can be fitted along as many walls as required, but usually all that is needed is to have it along one outside wall, which is where most heat losses occur. Hot water at a mean temperature of 170 degrees F. is pump circulated through a continuous length of the special finned sections which are contained within the attractively designed casing.

Air from the room enters at the bottom of the enclosure, is heated as it passes over the fins, and the warm air is then deflected into the room through the top of the casing. The temperature can be controlled throughout the system, or through individual circuits, depending on the lay-out design, or by local variable control of heat emission by means of an adjustable damper strip. The system can be connected to most types of boiler using either oil, gas, solid fuel, or electricity.

THREE space heaters are manufactured by Potez Industries of Ireland Ltd. (Galway). All are free standing, flue connected, and ideal for heating the whole house, shop or office with a minimum cost of installation. Model 332, with 22,000 B.t.u./h. output, has ten hours for one gallon of fuel; Model 632, with 30,000 B.t.u./h. output, gives 9 hours burning for one gallon of fuel; while Model 732, with output of 43,000 B.t.u./h., gives 7 hours burning to the gallon.

In addition the factory also has in current production two warm air central heating units—Model 6011 (48,000 B.t.u./h. output), with domestic hot water boiler fitted as standard; and Model 1542 (50,000 B.t.u./h. output).

* * *

MANY new features have been introduced by William Sugg & Co. Ltd. (Manor Royal, Crawley, Sussex) with their new Halcyon model warm air heater. Used selectively, this new model, type 22/WH, will provide full comfort conditions in a room of average exposure and construction totaling up to 3,250 cu. ft. volume. Alter-

Continued page thirty

POTTEZ

GALWAY

The sole IRISH manufacturer of
Oil-Fired Heating Appliances



POTTEZ INDUSTRIES OF IRELAND

FACTORY IN GALWAY

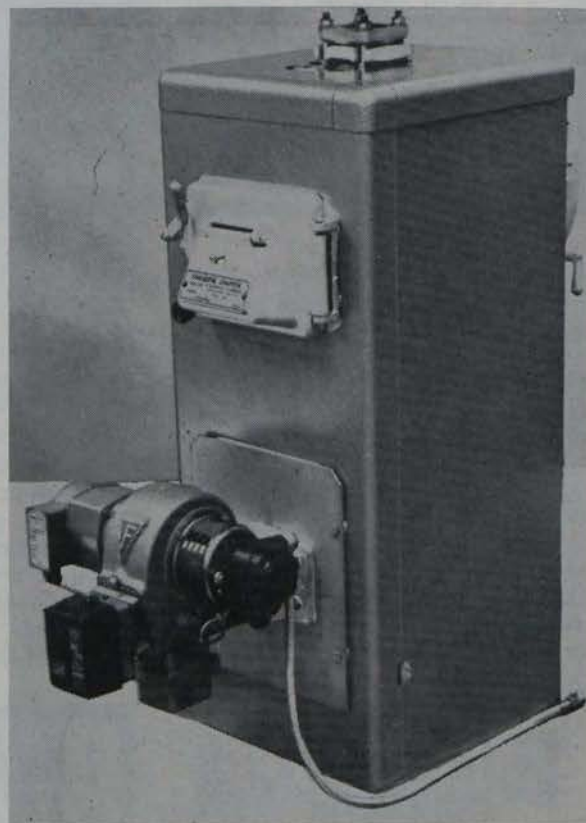
TEL. 2171

FC 204 Pressure Jet Oil Burner Boiler

Owing to the popular demand for an oil fired Central Heating unit with an output of 60/65,000 BTU's per hour, the Package Boiler Burner illustrated here is now on offer.

This unit, the product of FRANZIA and CHAPPEE, two well-known names in Ireland, fills a gap in the lower output range of pressure jet oil burners which is below the popular 25 F FRANZIA Oil Burner.

The boiler is a cast iron sectional type with hammer finish blue enamel insulating jacket and is complete with bricking and a swivel smoke outlet for connecting to a flue from any angle. The pressure burner is the well-known FRANZIA J 35 and the entire unit is complete with photo-resistance controls and boilerstat.



PRICE £109-0-0

This unit may be seen at the Irish Heating Centre, 19 Dame Street, Dublin, 2.



This Package Unit is backed by a first-class service organisation

FOR FURTHER PARTICULARS APPLY TO:—

IRISH TECHNICAL & PRODUCTION CO. LTD.

25 UPPER MOUNT STREET, DUBLIN, 2

Telephone: 62636 and 63421

SPECIAL REVIEW

from page twenty-eight

natively it will provide good background heating in a typical modern dwelling of up to 1,400 sq. ft. superficial area.

The 22/WH heater has an output of 22,500 B.t.u./h. and incorporates a more powerful 6-pole capacitor motor, direct drive fan, and Honeywell controls. In standard form a control panel, with all internal wiring, is an integral part of the fan unit. With the automatic fan control, the heater is allowed to reach its operating temperature before the automatic control switches on the fan, and the fan discharges all latent heat after the burner has been extinguished.

* * *

AN oil-fired whole house central heating system which also provides domestic hot water, and yet adds little to the cost of a new house when it replaces the conventional open fireplace and back-fire boiler—are the claims made for the Husqvarna "brick central" unit by A. H. Bibbey (Sales) Ltd., of Sawbridgeworth, Hertfordshire.

The system originated in Sweden where winter temperatures as low as 10 degrees F are common, and it employs the natural convection of warm air to distribute heat throughout the

house. It operates without motors, fans or ducts. As well as providing ample warm air circulation in houses of up to 1,200 feet super, plus ample domestic hot water, it also supplies heated towel rail.

* * *

THE PORTWAY Visaire is a packaged deal heating system for builders, designed specifically to be fitted in houses as they are built, using a basic principle of heating—keeping all available heat within the house. A heat exchanger is placed in a brick chamber, one wall of which should face into the living area, and two other walls adjoining areas selected to be directly heated, one of which should be the hall so that the heat can rise to the bedrooms.

The "package" consists of a heat exchanger, three adjustable flow delivery grilles and two fixed return grilles, flue pipe, oil tank, connectikit and fascia panel and mantelpiece.

The Portway "Trio Mark II" home heater fits any standard 14", 16", or 18" fireplace. The specifications include radiant/convactor heater with

integral domestic hot water supply, heavy gauge corrosion treated sheet steel casing, and domestic boiler, 1/2" mild steel plate, pressure tested to 20 lbs./sq. in. The gross output is 30,000 B.t.u. Charles Portway & Sons Ltd., Halstead, Essex, are also manufacturers of the Tortoiseaire ductless warm air heating.

INTERNATIONAL Boilers & Radiators Ltd. have announced the introduction of two new pumps in support of the revolutionary Thermopak AI launched earlier this year. The two pumps are the Thermopak BI and the Thermopak A2.

The Thermopak BI is identical to the Thermopak AI with the exception of the casing, which is of bronze, making the BI suitable for use in open circuits, e.g., launderettes. The performance of the BI is the same as the AI and it is suitable for installations of 15,000 B.t.u./hr. to 150,000 B.t.u./hr.

The Thermopak A2 is a fixed head version of the Thermopak AI and is suitable for installation of up to 30,000 B.t.u./hr., and particularly for high output back boiler systems.

CLYDE

LIGHT OIL BURNERS



Clyde Fuel Systems manufacture a wide range of light oil burners for converting boilers from solid fuel. Illustrated is model 'Junior' which can be easily and quickly installed.

6 BRANCHES THROUGHOUT IRELAND

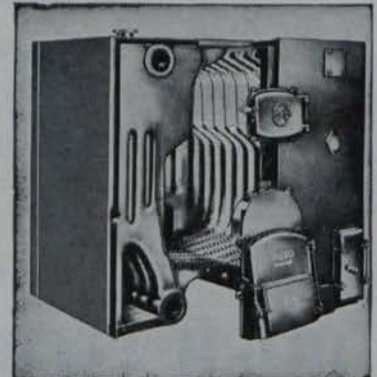


You can now take advantage of six service branches in Ireland. Another addition to the extensive after sales network throughout Ireland.

CLYDE

tasso

CAST IRON SECTIONAL BOILERS



Clyde "TASSO" cast-iron sectional boilers are available for solid fuel, oil, or mechanical stoker firing with operating efficiencies of approximately 80%. Suitable for central heating and hot water systems with ratings from 60,000 to 2,575,000 B.T.U.'s per hour.

CLYDE FUEL SYSTEMS LTD.

80 Holywood Road, Belfast. Tel.: Belfast 65365/6.

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CLYDE FUEL SYSTEMS (IRELAND) LTD.

