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

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ENGINEER



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December 1964

Published by ARROW TU Dublin, 1964
Vol. 4 No. 9

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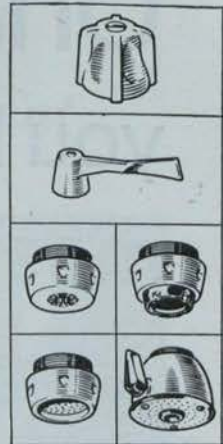
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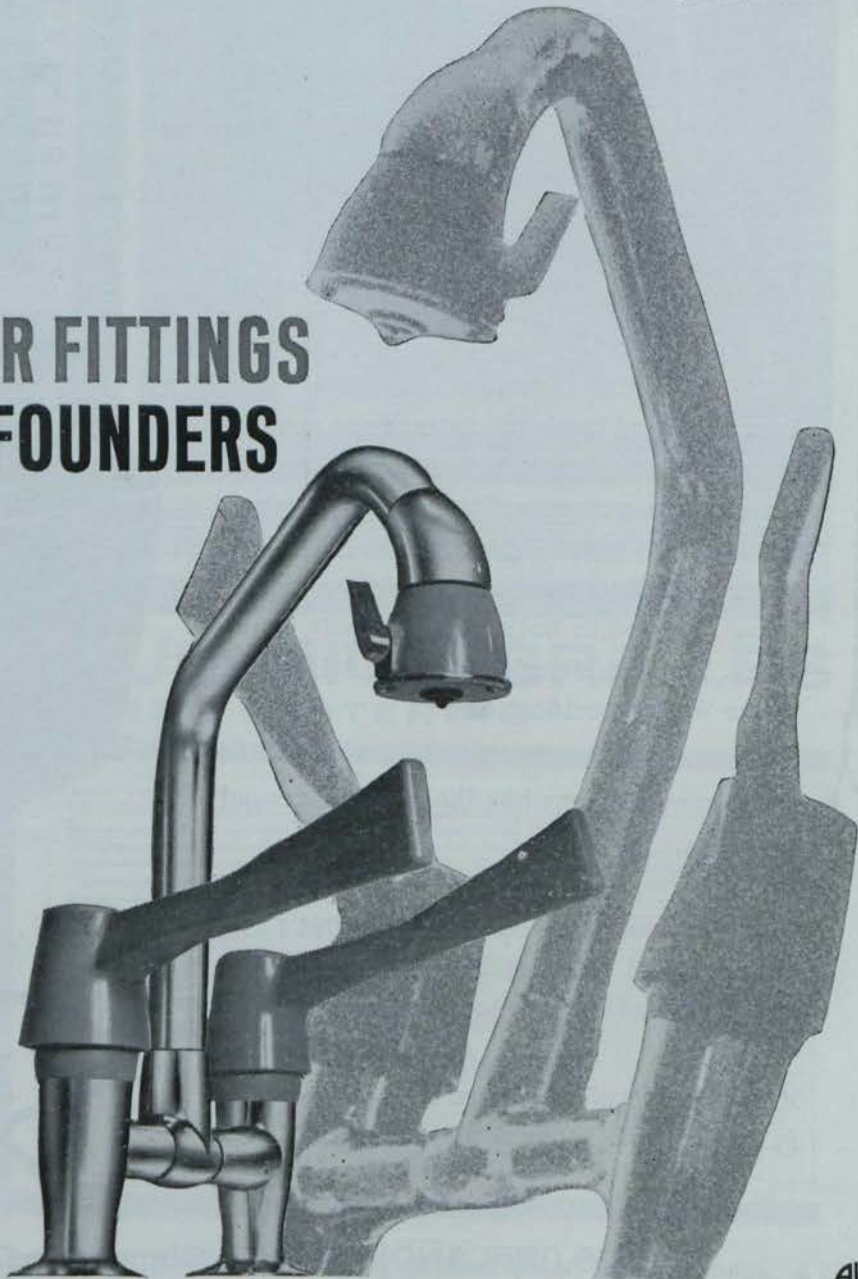
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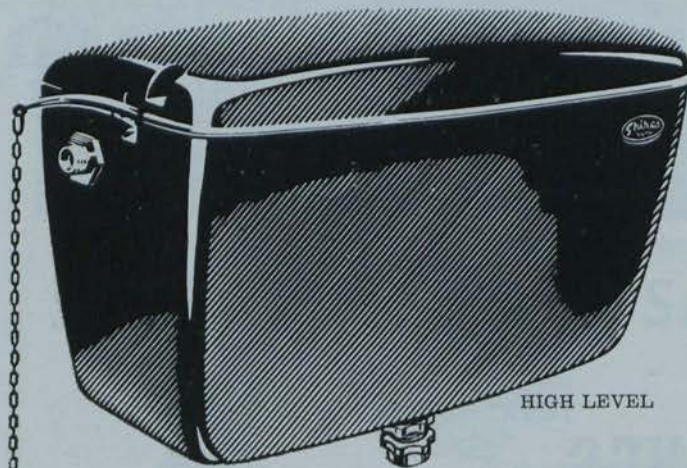


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One

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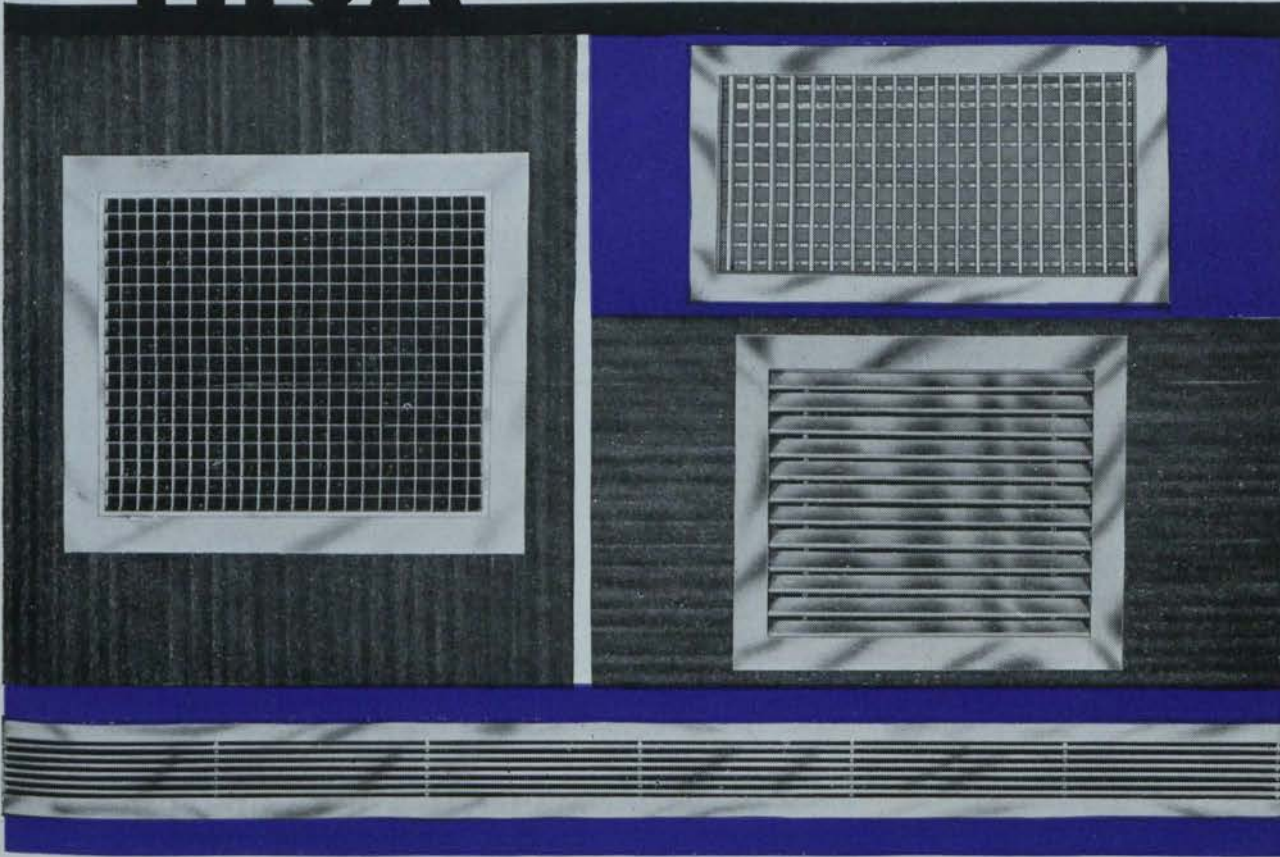