6 Mount Crescent, Dublin. Tel.: Dublin 66489.

Branches at Cork, Limerick and Longford.

industrial heating & ventilating

IN IRELAND



TURNER & Brown Ltd., engineers in plastics, Gibraltar Street, Bolton, have

PROPELLER FAN IS INTRODUCED

introduced a ring mounted propeller fan powered by a unique "inside-out" electric motor. Use of this motor, in which the armature assembly rotates around the outside of the field coils, has resulted in a particularly compact and streamlined design.

The fan is constructed of metal specially treated with acetal polyvinyl resin and is resistant to steam and a wide variety of acid and alkali fumes. The armature of the "inside-out" motor forms the boss of the axial flow impeller, which is aerodynamically designed. The motor has two speeds and can be controlled by star delta switching, giving speeds in the ratio of 1 to 1.4, or pole switching, giving speeds in the ratio of 1 to 2. Fans with single speed motors can be supplied, if required.

The fans are available in five diameters, ranging from 12 in. to 24 in., with outputs between 650 and 7,450 c.f.m. The motor is reversible and with reverse rotation the air flow is approximately 25 per cent. to 30 per cent. less.

* * *

A POCKET-SIZED thermometer mounted on a magnetic base, designed for taking

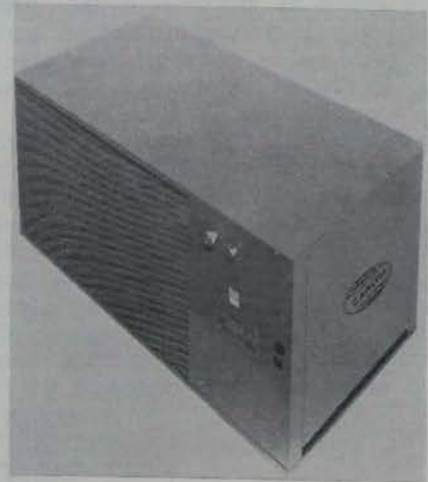
ROTOTHERM MAGNETIC THERMOMETER

readings on almost any metal surface without the necessity for attaching an instrument permanently, is introduced by the British Rototherm Co. Ltd.

The thermometer—Model 595—is fixed on a duralumin bar to which a strong magnet is rivetted at each end. The magnets make it simple to apply and remove, leaving both hands free for noting data.

The instrument itself has a 1½ in. dial and stainless steel body and bezel incorporating a very responsive bimetal helix.

At present there are four standard ranges on the Fahrenheit scale: minus 20°F to plus 140°F; 20°F to 220°F; 100°F to 400°F and 150°F to 500°F; and three standard Centigrade ranges: minus 30°C to plus 60°C; 0°C to 160°C, and 50°C to 250°C.



New Carlyle condensing unit

THIS new, quick-coupled condensing unit, for use with a fan-coil unit or with independent coil combinations, has been introduced by Carlyle Air Conditioning Company. It is available in two sizes that provide from 25,000 to 39,000 B.t.u. of cooling capacity. The units are designed for easy installation and are particularly suitable for the smaller air conditioning applications in commercial, industrial, office and retail premises.

IMPORTANT DUBLIN EXHIBITION PLANNED

A SPECIAL three-day exhibition of heating and ventilating equipment distributed in the Republic of Ireland by Wm. Finucane and Co., 5 Upper Pembroke St., Dublin, 2, will be held at the Montrose Hotel, Dublin, commencing

Tuesday, October 12 next.

The exhibition, from 5.30 p.m. to 9.30 p.m. each evening, will be open to consulting engineers on Tuesday, October 12, followed by architects on Wednesday, 13, and heating contractors

and engineers on Thursday, 14. Manufacturers who will be exhibiting equipment include: Trox Bros, Ltd.; Fenton Byrn and Co., Ltd.; Spiral Tube and Components Co., Ltd.; Girdlesstone Pumps Ltd., and Carter Thermal Engineering Ltd.

The Irish Plumbing and Heating Engineer.

A CENTRAL oil-fired boiler plant will be used in the provision of central heating for the 2,569 flats in the Ballymun scheme—the largest district heating scheme in these islands.

Heating is one of the mechanical and electrical services for which design and installation responsibility lies with G. N. Haden & Sons, a member of the Cubitt-Haden-Sisk consortium who are building the township. The overall building method to be used for the flats by the consortium is the Balency system, which is extensively used for blocks of flats on the Continent and in Israel and in the Argentine.

Services are to be integrated into the building system at Ballymun in the following way: 1. Heating in the flats will be provided by embedded floor panels. In the Balency system, walls are factory-made whilst floors are cast in concrete in situ. Embedded in these floors at this time will be heating coils and a flexible electrical wiring system. The necessary pipework is to be prefabricated in a factory on site. 2. A key factor in this building system is the "Technical Block." This block houses all the vertical heating, ventilation, water and plumbing services, and it will be prefabricated,

BALLYMUN SCHEME UNDER THE MICROSCOPE

with its pipework, on site. Each block, as it is placed in position in the building, becomes the wall between a kitchen and bathroom; baths, wash basins and cookers, etc., are then easily connected to their appropriate pipework.

The incorporation of the services in the structure in the way described above is novel in these islands, though well tried on the Continent and elsewhere. It allows for great speed in building—the Balency system caters for the erection of two normal flats in one day, using only one crane.

BESIDES the flats, 400 Lowton-Cubitt five-roomed houses are to be built on the site. One hundred and twenty of these are to be occupied before the district scheme is ready, and these will be fitted with individual gas-fired warm-air units for heating.

Central oil-fired boiler plant with an output of approximately 80 million B.T.U.'s per hour will be capable of

providing heat, and hot water, for the whole township over its 192-acre site. Distribution of heat from the central plant will be carried out by high pressure hot water mains. These, in general, will run through the basements of blocks of flats following the lines of spine roads sweeping out from the town centre.

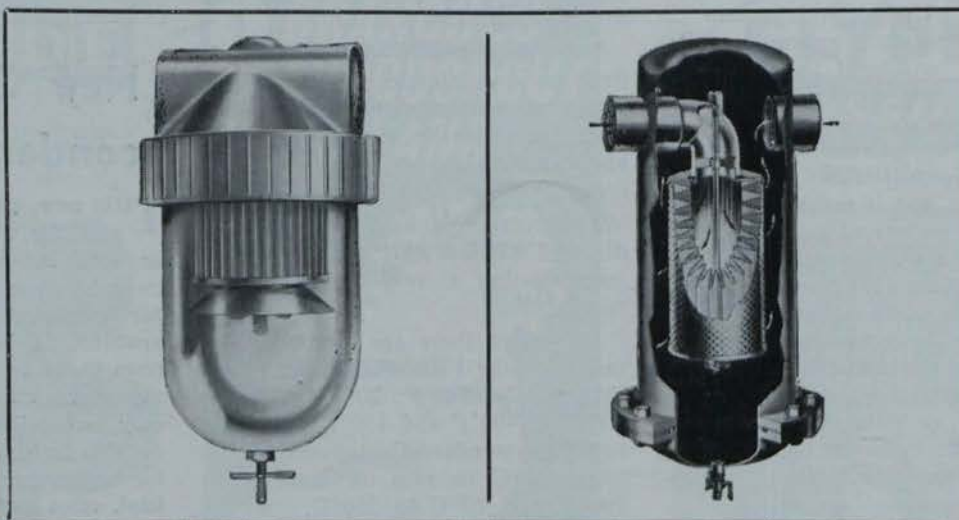
This is believed to be the largest district heating scheme in these islands. It will allow the occupants to have ample heating and hot water at a very low cost.

Cold water is to be pumped from a central reservoir near the central boiler house direct to taps in flats. This novel system replaces the need for separate booster plants and large storage tanks for each block of flats.

There will be 3,021 dwellings, as follows: 1,345 four-room flats; 499 three-room flats; 725 two-room flats; 452 Lowton-Cubitt dwellings, sub-divided into 400 two-storey houses and 52 one-room flats.

compressed air
pipeline filters
by

VOKES



Vokes compressed air pipeline filters are available for vertical or horizontal installation in seven standard sizes to cover lines from $\frac{1}{2}$ in. to 4 in. and pressures up to 500 p.s.i. Custom built filters are also available to meet specific requirements. Vokes also manufacture a filter for use in $\frac{1}{4}$ in. and $\frac{1}{2}$ in. air lines fitted with a transparent bowl to enable the need for servicing to be quickly seen. Write for details.

THE LEINSTER ENGINEERING COMPANY LTD., 158 & 159 Church St., Dublin, 7. Phone 777093/4.

THE term "air conditioning" is probably the most abused term in building services.

Many modern buildings are advertised as complete with air conditioning, but this may, in fact, turn out to be a series of extract fans mounted in external windows or a simple warm air heating plant.

Air conditioning is, as its name implies, the conditioning of air in all senses of the word, i.e., by heating, cooling, humidifying and filtering, and an air conditioned area is one in which all of the above conditions must remain constant irrespective of variations of either external weather conditions or internal factors such as lights, machinery or other sources of heat gain.

Up to ten years ago, due to the high cost involved, air conditioning in this country was mainly confined to industrial applications, i.e., laboratories, etc. However, in recent years, more and more commercial office blocks are being air conditioned. The main reasons for this are as follows:—

(1) The need for un-openable windows in centre city areas due to traffic noises and air pollution.

(2) The lighter form of construction now used for modern buildings having no thermal time lag and responding quickly to changes in external weather conditions.

(3) Modern buildings tend to more and more floors, thereby losing all natural shading from surrounding buildings and by their being exposed to direct solar radiation.

(4) The proven increased efficiency of staff when working in conditioned spaces.

(5) The increased life of interior decorations in the conditioned area.

As central heating was regarded as a luxury some ten years ago so air conditioning tends to be similarly considered in the present day. This attitude of mind is now, however, changing and whilst air conditioning in many cases is not considered a necessity, many commercial property owners are finding that buildings with air conditioning are more readily let than those without.

Most multi storey buildings to-day require some form of ventilation. If this is provided the design engineer will normally utilise the ventilation system for supplying heat and install a plenum system. Filters will, of course, be obligatory so a system is installed which, with the addition of some refrigeration and humidifying equipment and their associated con-

Air conditioning—probably building's most abused term today

By . . .
A SPECIAL CORRESPONDENT

trols, could readily be converted to fill air conditioning. Humidity, however, is not a thing the average office occupant is generally aware of as it may vary from 40% R.H.—60% R.H. without occupants being conscious of any change.

The refrigeration is, however, a different matter as increases in ambient room temperatures will very rapidly affect the comfort conditions of the occupants. Unfortunately, refrigeration equipment and its associated controls are relatively expensive, causing

probably a 30% additional expenditure on the original layout for the plenum system.

IN this country the main need for refrigeration is to counteract the effect of solar heat gains. If it is decided that the installation of refrigeration is not economically possible, there are several methods of reducing solar heat gains. These are:—

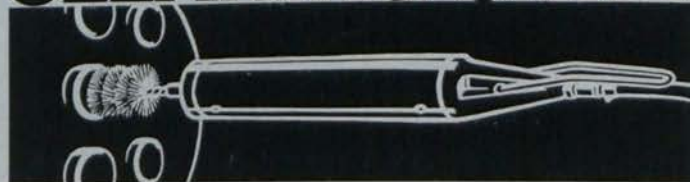
(1) By reduction in glass areas.

(2) By use of venetian blinds.

(3) By torrid orientation of the building. This is to ensure that the areas of maximum exposure are facing east and west so that during ordinary office hours the maximum solar heat

Continued overleaf

A UNIQUE BOILER-TUBE CLEANING UNIT!



The Ferret is a completely unique type of boiler-tube cleaning unit. Attach it to a standard tube brush and it will creep along the tube—without revolving—and without any need for manual pushing and pulling! When it reaches the tube end, the double thrust action then reverses and the Ferret returns—ready for the next tube!

- THE FERRET**
- * Cuts labour time—no manual pushing and pulling
 - * Does away with extension rods
 - * Gives cleaner tubes
 - * Works quickly

For Publication No. 208, or a demonstration in your own plant, contact:

HALPIN & HAYWARD LTD.

Unity Buildings, 16/17 Lower O'Connell St., Dublin, 1. Tel.: Dublin 48638, and 589 Upper Newtownards Road, Knock, Belfast, 4. Tel.: Dundonald 3212.



● Mr. "Ted" Barrett (right), the newly appointed Van den Bosch Sales Engineer for the Republic and Northern Ireland, with Mr. Allan Cavinder, General Manager of Van den Bosch Ltd.

VAN DEN BOSCH APPOINT AGENT

VAN den Bosch Limited (Europair House, Wimbledon, S.W. 19) announce the appointment of Mr. T. F. Barrett, M.I.M.I., A.M.Inst.Pet., as Sales Engineer for the Republic and Northern Ireland.

With Mr. Barrett's appointment, Van den Bosch have opened an office in Dublin at 20, Fairyhill, Newtownpark Avenue, Blackrock. This brings the total number of countries in which the Company has offices to 17.

Mr. Barrett, who is a mechanical engineer, has many years experience in the heating and air conditioning field.

AIR CONDITIONING

from previous page

is impinging on the face of the building having minimum exposure.

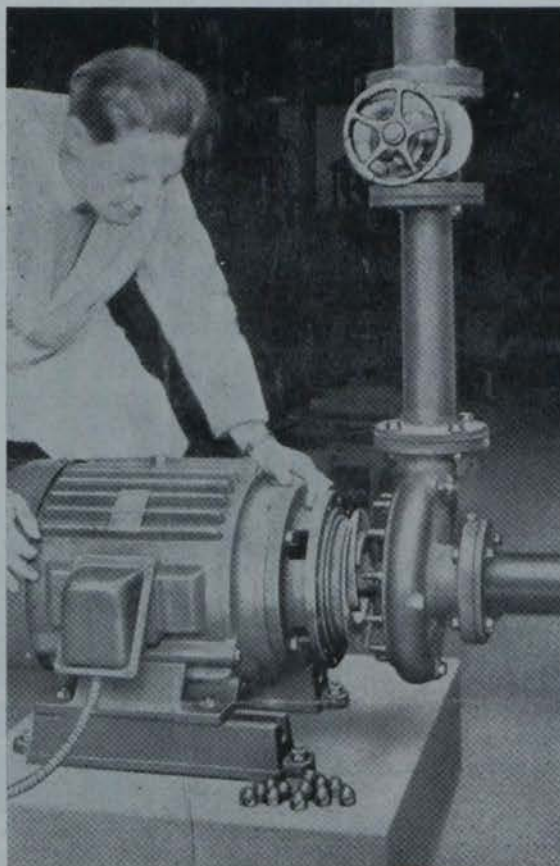
(4) By the use of recessed windows and overhanging balconies to maintain maximum shade conditions on glazed areas.

(5) By sheltering the building within the shadow of other buildings or natural formations and, if the building were single storey, by planting trees.

(6) By painting exposed surfaces of a building in a light heat reflecting colour.

A METHOD of ceiling central heating which cuts electricity consumption by a quarter has been developed by I.C. The system, known as "Flexel," uses thin sheets of conducting silicone rubber laced with carbon. The "laver" of this is pinned to the joists of the ceiling during building.

The Centrifugal **MOPUMP** for General Service



This model G.S. Mopump is, as the name implies, suitable for a wide variety of duties handling water and other liquids.

The unit construction G.S. Mopump illustrated here offers some remarkable installation advantages.

'MOPUMP'

is the trade name for Centrifugal Pumps manufactured by Rhodes, Brydon & Youatt (Division of Crane Ltd.).

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

TYLORS OF IRELAND LTD.

55 Rathgar Ave., Dublin, 6. Tel. 904603/4. Grams: "Tyland, Dublin".
Belfast Office: CRANE LTD., Mulhouse Lane, Belfast, 12.
Telephone: 32388. Grams: "Cranelon, Belfast".



MONTHLY SPECIAL REVIEW

Industrial, commercial
unit heaters and air
heating systems.

Manufacturers recommendations must be rigidly followed

THE term unit heater denotes the assembly of elements, of some form or another, the function of which is heating. The main essential elements of a unit heater are the heating elements, casing, fan and motor, outlet grilles or louvres. Ducting, grilles, filters, etc., may also be included.

Several types of unit heaters are in use, but the more common types may be classified according to one or more methods.

Arrangement of elements: Two main types come under this heading:

- (i) the draw through type, in which the fan draws air through the elements, and
- (ii) the blow through type in which the fan blows air through the elements.

By heating medium: The chief heating media are steam, hot-water, oil, gas, electricity.

By type of fan used: The two types of fans generally used are:

- (i) the propeller type, which can be of the horizontal blow or down type.
- (ii) centrifugal fan type can be of the smaller range such as is used in the cabinet type heater, or the larger industrial type. Both may be used for the delivery of air horizontally, vertically or downwards.