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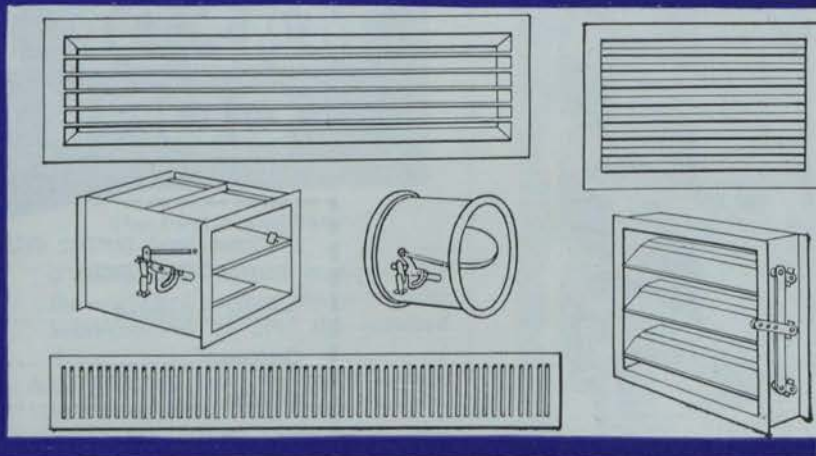
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NORTHERN IRELAND

BIG NEWS FOR N.I. READERS

—see page thirty-six

'USE IRISH' WARNING ISSUED

IN connection with the "Buy Irish" campaign, the Minister for Local Government reminds those connected with State-aided private housing that it is a condition of the payment of Housing Grants that materials and appliances manufactured or produced in the State be used, as far as possible, in the provision of the houses or in carrying out reconstruction work or repairs.

Cases have come to notice in which this condition has not been fully observed, a Department statement says. The Minister has now issued instructions that, for the future, the condition requiring the use, as far as possible, of Irish materials and appliances is to be enforced strictly and failure to comply with it may involve complete forfeiture of the grants.

The Minister is reminding all local authorities that in the case of all housing, sanitary services and other public works carried out by them, whether by contract or otherwise, Irish materials and appliances must be used as far as possible.

VANDAL-BEATING WASHBASIN

A new, small washbasin in ceramic glazed fireclay provides an answer to problems arising from rough treatment in public places. Integrally moulded with the Insette basin is a rectangular section to enable the basin to be built-in into the wall to a depth of 4½". Although not designed specifically as an antidote to wanton vandalism, such a fixing undoubtedly withstands the efforts of those who love to show their strength by wrenching equipment from its appointed place.

The primary purpose of the Insette is to provide adequate hand washing facilities where space is restricted. This it does admirably, with an overall width of 18" and a wall-face to front edge projection of only 7½". In spite of this, the

trade Topics

A MILLION pound ultra modern plant to manufacture "cleaner" gas is to be erected in

DUBLIN TO GET NON LETHAL GAS

Dublin. A spokesman for the Dublin Gas Company said that the oil refinery-type plant, which will manufacture a non-lethal fuel, will be in operation in two years' time.

Petroleum products will be used. The new gas, unlike the present coal gas, will not limit the ability of the lungs to take in oxygen.

Companies in Britain are conducting tests with the new gas, which has been found very efficient. The Dublin company, having studied the developments, has now decided to push ahead with its own operations.



The Insette washbasin.

6" deep bowl is not cramped, for the corbelled section allows it to be semi-recessed to give the required space.

Also recessed into the same section is a soap alcove of ample dimensions, the lower front edge adequately lipped to prevent soap from sliding into a bowl. This new washbasin is by John Slater (Stoke) Ltd., Berry Hill, Stoke-on-Trent, and is available in white or choice of eight colours.

IRISH PLUMBING & HEATING

ENGINEER

Vol. 4. No. 9. DECEMBER, 1964
THE IRISH PLUMBING AND HEATING ENGINEER is the only publication produced in Ireland catering exclusively for the heating, plumbing and ventilation industries with a guaranteed circulation covering the Republic of Ireland and Northern Ireland every month.

THIS month our special review feature looks at domestic gas and solid fuel fired boilers, burners and controls. The special review article is by A. L. Townsend and is accompanied by a comprehensive equipment review.

Due to heavy demands on space we have had to hold over W. J. R. Couchman's contribution in his series for domestic heating installers. It will appear next month.

However, good news is that early in the New Year we will begin serialisation of Volume II of A. L. Townsend's book, Plumbing. This will be welcomed by the many readers who closely followed Volume I. of this important work in the I.P.H.E.

There is also good news for our Northern Ireland readership on page thirty-six where plans for big N.I. developments are detailed.

Trade Topics review the month's news.

Editorial and advertising offices:

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

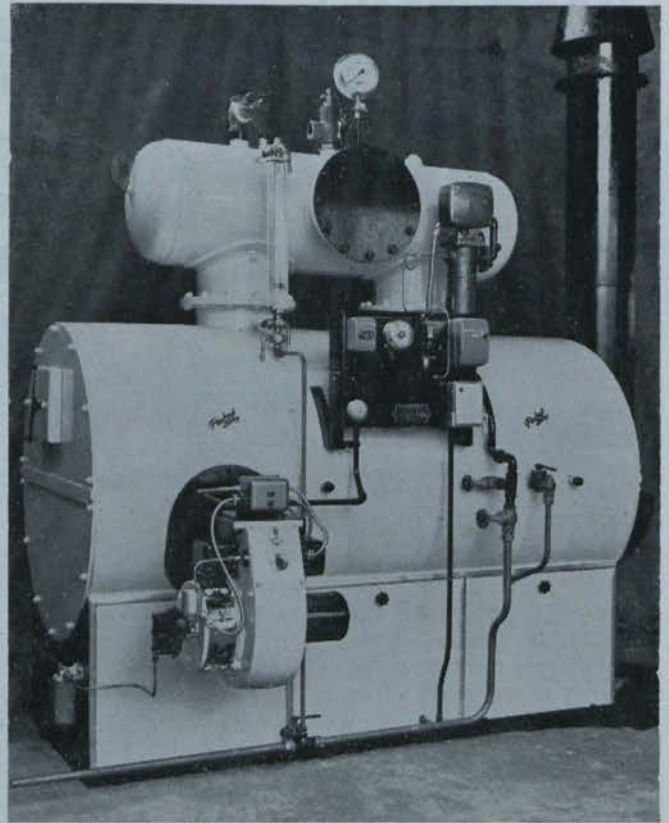
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Above: THE PERKINS PATOMATIC

A horizontal fire tube steam raising boiler with a wide range of sizes and applications. Packaged and electrically controlled models of the Patomatic are also available. Capacities up to 4,000,000 BTU's/hr. 100 to 4,000lbs. per hour evaporation.

Left: PC SERIES—55,000 to 1,000,000 BTU's/hr.

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

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



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MANUFACTURERS OF THE FAMOUS PERKINS 'FLUE-LESS' MINI BOILERS

trade Topics

AN increased membership was reported at the annual general meeting of the Association for Sub-Contractors and Nominated Suppliers held in Dublin last month. The need for strength in numbers was stressed as being the means of making the Association a real force in the building industry.