Uses: Unit heaters have three principal characteristics, as distinct from gravity heating units. They can have relatively large heating capacities in small casings; the ability to throw forward the warm air to a considerable distance in a controlled manner; low installed costs per B.T.U. output. So unit heaters are generally used in applications where the heating capacity requirements or the volume of space to be heated are large and would not

warrant complete heating or could not be economically done. Where the heating capacity is very large, the fitting of a number of unit heaters will prove more sufficient and economical than the use of a number of gravity units of the same total capacity. They are particularly useful where ceilings and roofs are high and prove more economical, in that they confine the heat to where it is required.

Floor space can be fully utilized by the placing of the unit heaters overhead. They have the added advantage that the amount and distribution of heat required can be controlled. Unit heaters have been proved to be most successful in factories and above all in places where ceilings are high and doors are opening and closing continually in cold weather. To overcome the problem of draught at doorways, a unit heater can be fitted overhead the door to act as a blanket to prevent the escape of warm air. Unit heaters are also employed where filtration of the heated air is required and they can be fitted to provide ventilation where the introduction of cold air is required.

Unit heaters are generally used in factories (where noise level is not a problem), garages, showrooms, workshops, warehouses, glass houses, corridors, etc.

Type of Units: Propellor types are usually used in free delivery applications where the heating capacity and distribution requirements can best be

met by units of moderate output and where air filtration is not required.

Horizontal types are used where ceilings are not too high and can be effectively felt.

Down blow types can be used where the roofs or ceilings are high and where floor space is limited.

Industrial centrifugal fan units are applied where heating capacities and space volumes are large and where filtration of the heated air or fresh air intake is required.

Cabinet types are used where the application requires an attractive appearance and low noise level to easy temperature control. These units are very versatile in use, where they can be used for fresh air intake, easy manual control of motors and dampers, etc. They can be of the floor, wall mounting or ceiling type.

Automatic Controls of Unit Heaters For Steam.—Controls can be of the on/off type or continuous fan operation with modulation of heat output.

For on/off operation a thermostat is required to stop and start the motor. Here it may be of interest to our readers to note that in some of the better manufactured units the blower motor has a built in safety protection to the windings, in the event of the heater becoming over heated. In order to start the motor again, a reset button is provided. Regarding the voltage operation of the motors, particularly of the smaller units, single phase 220 volt is preferred for safety conditions. For if a three phase motor is used, during operation of the fan or blower, one phase may be accidentally cut off to the motor, so the motor still continues to operate on two phases. If the unit is not protected by an overload relay switch, the motor

Continued overleaf



This special Review
article was compiled
by J. L. Fitzgerald.

will burn out. If a 220 volt supply is used, and if the supply or phase is broken, the motor stops giving better protection.

Continuous fan operation eliminates the intermittent blast of hot air resulting from the on/off operation. Generally in this operation a proportional thermostat controls a valve modulating the heat supply to the heat exchanger. A limit thermostat stops the fan when heat is no longer available.

Location of Heaters for proper heat distribution: The manufacturers' recommendations should always be adhered to for different makes of heaters have different mounting heights, etc., and the force of warm air varies according to the heating medium and the grille outlet as well as the type of blower used. Location of the unit heaters for proper distribution of heat is most important. Generally the units must be selected and arranged so as to provide complete heat coverage and maintain air motion and temperature in the working area.

The blow is dependent to a marked degree on the temperature of air leaving the heater, as well as velocity and volume. Mounting will be affected by the velocity and coverage and leaving air temperature of the heater. In order to obtain the desired air distribution the unit heater selected should be equipped with directional outlets, louvres or diffusers so that the desired coverage and temperature can be accomplished. Where possible, the units should be arranged so that the discharge air streams support each other and create a general circulatory motion in the space.

For particular heating spots, or zones of individual spaces in larger unheated areas, single unit heaters may be used, but allowance must be made for the inflow of unheated air from adjacent spaces and the consequent reduction in heat coverage, where possible, units should so located that the discharge or flow is into open spaces such as aisles and not directly on occupants. Piping connections for unit heaters, whether high or low temperature hot water or steam, whether oil fired or electric, the installer should follow rigidly the manufacturers' recommendations, for often the heater gets a bad name because of bad installation or not following exactly the manufacturer's recommendations.

Proper application depends on a number of factors: proper size, number and type, mounting height, direc-

SPECIAL REVIEW

from previous page

tion of blowing and versatility of direction, outlet velocity and temperature. Generally the manufacturers give complete details with regard to the foregoing and such literature should be consulted before purchasing any heaters.

Warm Air Heating Systems: Warm air systems may be divided into two types, the Gravity System and the Forced System. The former, though still in use, is very limited in its function. The motive head is due to the difference in weight between the heated air leaving the top of the heater shell and the cooler air returning at the bottom of the shell or housing. In the forced warm air heating all or nearly all of the motive head is supplied by a forced fan. Since this is the better and more efficient system, we will concentrate on the designed installation of forced warm air systems.

Forced warm air systems: In these systems the air circulation is effected

by centrifugal fans, motor driven. The following are the advantages of forced warm air systems:—

- (a) Ducting can be so designed and constructed to distribute the warm air to various points and can be so small as to be inconspicuous, and finally terminated by outlet grilles.
- (b) The circulation of the air is positive and gives even temperature distribution when properly designed.
- (c) System may be used as a cooler in summer, when properly designed.
- (d) Air may be filtered to keep the atmosphere pure.
- (e) Humidity control is easily attained.
- (f) Use of fan control system permits great flexibility in the location grilles and the supply of an even distribution of air.
- (g) Proper quantities of air may be drawn with the system and properly controlled and conditioned.
- (h) The furnace may be placed in a convenient out of the way place and the warm air ducted to where it is required.

Continued page thirty-eight

Kosangas for modern heating

There is a wide range of unit and warm air heaters available direct and indirect, including roof mounted, weatherproof models.

● *Propane Gas is clean-burning, fume-free . . . vital for unflued heaters. Supplied in cylinders, or in bulk tanks at very favourable rates.*

● *Propane Gas is economical and versatile. Can be used for many processes beside space heating.*

● *Supplies are available everywhere through the Kosangas dealer network.*

● *A country-wide service is given by Kosangas own fitters and service men.*

● *There is a FREE advisory service.*

**Contact The Kosangas Industrial Sales Department.
Dublin 74774, or Belfast 33221.**

To sum up the ideal advantage of warm air system is the control of temperature and the supply of conditioned air to the building, and the concealment of the heating medium. The supply of warm air to any particular room or section of the building can be shut off by closing the grill or setting the thermostat to the required temperature.

Regarding supply outlets and return grilles, the type of supply outlet that should be used will depend on the type of distribution system to which it is applied, e.g., the perimeter duct system, the supply outlets are usually located in the floor, or base board or underneath the window. To obtain the best result, the perimeter diffuser should deliver the air upward so as to blanket the window or cold wall with warm air. The return air grilles should be located in hallways or entrance doors or exposed places or inside walls, depending on the location of the supply outlets. Base board returns should be preferred to floor grilles. Floor ducting is ideally suitable for warm air systems where radiator or unit heaters cannot be used, due to machine location, etc. Dampers should be fitted to all duct systems to allow for air direction and volume control.

One important point to remember is to avoid sharp bends or elbows; ducts should be properly insulated to prevent heat bases. Particular attention should be paid to the connecting duct work between the furnace and the main duct, so as to avoid rigidity and the elimination of noise transference. The important factors to remember in the construction of duct work are: duct must be permanent, rigid, non-buckling and non-rattling; joints absolutely air tight and constructed of non-combustible materials, at least three or four feet from the furnace unit for a small unit.

Finally, a word about suitable controls. Best results are obtained when the fan is operated as continuously as possible, coupled with frequent, short cycles of burner operation.

The following controls are generally employed:—

- (1) A room thermostat, fitted at a carefully selected point where there is good air circulation and where a good average temperature is obtainable, which will give a true representation of the room temperature.
- (2) A fan thermostat fitted near the furnace outlet to start the fan at a temperature 10-15 deg. above room temperature and stop the fan

SPECIAL REVIEW

from page thirty-six

- 10-15 deg. below the cut in point. For best results to avoid draught, etc., the settings should be as low as possible.
- (3) A humidistat to regulate the moisture in the compartments or rooms, on units supplied with a humidifier. The humidistat can be located near the thermostat or it can be of the type fitted into the main air return duct.

- (4) Limit switches to the furnace, whether using gas, oil or solid fuel, should be provided as standard equipment.
- (5) High limit control switch should be provided in the furnace outlet to stop the burner if the leaving air temperature exceeds 200 deg. F. independent from the room thermostat.

Lastly, great care should be taken to provide regular servicing of the furnace, and controls and fan units, at least once a year. Grilles and air intake filters should be removed for cleaning or replacement.