It was also reported at the meeting that the possibility of having some form of liaison with the Association of Electrical Contractors was explored during the past year.

A select committee of the Association had a meeting with the Federation of Builders during the year. The discussions were to ensure that the clause in the main contract which affect the sub-contractor were framed in such a way as to safeguard the sub-contractor's interests.

New officers elected were: President, Peter McGloughlin (J. & C. McGloughlin Ltd.); J. J. Burke (Roofing Contractors Ltd.); A. Gordon Pearson (Smith & Pearson Ltd.); R. J. Chillingworth (Sound Systems Ltd.); M. Sheehan (State Glass Co. Ltd.), and John B. Doherty (John B. Doherty Ltd.).

* * *

THE RANGE of Bentone oil burners from the big Bentone-Verken concern of Sweden, which

WIDE CHOICE FROM BENTONE BURNER RANGE have become available here with the appointment of an agent,

cover a wide range providing a comprehensive service.

Selling at the fantastic rate of over 55,000 units a year, these burners are available from 50,000 B.t.u./hr. through a variety of models to 3,712,000 B.t.u./hr. Flange mounting for free burning without refractory brick work, the burner prices include Danfoss 57F3 relay and Danfoss DTO or Satchwell FFP twin thermostat.

The new agent for the Republic is Robert J. Burke, of 4 Molesworth St., Dublin 2



● At the opening were (from left): Mr. W. Maginnis, Technical Representative, Ireland, Perkins Boilers Ltd.; Mr. N. O'Connor, Director, Oil Fired Homes (I.) Ltd.; Mr. J. M. Murphy, Sales Manager, Irish Shell & BP Ltd.; Mr. G. F. Fassenfeld, Chairman, Oil Fired Homes (I.), Ltd.; Mr. E. W. Pigot, Irish Shell & BP Ltd.; and Mr. T. F. Barrett, Managing Director, Oil Fired Homes (I.) Ltd.

Oil Fired Homes open their new modern showrooms and offices

THE modern offices and showrooms of Oil Fired Homes (Ireland) Limited, at 6 Harcourt Road, Dublin, were officially opened late last month.

The company, which has been reorganised, is now under the management of Mr. T. F. Barrett, M.I.M.I., A.M. Inst.Pet., Director. The other directors are Mr. G. F. Fassenfeld, Chairman, and Mr. N. J. O'Connor.

Among the guests at a reception at the opening were Directors and Management of Irish Shell and BP Limited, Perkins Boilers Limited, and representatives of British manufacturers whose products are marketed in Ireland by Oil Fired Homes Limited. The opening was performed by Mr. J. M. Murphy, Sales Manager, Irish Shell and BP Limited, who complimented the Directors of Oil Fired Homes (I.) Ltd. on their enterprise and stressed that the only contribution of Irish Shell and BP Ltd. was by way of technical assistance and the main share of the credit was due to Oil Fired Homes (I.) Ltd.

Perkins have been in the oil-fired heating market for many years and started with equipment for ocean going liners. They have now developed the revolutionary "Mini" Flueless Boiler series which is the smallest pressure jet oil-fired boiler on the market.

Equipment on display includes working models of Perkins oil-fired boilers and all ancillary equipment for industrial and home heating, including Flexaire, Titus Grilles, Kingsway products, Opio, Ryland, Rad 66 circulating pumps, thermostatic and radiator valves, time clocks, roomstats, etc.

Oil Fired Homes (Ireland) Limited recommend 28 sec. oil for their vapourising units and 35 sec. oil for their pressure jets. Irish Shell domestic fuel oil and B.P. Domesticol are recommended fuels.



Merry Christmas

The Editor and staff wish
for all our friends
a Happy Christmas
and every prosperity in the
New Year

● In the Intercontinental Hotel were (from left): G. M. Soden, managing director; T. S. Usher, director; Thos. Heiton, and Mr. D. D. Frame, chairman, Hammond Lane Industries Ltd.



SUCCESSFUL "MAID" SHOW BY HAMMOND LANE INDUSTRIES

AT this stage when the current housing drive is about to be intensified following on the issue by my Department of the White Paper entitled "Housing Progress and Prospects," it is encouraging to see that Irish manufacturers are increasing output to meet the expanding need for domestic appliances of a high quality and finish. The Minister for Local Government, Mr. Blaney, said this at a reception in the Dublin Intercontinental Hotel last month to mark the opening of an exhibition of "Maid" stainless steel equipment by Hammond Lane Industries Ltd. in conjunction with Samuel Fox & Co. Ltd. of Sheffield.

Said Mr. Blaney: "The stainless steel sinks on view are, I understand, the only articles of this nature manufactured in Ireland, and the proof that they represent good value for money is seen in their ability to sell on the Irish market in open competition with similar articles from Great Britain and the Continent with no protective import duty." It was particularly encouraging to note that over 50 per

cent. of the total output of these sinks is exported, making a valuable contribution to our national balance of payments problem.

"I understand also that the Hammond Lane people succeeded in winning the contracts for the supply of catering equipment to such large undertakings as the American Embassy across the road, Dromoland Castle in Clare, and some of the city's major hotels. This type of success helps to kill, once and for all, the prejudice which exists in too many people's minds against Irish manufactured goods," said the Minister.

It was stated at the reception that Hammond Lane Industries plan to commission the most modern fabrication plant in Europe within the next six months to double their output of sinks. Mr. M. H. S. Webber, sales manager of Samuel Fox, said that his company was doing all it could to establish itself as permanent supplier of stainless steel to Ireland.

Other speakers were: Mr. D. D. Frame, Chairman, Hammond Lane Industries Ltd., and Mr. M. H. S. Webber, Stainless Steel Manager, Samuel Fox & Co.



W. J. R. Couchman's "Seven Deadly Sins of Domestic Installation" article, held over due to heavy space demands, will appear next month.

trade Topics

A CONSUMER leaflet describing the new 815 water heater has just been issued by Ascot Gas Water Heaters Limited. The leaflet, in full colour, illustrates the versatility of this new room sealed, balanced flue water heater in supplying hot water to the whole house, in a variety of installation positions.

* * *

AT A meeting of the Engineering and Scientific Association of Ireland, held this month in the Physics Theatre, T.C.D., one of the films shown described the design, fabrication and installation by the pipework engineering division of Stewarts & Lloyds of the pipework for the new Spencer Works of Richard Thomas & Baldwins.

Some 40 miles of welded and seamless steel fabricated pipework were supplied and erected. Among the varied and complex pipework systems shown were high pressure steam mains, high pressure water systems, cooling systems, fuel oil supply lines, hydraulic generating and control systems, mild steel ducting.

* * *

THE popular Creda Corvette has been completely re-styled to match the modern kitchen. The Mark II. version is designed to fix on the wall or window sill close to the kitchen sink and will plug into an adjacent earthed 13 or 15 amp. socket outlet. An improved slim grey hose connects with the kitchen tap for filling the heat-resistant glass flask which will hold up to a gallon of water. A push-button beneath the Corvette switches on the heating element and brings water rapidly to the boil. As mains water can be used, it is suitable for cooking or for making tea.



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SPECIAL REVIEW

THIS MONTH

DOMESTIC GAS; SOLID FUEL FIRED
BOILERS; BURNERS; CONTROLS.

Boom brings big challenge

THE welcome boom in home heating coupled with increasing demands for adequate supplies of domestic hot water, has proved a real challenge to installers and equipment manufacturers alike.

Boiler makers are to be congratulated upon the response which they have made. Indeed, it would be true to say that the vast improvement in the presentation of all kinds of boilers has given quite an impetus to this market in D.H.W. supply and home heating.

Slim, easy-clean cabinets in gleaming enamel now house boilers of really high performance.