WITHOUT THIS

22 MILLION PEOPLE WON'T WANT TO KNOW YOU

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

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

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

The wide range of Lincoln Furnaces. The largest range of furnaces manufactured in the U.K. There is a Furnace for every installation. Lincoln ducting,

purpose made ducting for every job. So, if you think you measure up to our high standards and like working with a company that likes working, then you deserve a share of the cake. Write for full information on Lincoln Furnaces, or ask our representative to visit you.

Please send me fully illustrated literature.

Please arrange an appointment
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Lincoln Furnaces Ltd.

Area Representative, J. Fleck Esq.,
12 Wynnland Road, Carmonay,
Newtown Abbey, Co. Antrim.

THE name Thermobloc is used by the Wanson Company Ltd. (Borehamwood, Herts) for their complete range of oil-fired air-heating equipment. Thermobloc air heaters have been continuously developed over many years and the present range of units represents one of the most extensive in the air-heating industry.

At the lower end of the scale is the Universal range of units with outputs of 200,000 to 400,000 B.t.u./hr., which are "off-the-shelf" heaters designed to run on gas oil or gas. Also in the vertical design of Thermobloc is the range of Standard Industrial Units, which outputs from 200,000 to 1,300,000 B.t.u./h. With higher ratings still are the Thermobloc Multipass units rated at 550,000 to 3,500,000 B.t.u./h. These units are also designed to operate on gas oil, or on 200 sec. or 950 sec. oil fuel for the larger versions.

Largest and of greatest technical interest in the Thermobloc range are the HTV units, which form a new concept of air heating. Designed for outputs up to 16,000,000 B.t.u./h., the

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).

HTV units are the most recent types designed by Wanson and there are now several installations used for both industrial heating and drying applications.

* * *

F. H. BIDDLE Limited manufacture the Waterbury range of oil and gas-fired warm air heaters. The oil-fired series provide capacities from 50,000 to 1,200,000 B.t.u./h., and the gas-fired series from 50,000 to 500,000 B.t.u./h. Both oil and gas-fired units up to and including a capacity of 200,000 B.t.u./h. are available in two types, viz.: the Hi-Boy and the Downflo.

The Hi-Boy models provide an up-

ward air stream and may be used for duct connection or with a top diffuser as a free-standing warm air circulator. The Downflo models provide a downward air stream for application to an under floor duct-work system.

* * *

A NEW warm-air curtain unit, completely self-contained, has been announced by Merican Electric Company Ltd. (Stratford Road, Birmingham). The unit consists of a steel cabinet, 3' x 3' and 16" deep, which when suspended over a doorway, takes in room air from the front or either side, and discharges it from a grille 30" long and 4" wide to form a down-flowing "curtain" in the doorway.

Three electric elements of 3 Kw. each allow for three stages of heat control, by means of an easily-accessible rotary switch marked for high, medium, low, cold and off. A centrifugal fan delivers air at approximately 850 c.f.m., but a speed control knob gives variable air output irrespective of whether all or part of the heating elements are switched on. The fan is very quiet in action.

HARRIS Still leads the Way... ENGINEERING CO. LTD.

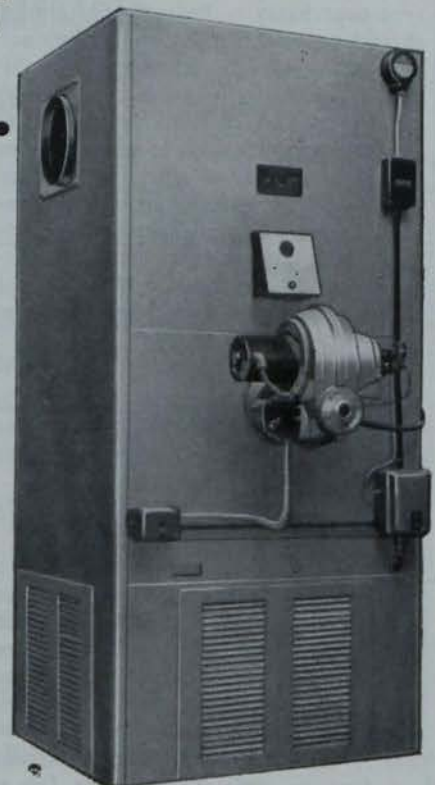
A NEW 500,000 Btu's OIL FIRED AIR HEATER

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

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

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

HARRIS ENGINEERING CO. LTD.
KILLOWEN STREET, COLERAINE, NORTHERN IRELAND
Telephone COLERAINE 2315



THE Lennox Heating Co. Ltd. (Croydon Airport, Croydon, Surrey) manufacture a wide range of gas-fired and oil-fired warm air heating equipment for residential, commercial, and industrial heating systems. The equipment is marketed through approved installers in the Republic of Ireland and Northern Ireland.

The range of oil-fired equipment, which is available both in the North and the Republic, comprises a wall flame unit with an output adjustable between 37,000 and 48,000 B.t.u./hr., this being available as an upflow unit only, and six pressure jet heaters covering the range from 56,000 to 134,000 B.t.u./hr., both upflow and downflow.

In Northern Ireland, Lennox gas-fired equipment covering the range from 28,000 to 132,000 B.t.u./hr. is available. The "Lennette," a 28,000 B.t.u./hr. downflow unit, is available for selective or partial heating systems, and is ideally suited for local authority housing projects or for flats or lower cost houses. The "Duracurve" heat exchanger which is exclusive to Lennox Heating equipment, is a major feature of the G8 series of upflow and downflow units—a range of fifteen heaters covering from 36,000 to 132,000 B.t.u./hr. in both upflow and downflow patterns.

* * *

A NUMBER of heating products introduced recently by Matthews & Yeats Ltd. include a range of new Cyclone plate-finned air heaters suitable for heating, air conditioning and process heating installations. 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" increments, from 12" x 12" to 72" x 72", thus giving a very wide range of duties.

A fan unit which is not only driven from a tractor but can be readily transported around a farm so that a single fan can tackle a variety of jobs, has also been introduced by Matthews & Yeats Ltd. The unit is provided with heavy steel brackets which couple to the three-point hydraulic lifting linkage of a standard tractor. Fixing pins supplied are suitable for categories 1 and 2 linkages.

A new larger packaged drying unit from Matthews—the P.U.4.—is the largest of the range and will supply up to 41,500 cubic feet of air per

PRODUCT REVIEW

from previous page

minute. The unit incorporates a 45V aerofoil high efficiency fan, belt driven from a 50 h.p. motor, and is fitted with an 84 Kw., 3-step heater. The firm's agents in the Republic of Ireland are Heatovent Supply Co., 379 South Circular Road, Kialto, Dublin, while sales for Northern Ireland are handled from Matthews & Yeats head office at Cyclone Works, Swinton, Manchester, Lancashire.

* * *

GRAYHILL semi-permanent nylon air filter panels are designed for use with Grayhill Electrostatic Precipitators, forming together a combined unit capable of operating at filtration efficiencies in excess of 98 per cent. photo metric test, Methylene Blue Test and B.S. 2831 down to .01 micron. They are from an interesting range of products of the Grayhill Engineering Co. Ltd. (Hammond House, Coventry Road, Sheldon, Birmingham).

The same company also produces the Econoil range of oil-fired heaters which can be spread either by a single diffuser or a ductwork system with multiple outlets as required. Two models are available—X 19 (capacity 250,000 B.t.u./hr.), and X 24 (capacity 380,000 B.t.u./hr.). Grayhill direct and indirect gas-fired unit heaters are the latest additions to the Company's wide range of Space Heater Units.

Grayhill's "G" series of oil-fired space heaters are available in four models with outputs ranging from 300,000 B.t.u./hr. to 100,000 B.t.u./hr. The units are totally enclosed in the outer case which leaves the exterior uncluttered and tamperproof.

* * *

CLYDE Fuel Systems Ltd. (Ireland) have now added two new models to their range of free-standing Clyde Gen-O-Therm industrial space heaters—models CH5 and CH6, with ratings of 750,000 and 1,000,000 B.t.u./hr., respectively, thus extending the range from 100,000 B.t.u./hr., and so catering for the needs of both small workshops and large factories.

The two new models operate on light gas or diesel oil of 40 seconds viscosity Redwood No. 1 at 100 degrees F., and are complete packaged oil-fired air heating systems having incorporated in their design many up-to-date and cost saving features. These include the special stainless steel "Contraflow" combustion chamber

about which air is drawn through filters in the base and circulated by twin centrifugal type fans for quiet operation.