Magazine boilers burning anthracite grains offer the least operating bothers in the solid fuel boiler range. The magazine is filled once a day, or once in two days on light loads, so that the dust and noise of stoking are reduced to an almost imperceptible amount. Fan-assisted draught provides noiseless combustion with fuel consumption consistent with the system's demand for heat. Thermostatically controlled, the fan operates when more heat is called for, and stops running when that demand is satisfied. Between demands, the fire "slumbers" and remains ignited but extremely slow burning until the fan comes into operation as the thermostat senses the need for more heat.

For those who really cannot afford a magazine boiler there are many of the enclosed pot type boilers available in modern styling and with good performance. The use of anthracite or one of the "premier" solid fuels is well advised in place of bituminous coals.

And for those who need only an adequate domestic hot water supply, several new designs of small solid

fuel boilers are now on the market. All of these will grace any kitchen, take up little space, give good performance and take the chill off the kitchen at the same time.

More householders come to recognise the merits of central heating but not all can afford, or even wish to have, full central heating. The choice of a smaller independent boiler—and there are many to choose from in the solid fuel range—will give D.H.W. and a few radiators so designed and placed to give a comforting "background" warmth.

In such cases appliances currently termed room heater-boilers may be a satisfactory solution. These, in many styles, resemble closed solid fuel stoves styled on an inset radiant-convactor fire grate. These will warm the room in which they are fixed, and their integral high powered back boilers will heat an indirect cylinder of up to 30-gallon capacity, and give "background" heating through three or four radiators.

To mention one or two of the latest in this field: The "Parkray 77," which has a back-boiler output of 15,000 B.t.u./hr., which has been seen to do a really good job in room warming, D.H.W. supply, and background heat to 3 bedrooms and hall. Then there is the new Redfyre room heater/boiler by Newton Chambers. This has a boiler output of 21,000 B.t.u.—a useful heat output indeed! Or the Aga Home Heater by Allied Ironfounders: this has a boiler output designed to support a 30-gallon hot store vessel and provide heating up to 125 sq. ft. of radiation.

Gas is a refined fuel. It burns smokelessly, under automatic control, and is always "on-tap"—no fuel storage or ordering problems here. It becomes increasingly popular as a boiler fuel and boiler makers have produced a splendid range of gas-fired boilers to suit all sizes of system, and all pockets.

Made in boiler outputs of from 30,000 to 85,000 B.t.u./hr., gas fired boilers can serve the smallest and the

largest of houses.

They are obtainable for use with conventional flue forms or they may be had in balanced-flue type. The balanced-flue boiler is so designed to take combustion air from and discharge products of combustion to the outside air, by way of a specially designed combined air inlet—combustion outlet adaptor which simply needs fixing into any external wall. Thus the balanced flue boiler overcomes all flue problems.

Gas-fired boilers are available as strength and forward boilers for gravity or pumped circulation, or they may be had as small-bore units. That is, boilers within the casing, of which there will be the pump, perhaps a blender valve, and any other equipment which would otherwise appear external to a straight-forward boiler casing. Such "package deal" boilers, specially designed to meet the small bore market, offer a neater and quicker installation.

In this equipment review

we take a look at new

developments in the fields

covered by the foregoing

special review. (All claims are

those of the manufacturers).

AN IMPORTANT development in the world of central heating equipment is the introduction of a new high output gas boiler at a remarkably low price. The boiler, which is made by Ideal-Standard Limited of Hull, has a 70,000 B.t.u./hr. output and extends the existing Concord range of boilers rated at 35,000 and 45,000 B.t.u./hr.

Also new is the fact that all three sizes of Concord are now available with a choice of four control systems, meeting the requirements of both installer and householder. For example, the Elect version enables an electric

Continued overleaf



This special Review article was compiled by technical expert A. L. Townsend.

clock controller and room thermostat to be connected, while the S.B. De Luxe model has a wall-mounted programme selector that enables one to push a button for the service required, e.g., central heating and hot water all day, or just twice daily, only hot water twice daily, etc., etc. Ideal-Standard comply with recommendations for a low voltage control system to help ensure safety.

Conscious of the importance the modern housewife attaches to good design, Ideal-Standard have given their boiler neat compact styling with each model standing 36 in. high, so that it matches the height of other standard kitchen units. The finish is stove enamelled white with a selection of coloured doors, or all cream.

* * *

FROM the Trianco stable of solid fuel boilers—they range from 68,000 B.t.u./hr. ratings to 2,000,000 B.t.u./hr. is the P55/65 solid fuel gravity fed domestic boiler. It has an output according to D.S.F.A.A.C. (Domestic Solid Fuel Appliances Approval Council) rating of 58,000 B.t.u./hr., and by Trianco standard rating methods of up to 68,000 B.t.u./hr. It has been specially designed to burn a wider

PRODUCT REVIEW

from previous page

range of anthracite qualities and also graded coles which have a higher calorific value than ordinary gas coles.

This unique and versatile boiler will heat five or more radiators according to their size and also provide constant hot water for bathroom, washbasins and kitchen. Special features are the exceptionally large hopper capacity secondary air control and variations in blast obtainable on the forced draft fan, making this model capable of a wide range of outputs according to fuels, and a high standard of attention-free operation.

Trianco automatic solid fuel boilers are the results of years of research and development and have, under stringent tests, achieved efficiency factors of 80%. The P.55/65 is thermostatically controlled and incorporates many important advances.

* * *

NEWEST warm air central heating units from Radiation Central Heating Ltd. are the Ductair G2300 series, developed from the highly successful G105/23

With an output of 23,000 B.t.u./hr., the units—G2301 for conventional flues, the G2303 for SE-Duct applications in multi-storey blocks, and the G2303 with balanced flue—provide full or background heating in the small house or flat. They incorporate variable fan power, a centrifugal fan capable of voltage adjustment giving the exact fan power to suit long or short duct runs.

Another new feature common to all three units is a unique safety device. Each is fitted with an overheat safety valve operating independently of the main solenoid valve, providing an extra safeguard.

The layout of services has also been simplified so that all controls are easily accessible.

* * *

QUADRANT Engineers announce that due to the remarkable sales of the PTTW series they have increased their Dublin stock to include every size in the P22W range from 63,600 up to 169,000 B.t.u./hr.

“The initial large stocks were gone very quickly and successive shipments were sold out before arrival,” report Quadrant.

Continued page twenty-nine.

SUDDENLY . . .



You have made us the largest stockists of cast iron heating boilers and steel column radiators in the country . . .

. . . and you can make our stocks work for you . . .

★ For Heating In A Hurry

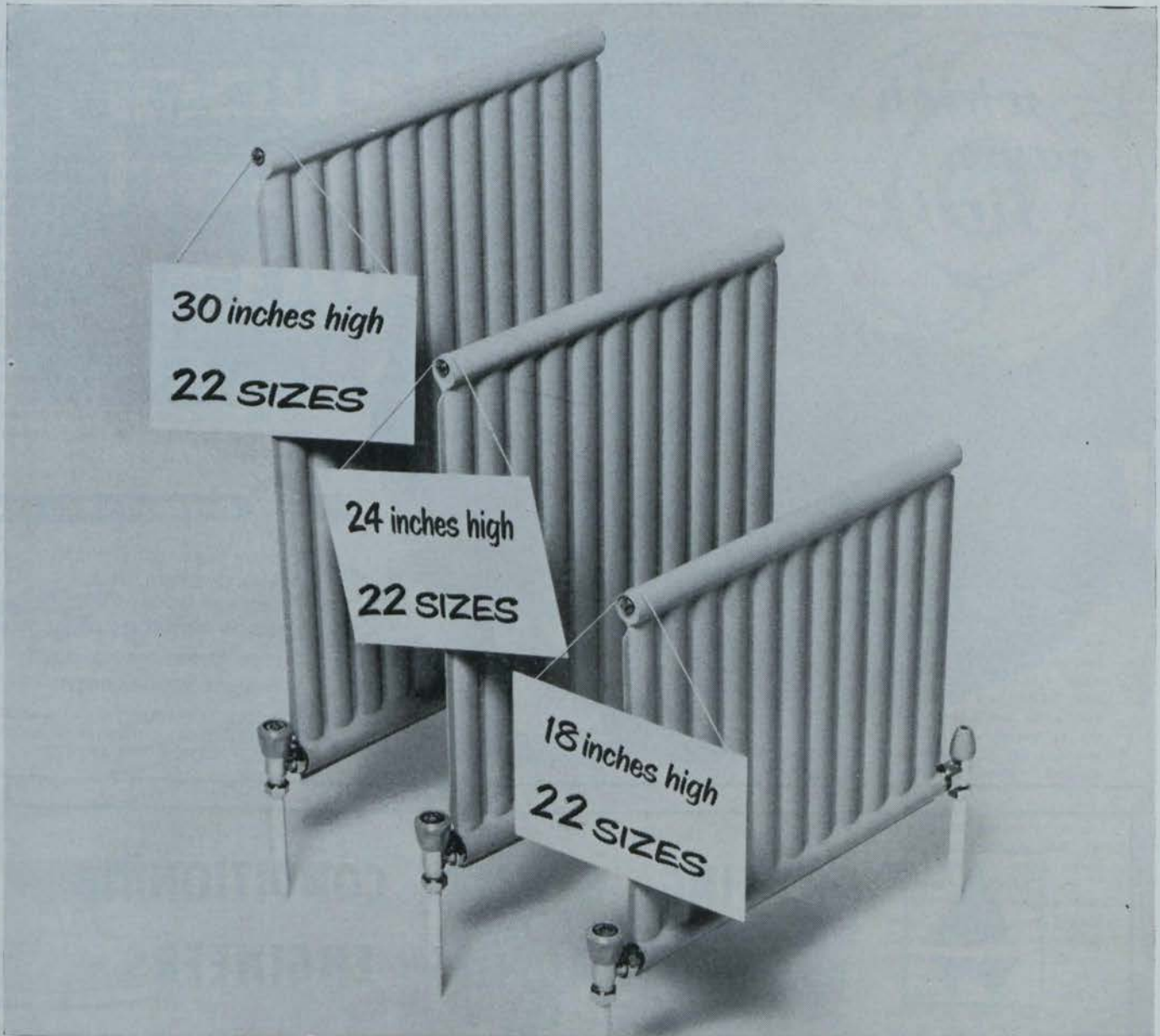
Telephone 693940 and 693943 Telegrams Halo Dublin.

QUADRANT ENGINEERS

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



Sole Agents for BUDERUS Boilers and Radiators



There isn't a room you can't accurately heat from the 66 Potterton radiators

Potterton radiators' range of sizes has been carefully scaled to give really fast production.

The result is 66 sizes—from which you can more accurately meet customers' heating requirements.

Fast production helps to keep a good stockpile. So you've no worries about delivery.

Potterton radiators' heat emission is guaranteed correct. This saves your time.

You don't have to specify more, or bigger radiators than are needed.

Your customers get all the warmth they want. Which makes more satisfied customers for you.

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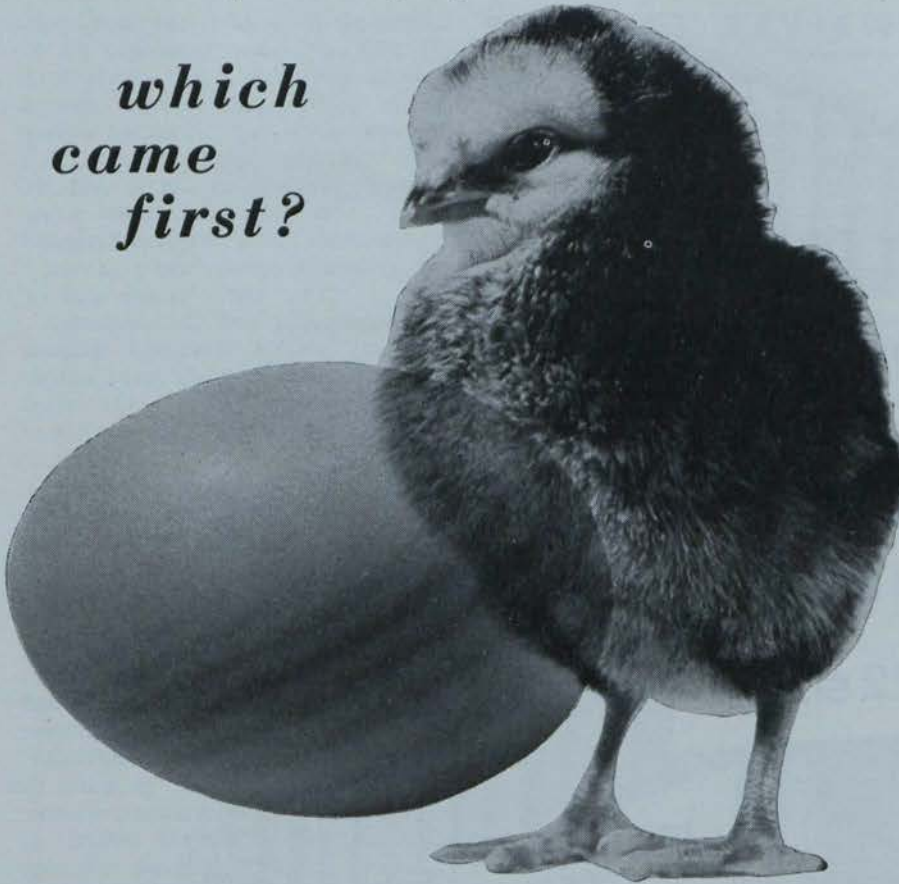
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IN IRELAND



No. 12—Presented with the December, 1964, issue of the Irish Plumbing and Heating Engineer.

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This will be followed by a detailed survey of swimming pool services and, in future months, many other important subjects.

This month's special Review feature deals with industrial and commercial radiators, radiant panels and convectors.

Also in the industrial section is part two of our special survey of dust and waste collecting plant.