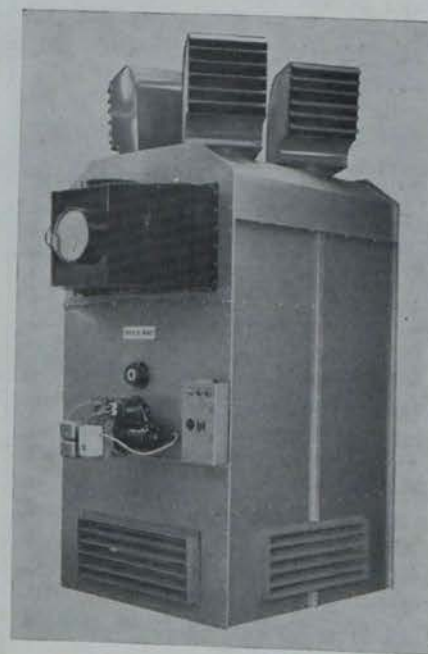
All units are fully insulated in order to deliver heat to where it is required. The I.D. fan, the shaft of which is air cooled for long life, is set for controlled combustion, alleviating the necessity of providing the correct draught conditions for efficient combustion, thus reducing installation costs regarding flue dimensions. The position of the flue gas outlet can be orientated on request, to suit site conditions, at no additional cost.

With this model, provision is made, with suitable accessories, for connection to conventional flue, Se-Duct or common flue system in multi-storey buildings or balanced flue system. The dimensions are: height (excluding duct base), 38½"; width, 15", and depth (excluding spigots at rear), 21". The standard duct base is 7½" high.

* * *

BATTERIES of spirally finned, all copper tubes through which steam or low or high pressure hot water is circulated are manufactured by the Spiral Tube Company of Derby. The excellent heat transfer properties of Spiral Tube make these batteries a compact and efficient means of air heating for use by heating engineers and contractors. The Company's "Component" Series 11 units incorporate a new type of casing and a new

continued overleaf



● The model 1000 Pak-A-Way oil fired air heater.

Thirty-nine

The Irish Plumbing and Heating Engineer.

kind of heating element, both of which considerably reduce initial cost relative to output.

Spiral tube unit heaters are similar in principle to air heater batteries, but smaller in size and incorporate a motor driven fan for the rapid distribution of warm air in factories, workshops and offices. Although the models are standard, the spiral tube elements are varied according to the heating medium used—steam, low pressure hot water or high pressure hot water. Agents for the Spiral Tube products in the Republic of Ireland are W. Finucane & Co., Dublin, while in Northern Ireland the Company is represented by McCulloch, Miller & Morison Ltd., Glasgow.

* * *

A NEW addition to the F. H. Biddle range of Forceflo noiseless fan convectors is the "UC" series. The internal components such as heating coil, fans and motors, are identical to those used in the most successful Biddle "U" Series Forceflo. The new range consists of four models—UC17 (27,000 B.t.u./h.); UC27 (41,500 B.t.u./h.); UC37 (51,000 B.t.u./h.), and UC47 (62,000 B.t.u./h.).

Each unit includes a built in or remote switch giving three speeds and thus three outputs are obtainable, e.g., Model UC17, 17,300, 20,000, and 27,000 B.t.u./hr. The units have been carefully tested for noise level through the entire octave band spectrum at various speeds, thus providing reliable, accurate and guaranteed noise factors against internationally accepted noise criteria curves.

* * *

THE Package Heater Co. Ltd. (Chiswick High Road, London) have recently extended their wide range of "Pak-a-Way" automatic oil-fired air heaters. The latest model, which is designated Model 1000, is rated at 1,000,000 B.t.u./h. and fired on gas oil with a viscosity of 35 sec. Redwood No. 1 at 100 degrees F. Average fuel consumption is 3.57 gal./h., the air flow capacity being 8,800 ft. 3/min. at 60 degrees F.

* * *

THE three-way Copperad Fan Convector has been specially designed to permit simultaneous three-way warm air distribution so that it can be located in and heat a room, and at the same time by means of two short lengths of connecting duct-work, heat two adjacent rooms to the rear or to the left or right hand side of the unit, as required.

By use of blanking plates which are https://arrow.tudublin.ie/bsn/vol5/iss6/1
DOI: 10.21427/D73D9P to give two-way dis-

PRODUCT REVIEW

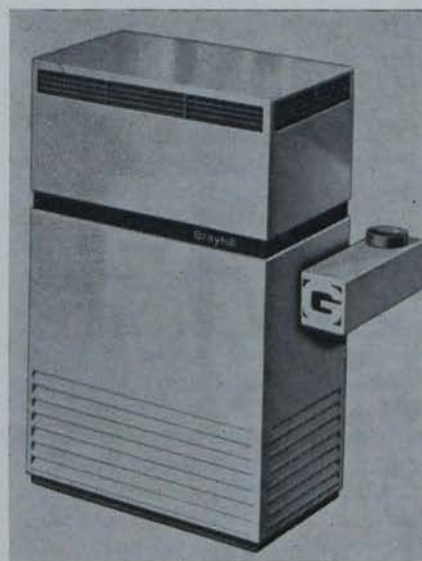
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charge only if required. Outlet grilles complete with adjustable dampers are fitted so that the amount of air to pass into any one or more rooms can be easily controlled. The three-way fan convector is also fitted with three speed motors which are controlled by readily accessible switches. The manufacturers are Copperad Ltd., Colnbrook, Bucks., England.

* * *

ELECTRON Ltd. (of Croydon, Surrey) manufacture electric duct heaters of both standard and special sizes. These are designed for heating and air conditioning plenum systems or for re-circulating drying ovens, with temperatures of up to 600 degrees C. Case sizes and wiring arrangements are to the customer's exact requirements.

Two types of air heater can be supplied—either the open coil type, constructed from 80/20 nickle chrome elements, supported on insulator bars or the sheathed type, which consists of



● One of the Grayhill Engineering "G" series (see Review).

a helically coil resistance wire centrally located in a solid drawn sheath or tube and can be made of mild steel, stainless steel, etc., depending on the requirement.



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The new series represents the latest development in the field of space heaters.

Modern and attractive in appearance the "G" series provides trouble-free heating with a high efficiency value of over 80% for all industrial purposes.

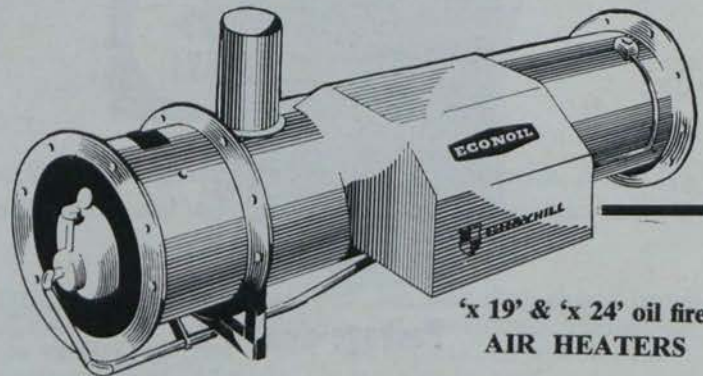
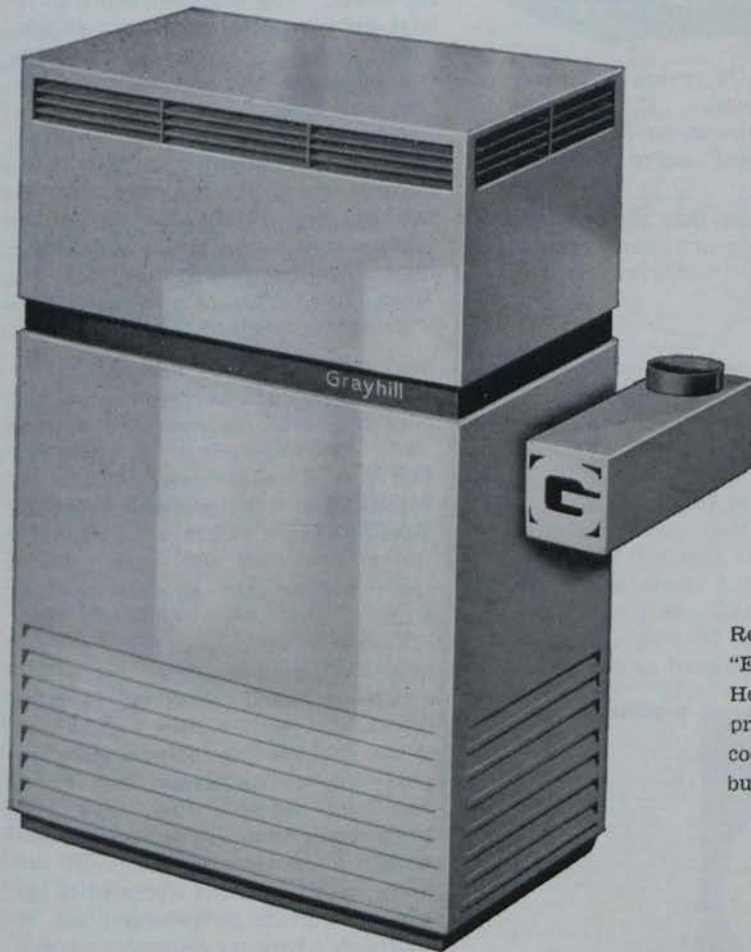
Quick and easy to install, it includes single piece flue elbows, cravats and cowls in aluminium. Fully Automatic controls are supplied and fitted in accordance with the latest British Standards. Models "G" 75 and "G" 100 are specifically designed to provide high-low operation as standard.