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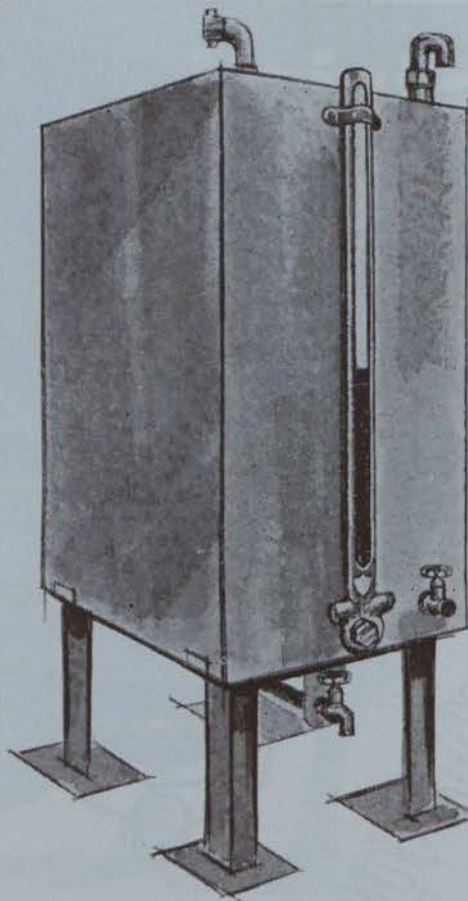
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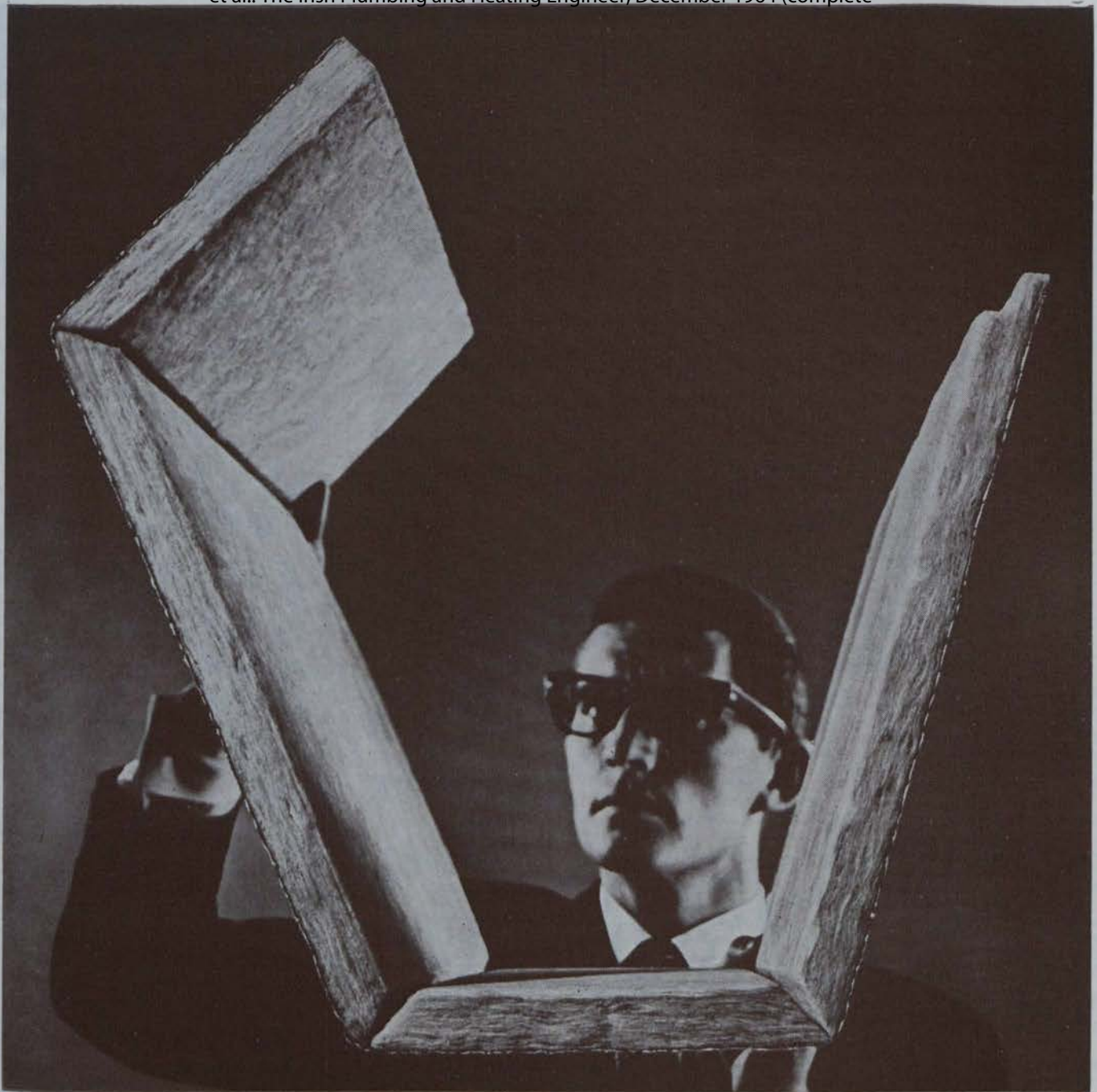


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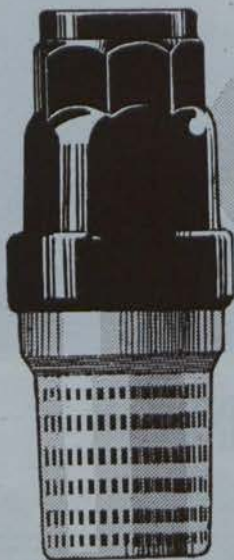
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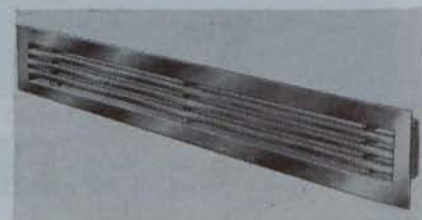
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PROGRESS REPORT ON THE NEW IRISH HEATING CENTRE

THE Irish Heating Centre is now in its second month of operation. The number of enquiries at the Centre in the first three weeks was unexpectedly large and, in spite of the unseasonably mild weather, high weekly figures were recorded right through November. At present about 200 people call at the Centre every week, most of whom are given a 20-30 minute consultation. In addition, letters and telephone calls come from all over the country.

Whatever form their contact with the Centre takes, most people express appreciation of the fact that there is a place where impartial information is obtainable and where no effort is made to sell a particular system or type of equipment.

A statistical breakdown of the enquiries received at the Centre shows 10% Industrial and 20% Rural. Of the total number of callers at the Centre, 28% were interested in solid fuel, 27% oil, 17% electricity, 7% oil fired warm air, 3% ancillary equipment, 2% gas. The remaining 16% were enquiries of a general nature, usually requests for a run-down on all the available systems. Almost half the solid fuel enquiries referred to partial central heating using back-boiler systems.

Interesting

The figures for warm air are particularly interesting. Of all the people interested in full oil fired central heating, one in five wanted warm air. Whether as a result of the "buy Irish" campaign or the attractive prices, there was a great deal of interest in the availability of Irish anthracite.

The Irish Heating Centre has increased staff to plough through the backlog of work and give a quicker and more efficient service on current enquiries. One important aspect of this improved service will be of considerable benefit to its panel of Approved Installers. The time wasted in designing installations and submitting quotations to people who are chiefly attracted by the fact that

the estimate is free is a nuisance and an annoyance to every installer.

Reduce Waste

The Irish Heating Centre does everything possible to reduce this waste age by giving information on the order of expenditure involved and by judging in consultation the "seriousness" or otherwise of an enquiry.

The general reaction to the Irish Heating Centre from trade as well as from public is very encouraging

INDUSTRIAL SECTION EXTRA

For the conclusion of J. L. Fitzgerald's special review article on dust and waste collecting plant see page thirty-seven.

and there is now a great deal of evidence to support the view that it has a key roll to play in the future of Irish heating.



The warm air heating leader of Canada is rapidly expanding over here!

Lincoln's new factory and Head Office at East Grinstead offer greatly increased productive capacity. It will be needed to handle the growing demand for Lincoln installations. Efficient central heating is essential in modern homes and the advantages of Lincoln Warm Air are recognised by an increasingly discriminating public. The parent company, Bartaco Limited of Ontario, are the largest manufacturers of heating equipment in Canada, where the rigorous winters provided the proving ground for the development of warm air heating.

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- * **National Advertising.** All enquiries resulting from Lincoln advertising are passed on to the local Authorised Installer. Lincoln provide a full range of sales promotion material and give co-operative advertising support.
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Seventeen

We begin here the first part of a new series of articles of wide scope covering a variety of vital topics.

PART 1

This three-part series will be followed by one on swim pool services.

ECONOMY IN AIR DISTRIBUTION OF FAN COIL AND INDUCTION UNITS THROUGH REGULATION

IT is obvious to all of us, in the business of designing and installing heating and air conditioning systems, that our major objective is to provide a trouble-free, satisfactory installation at minimum cost. The subject: "Economy in air distribution of fan-coil and induction units through regulation," provides one of the most important means of accomplishing this objective.

In order to cover the subject, it will be as well to review the type of equipment to be controlled and the methods of integrating this equipment into a complete heating or air conditioning system.

In any multiroom building, the owner, the architect, the engineer, the builder, the installing contractor and, eventually, the occupants,—anyone and everyone with an interest in comfortable environment—will benefit by the use of automatic regulation controlling the hydronic heating and/or cooling units. Since this is such a broad subject, the review will be confined to the automatic control of individual induction and fan coil units whether they be used for heating, cooling or a combination of both heating and cooling.

A brief review of both the fan-coil and induction systems will allow a better understanding of the necessity for proper control of individual room units.

THE fan coil conditioner system is generally applied to air conditioning perimeter spaces. The basic elements of these units are plate fin coil and an electric motor driven fan section. The fan section recirculates air from within the perimeter space through the coil which is supplied with either hot or cold water; thus the recirculated air is either heated or cooled. The recirculated air is filtered as it is drawn into the unit enclosure, which not only improves sanitation within the space, but also protects the fans, coil and motor from becoming clogged with dirt, lint, etc. Fan-coil units can remove moisture locally within the space and introduce and condition ventilation air drawn through an opening in an exterior wall.

(Text of lecture given by RICHARD BERNHARD*, at the 2nd Europair Congress, Brussels. Edited by ALLAN CAVINDER, A.Inst.M.S.M.**).

The chilled water and hot water piped to each fan-coil unit are supplied from central heating and cooling equipment. The arrangement of the water piping system will be considered later. In addition to supplying each fan-coil conditioner with water, electrical circuits must be provided to operate the fan motor.

The greatest advantage of the fan coil unit is its flexibility for adaption to many building requirements. A fan-coil system applied without provision for positive ventilation, or one taking ventilation air through an aperture, is one of the lowest first cost central station type perimeter systems in use to-day. It requires no ventilation-air duct work, is comparatively easy to install in existing structures and, as with any central station per-

imeter system utilising water in pipes, considerable space savings can be realised throughout the building.

The air-water induction unit was developed to reduce space requirement. An induction system normally uses outdoor air which is brought into a central air-conditioning apparatus where it is pre-heated in winter, filtered, dehumidified or humidified depending upon the season, and reheated when necessary. A fan located in the central station apparatus delivers this primary air through conduits at high velocity to the individual room units.

IN an induction unit, the primary air passes through a sound absorbing plenum and is discharged through nozzles at high velocity. This action draws the secondary air (room air) through the coil by means of induction. The secondary air mixes with the primary air and is discharged into the room. The secondary air is either heated or cooled as it passes through a plate fin coil which is located within the unit and is supplied with either hot or cold water as the season may require. Induction ratios of secondary to primary air as high as six to one result in smaller ducts and central air-conditioning apparatus as compared to conventional duct systems which must handle all of the conditioned air supplied to a room. It must be remembered that an inductor unit only handles from 15 to 30 per cent. of conditioned air from the central station apparatus.

The induction system provides individual room control through the secondary coil in which the hot or cold water is regulated to suit the environment. These units are primarily used

Continued page twenty.

* Manager of Manufacturing and Engineering American Standard Industrial S.A., Brussels.
** Technical Sales Manager, Van den Bosch Ltd., London.

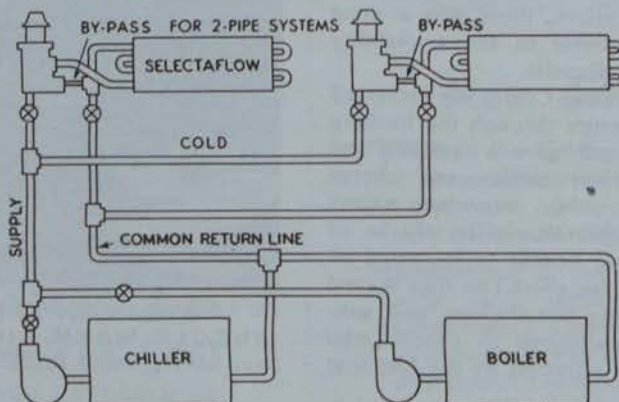
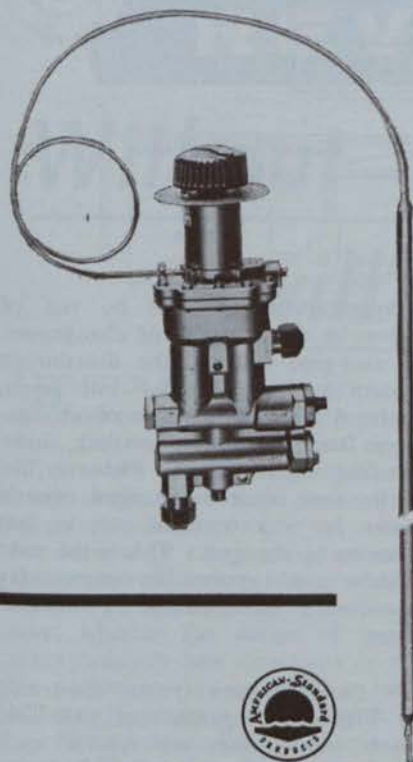


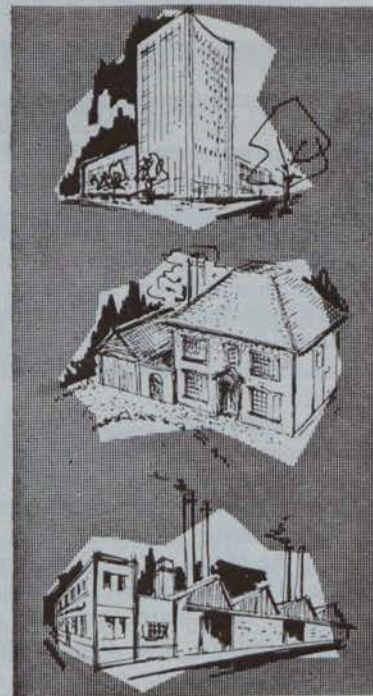
FIG. 1.

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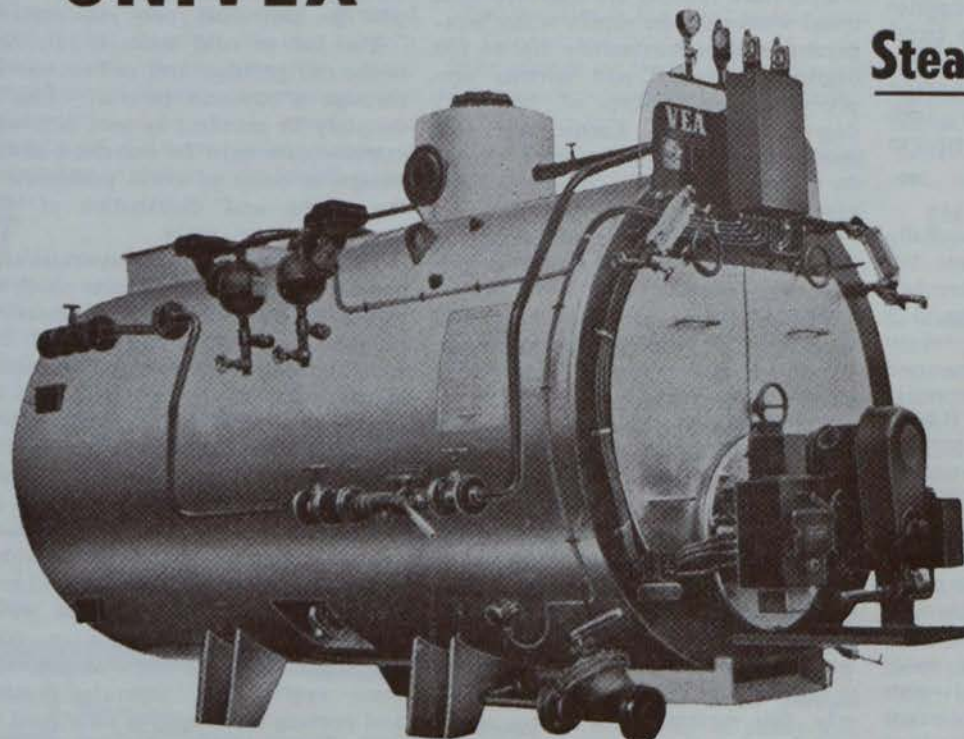


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for under-window installations as they eliminate severe downdrafts.