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TWO sizes of new, quick-coupled condensing units with matching fan coil units for air conditioning have been introduced by Carlyle Air Conditioning Company.

The units are designed to make installation easier and are particularly suitable for the smaller air conditioning applications in commercial, industrial, office and retail establishments where a split package system is necessary.

The new 2 and 3-ton air-cooled condensing units, providing cooling capacities from 25,000 to 39,000 B.t.u./hr. employ quick-coupled refrig-



erant tubing to ensure a cleaner refrigeration system. The tubing, available in lengths up to 50 feet, is furnished, charged, sealed, factory-clean and tested.

Lower-priced than previous models, the condensing units can be used with

Carlyle quick-coupled fan-coil units or with independent coil combinations. By using accessory adaptors, units may be brazed in the conventional way, if desired.

The condensing units are enclosed in a heavy-gauge galvaneal steel casing for placement outside on a slab or on a roof. The cabinets, which have large service access areas, are 44 ins. wide, 22½ ins. high, and 22 ins. deep. Internally, the unit control box has been redesigned.

All models use a new line-break protection device against overloads. Located inside the compressor motor winding, it is highly sensitive to excessive temperature or current conditions. Another protective device, the Time Guard Circuit, is an accessory. Irish agents: Walkers Ltd.

* * *

COPPERAD Ltd. have announced the introduction of a range of standard-

NEW AIR HEATER BATTERIES

ised electric air heater batteries. It is claimed that the range is suitable for most normal

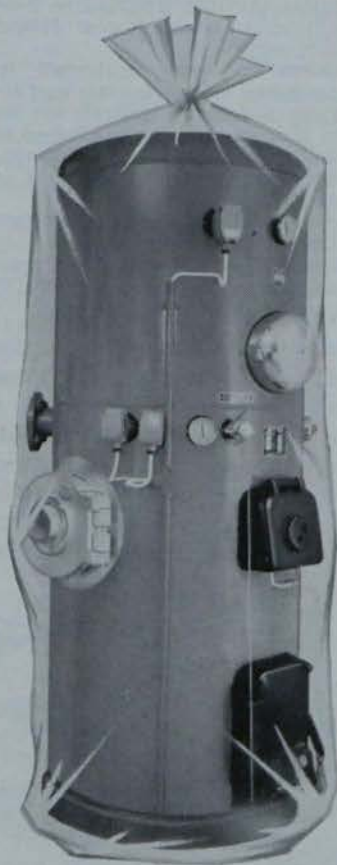
space heating and process applications.

The elements are of the tubular mineral insulated type, completely waterproof, and sheathed in solid drawn non-ferrous alloy. They are modestly rated and run at a comparatively low surface temperature to ensure long working life. For high temperature applications stainless steel sheathed elements are available, similarly for applications where extra low element surface temperatures are required or where the air velocity is low, finned elements can be supplied.

The batteries are available in a wide range of standard sizes and ratings. The standardised duct sizes start at 12 ins. square and increase in increments of 6 ins. in length and width to a maximum of 36 in. high and 48 in. wide. Each size can have four different loadings by the use of 1, 2, 3 or 4 banks of elements. Ratings are from 4.2 kW. and 202 kW and output from 14,300 B.t.u./hr. to 688,000 B.t.u./hr. Larger or smaller ratings can, of course, be supplied if required.

* * *

A NEW control and limit thermostat, type GAT, has been marketed by Maclaren Controls Ltd. (333 West Street, Glasgow, C.5). The unit is designed for use with an automatically fired heating system and is connected in series with an oil burner control unit. It provides the two separate functions of control and limit thermostats.



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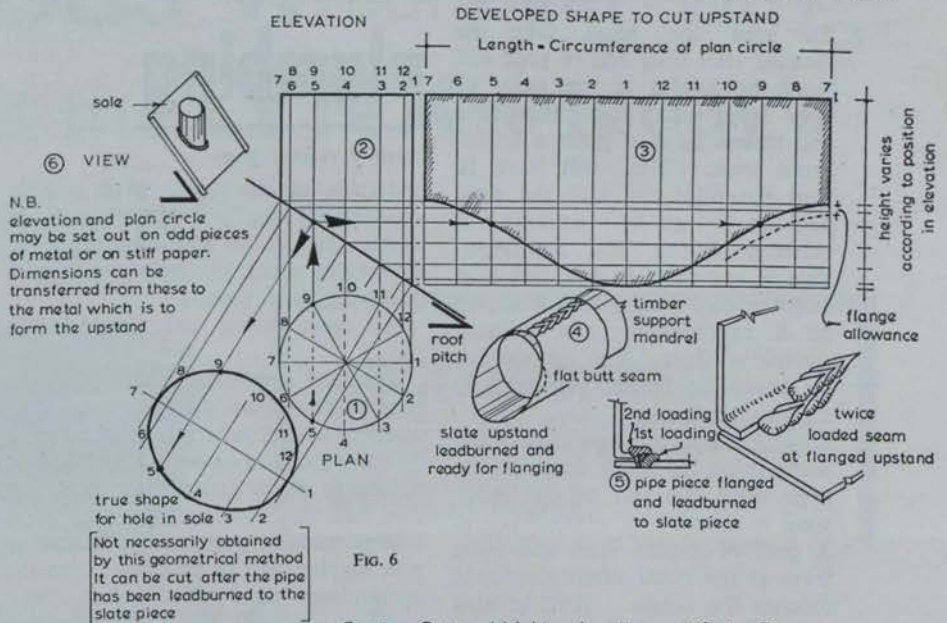
stoop to it. Of course, later when you are leadburning on the site you may have to work in awkward positions, but there is no reason why you should make things difficult for yourself in the workshop. When you become more expert you will not be worried by a tricky site position because you no longer have any trouble with the technique of leadburning, and will be able to concentrate only on how best to apply it.

Preparing and leadburning flat butt seams.—Flat-butt seams are used to join the edges of lead sheets. The joint is burned in the **down-hand** position—that is, with the work on a flat, horizontal surface so that the plumber can look down upon it, and this is the easiest of the many joints that can be made by leadburning.

The method of making flat-butt joints can be used to illustrate the points that have already been explained about leadburning. Remember that it is important to have good, clean preparation and meeting edges that fit well; penetration by fusion right to the underside of the joint; adequate filler rod to give a joint surface that is proud finished; a clean, hot flame; easy stance at the bench; and rhythmic action.

To prepare the joint:—

1. Carefully cut or pare the meeting edges of the sheets to be joined so that they butt snugly together.
2. Shave clean the top surface of each abutting edge to a width of a little over $\frac{1}{4}$ in.
3. Then lightly shave the meeting edges of the under-side to an angle of about 45° . This will remove all burrs and help the butting edges to fit closely; it also ensures that the surfaces are clean so that they will fuse and receive the fused filler rod when the weld pool has penetrated to the bottom of the joint.
4. Fit the shaved pieces together. they may be lightly dressed flat if necessary. The flat butt seam is now ready for leadburning, and this is done as follows:
5. Light the blowpipe as already described, and adjust the flame until it is neutral (Fig. 4).
6. Now "tack" the joint by bring-



Setting Out and Making Leadburned Slate Piece

ing edges until they melt and flow together at this spot. Do this at intervals of about 3 in. along the butted joint line. Remember that the hottest part of the flame is about $\frac{1}{8}$ in. in front of the round-

ed, white inner cone. You should use this part of the flame throughout the fusion process, by bringing the flame down until the white cone is $\frac{1}{8}$ in. away from the metal (Figs. 4 and 5).

Continued overleaf



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plumbing

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7. To load the joint, take the cleaned lead filler rod in your left hand, holding it in the palm of your hand with your forefinger and thumb as if it were a kettle-drum stick. You will have to feed the filler rod into the weld pool as you go by "walking" it between thumb and forefinger. This is not easy at first, but it is essential that you should learn to do it rhythmically, and without conscious effort. You can do this by practising before you actually start to leadburn.
8. Starting at the right-hand end of the seam, bring the flame down to the joint until the end of the inner cone is about $\frac{1}{4}$ in. away from it. A pool of molten lead will soon form at the point where the flame touches the metal. (Left-handed persons might find it easier to start from the left-hand end).
9. Melt about $\frac{1}{4}$ in. of filler rod into this pool. This will fill the pool, and some will stand proud of the surface.
10. Move the flame about $\frac{1}{4}$ in. along the line of joint and then pause for a few seconds. Another molten pool will form before the first has completely solidified. Into this molten second pool add another $\frac{1}{4}$ in. of melted filler rod.
11. Move the flame about $\frac{1}{4}$ in. along the line of joint once more, pause slightly, and then add more filler rod as before.
12. Continue rhythmically in this way to the end of the seam.

NOTE the steps in the progression: obtain a molten pool, add filler, rod, move the flame along, pause slightly, add more filler rod to the new pool; move along again, pause, add filler rod; move along—pause—add filler rod—in a simple rhythm. If you add to this steady series of actions a slight raising of the flame after each move along so that it licks up the filler rod end which is held just in front and a little above it, you will very soon find yourself producing those pleasing, regularly spaced "V's" which characterize good flat butt seams burning.

The V formation results, as has been said, from the natural cooling lines of the molten pools of lead. A very hot flame will be difficult to control at first, and you may find that the V's are long and closely laid against one another. Too cool a flame will not provide enough heat to give proper fusion, and the result will be short V's and lack of penetration to the

underside of the joint. With a little experience, you will soon find the nozzle size, flame size, and speed of movement which will help you to produce the best results.

All these points are illustrated in Fig. 5.

Practical application: a leadburned slate piece.—Slate pieces are used to weather a roof where it is penetrated by soil pipes and so on. They can be bossed to shape from sheet lead, but this has the disadvantage that quite a large piece of sheet lead is needed to give surplus lead to be bossed into the upstanding "pipe" of the slate piece, and, as you will know, the bossing operation is hard work and takes a long time.

IT takes less lead, much less time, and very much less effort to set out a lead slate piece (with the help of simple geometry), cut it to size, fold it to shape, fit and leadburn it. Fig. 6 illustrates a slate piece and shows, step by step, how the setting out is done.

Suppose a slate piece is required to weather a pipe of $4\frac{1}{2}$ in. outside diameter passing through a roof which slopes at an angle of 45° , and its upstand or pipe portion is to be 4 in. high at its least height—that is, at the face looking up the slope. The stages of making it are shown in Fig. 6.

1. Set down on any convenient clean, smooth surface the plan circle of the pipe piece (Diagram 1).
2. Project up from this to produce the elevation of the pipe piece (Diagram 2).
3. Draw the angle of the roof slope and measure 4 in. up from it to find the top line of the pipe elevation (up projection line number 7 in Diagram 2).
4. Divide the plan circle into equal parts (usually 12) as shown in Diagram 1. Number these as shown 1-12—so that they are easy to identify. Notice that the 7 and 7₁ share a common line length in the development—Diagram 3. They will eventually meet to form the butting joint edges of the pipe piece.
5. Project vertical lines from the circumference of the plan circle up to the pipe piece elevation (Diagram 2), and number these as on the plan circle. You will see that

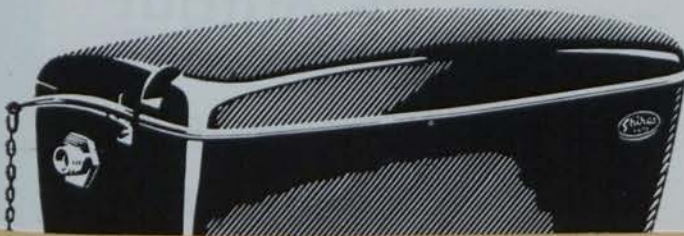
elevation line 1 now gives the length of the pipe piece at its longest side or face. Line 7 gives the shortest length, and the others will range in length between these two according to their position round the pipe piece. They are used in the next step to help give the shape of the flat piece of lead which will eventually fold to form the pipe.

6. Choose a piece of flat sheet lead from which to make the pipe piece. This must be at least as wide as the greatest height of the full size pipe piece elevation (that is, as wide as line 1 plus about half in. to be turned as a flat flange for leadburning). The length of this piece must be at least $3\frac{1}{7}$ times the outside diameter of the pipe to be weathered. (Circumference = $3\frac{1}{7} \times$ diameter). In this case it would be:—
 $3\frac{1}{7} \times 4\frac{1}{2}$ in.

LAY a straight line lengthwise near the top edge of this flat piece of lead. (If the cut along edge is already straight then this can be used instead). Mark vertical division lines at right angles to this straight long line or edge. These must correspond to the divisions in the plan circle (1): there must be the same number of lines and they must be the length of the arc between the lines on the circle apart. Number these lines to correspond with the elevation.

7. Carefully transfer the lengths of the elevation lines to their respective numbered lines in the development on the flat sheet of lead. (Diagram 3). You could use compasses or a rule for this but, dividers are more accurate and therefore better.
8. By drawing a freehand curve through all the lower points thus obtained, trace the line to be cut for the bottom edge of the pipe piece. (Remember to add $\frac{1}{2}$ in. for the pipe flange).
9. After carefully cutting off the lead you do not need, shape the pipe piece round a mandrel and leadburn it as shown in Fig 6, Diagram 4.
10. When you have leadburned the flat butted seam you can flange the bottom of the pipe piece (Diagram 5).
11. The pipe or upstand piece can now be leadburned by a twice-loaded flat butt leadburned seam as shown in Diagram 5. The completed job is shown in the view (Diagram 6).

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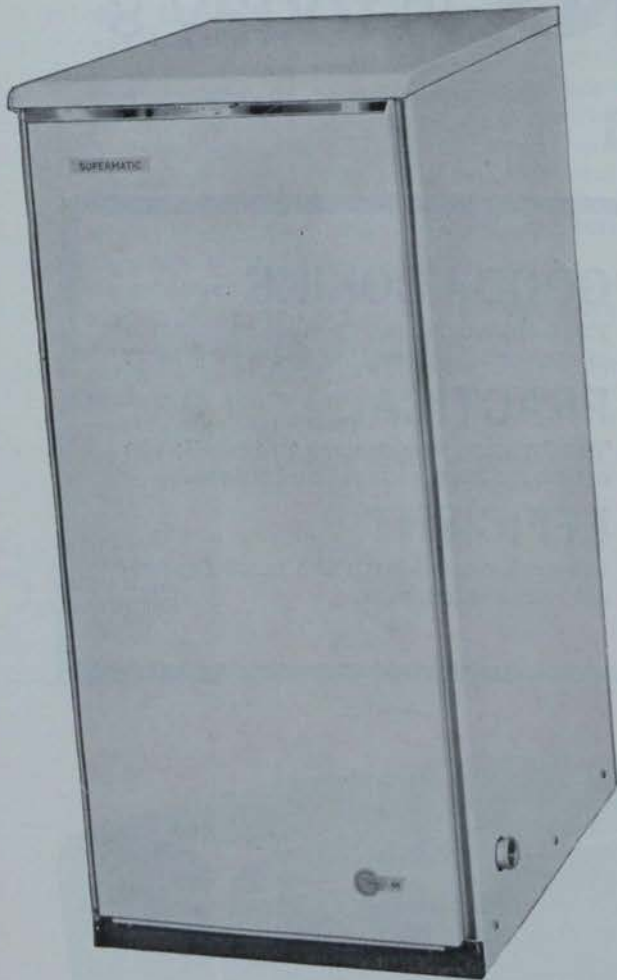
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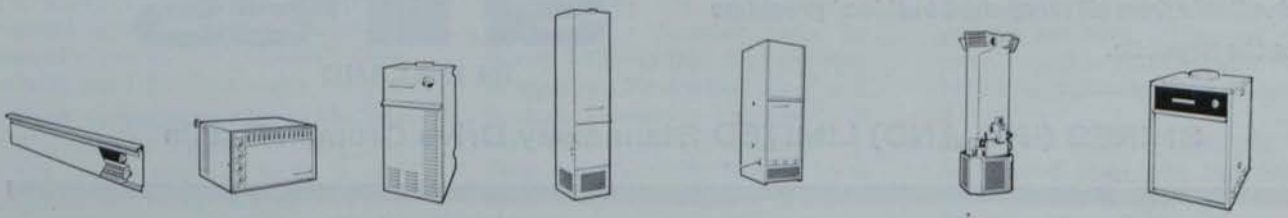


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