It is interesting to note that induction units have no moving parts, provide a positive supply of air to a room, and require only the absolute minimum of maintenance and service.

This system has been successfully applied to many office buildings, hotels, hospitals and apartment buildings, and where 100 or more units are involved in a single building, it may provide the most economical installation.

To understand further the necessity of economic control of individual fan-coil and induction units, it is pertinent to review the various classifications of water systems.

In the broad sense, there are three separate and distinct classifications, namely: hot water systems; chilled water systems; and dual-temperature water systems.

The hot water systems, normally used in Europe, are those in which the maximum water temperature is limited to approximately 212 degrees Fahrenheit and static pressures to approximately 72 pounds per square inch gauge, providing an open system is used and the expansion tank is located at the highest elevation in the water system. This system does not normally require a coded boiler, nor the necessity of a full-time resident engineer for operating the boiler. Most of the present-day installations use this type of water system, and, in fact, a modern trend is to locate the boiler on the top of a building so as to eliminate the static head on the boiler. Naturally, such an arrangement almost always requires a gas or oil-fired boiler.

THE chilled water systems usually operate with water temperatures between 39 and 55 degrees Fahrenheit and pressures rarely exceeding 125 pounds per square inch gauge. Anti-freeze or brine solutions may be used for systems which require temperatures below 37 degrees Fahrenheit. It is important to remember that wherever the application of this system is such that the chilled water flow rate required at the fan-coil or induction units be throttled at reduced cooling loads, provision must be made to maintain a constant flow of water through the chiller or evaporator of the refrigeration unit. Where the water control valve at the individual room units is of the by-pass type, a constant flow through the chiller is maintained when the flow of water to the unit is throttled. Where the water control valves at the individual units are of

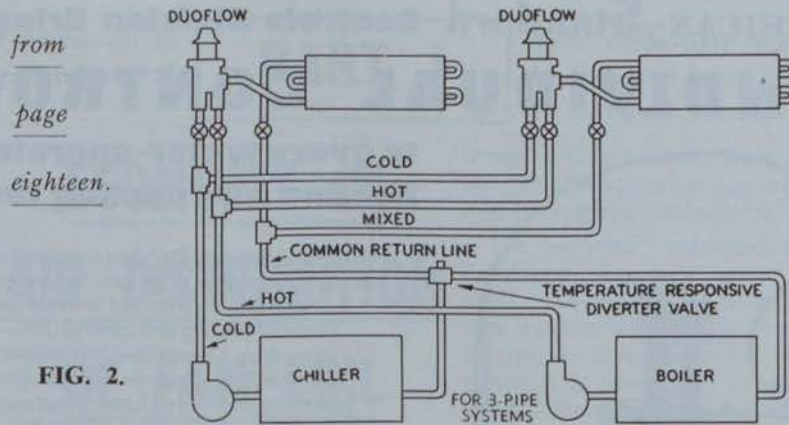


FIG. 2.

the throttling type, a relief line must be provided from the outlet of the chiller to the suction of the chilled water pump. The relief valve in this line is controlled by a differential pressure controller which maintains a constant differential across the chilled water pump. As the pressure differential tends to increase due to throttling of the unit control valve, the relief valve opens. As the pressure differential tends to drop, the relief valve closes.

The dual temperature water system is the most interesting and advanced and provides a combination of hot water heating and chilled water cooling which circulates hot or chilled water, or both, to provide heating or cooling using common piping and terminal heat transfer apparatus. Dual temperature systems are operated with usual winter design supply water temperatures of approximately 100 to 150 degrees Fahrenheit, and summer supply water temperatures of 39 to 55 degrees Fahrenheit. Furthermore, this dual-temperature water system is readily adaptable to two, three and four-pipe systems.

A brief consideration of the piping arrangements may be useful at this juncture.

Basically, there are many types and variations of piping arrangements. However, only the most widely used ones will be reviewed.

Fig. 1 and Fig. 2 are not intended to be used for piping system design but merely to illustrate the application of Selectaflo and Duoflow valves in 2 and 3-pipe systems.

The two-pipe arrangement shown in Figure 1 can be used for heating and cooling purposes. This system has a main for supplying either hot or cold water, but not both at the same time, to fan-coil and induction units. Similarly, this system has a return main, and therefore the arrangement is called a two-pipe system. It can be adapted strictly for heating or cooling and can readily be modified for dual-

temperature applications by use of valves or other means of changeover. In two-pipe systems, the distribution system may be divided into zones, each of which is capable of changeover from heating to cooling, independent of other zones. However, the entire zone must be changed over in order for any terminal unit in that zone to be changed. This is the most widely used system in present-day year-round air conditioning installations.

IN the three pipe system illustrated in Figure 2, separate hot and cold water supply lines are run to each fan-coil or induction unit, which are equipped with valves to permit selection of either hot or cold water at any terminal unit, independent of other terminal units in accordance with the individual room requirement.

The hot or cold water is returned to the refrigeration unit or heat source through a common return. This is certainly an excellent system, although extreme care must be exercised in the design in order to avoid problems in the mixing and distribution of the common return main.

The 4-pipe system incorporates separate supply and return mains which are run from the boiler and refrigeration plant to and from the individual terminal units, and a valving arrangement is employed at the terminal unit to permit the introduction of either hot or cold water in accordance with the individual unit requirements. When a single plate fin coil is employed in the terminal unit, as is the common practice, return valves are provided which are sequenced with the supply valves to permit flow of hot water into the hot water return or cold water into the cold water return. In some applications, separate heating and cooling coils may be employed in each terminal unit, thus eliminating the necessity of return valves. Generally speaking, this is an expensive and rarely used system of piping.



MONTHLY SPECIAL REVIEW

Radiators, Radiant Panels,
Convectors and Controls.

Without central heating houses will become obsolete

BBETTER heating is the key to the design of homes at the present time, for it provides an extra degree of freedom in meeting individual needs in the areas of the home which at present are too cold to be suitable for daytime or evening use, except in the summer. But there is an increasing demand for higher comfort levels anyway; whether the design of houses takes radically new directions or not, the person moving into a new home increasingly expects to be warm."

—Extract from Parker Morris Report: "Homes for To-day and To-morrow."

Houses built to-day without central heating may well be considered obsolete before their completion. There is an increasing demand for higher comfort in the modern home and facts are the most convincing forces to support our statements. In 1963 nearly one quarter of the two million systems in operation in Britain were installed that year.

THE most common form of domestic central heating control is the water filled radiator, whether the radiator is of the cast iron, panel pressed steel or multi finned radiator.

Here we will have a short review of the prevalent units in use. Radiators, panels and unit heaters can be divided into three general categories:

- (a) Electric units,
- (b) Hot water units,
- (c) Steam heated unit.

The oil filled radiator in recent times is becoming very popular. The

fact that a house can be heated bit by bit by the plug-in type radiator is making this system popular and the initial capital cost is small in comparison to the oil-fired or solid fuel system.

No matter what the shape or size, the basic design is the same. An electric element, complete with built-in thermostat, is fitted to the oil-filled radiator and hermetically sealed. The units are attractive and when wisely used by means of a time clock, they can be very economical and efficient.

Yet the most popular forms of domestic heating is the water-filled radiator. The water-filled radiator comes in many forms and styles. Despite the fact that the pressed steel panel radiator is the most widely used in the average home, there is a definite change or trend to forced warm air system, incorporating the multi-fin type heater.

Just over a year ago a highly efficient aluminium radiator was introduced and it proved most suitable both from an aesthetic and economical point of view for schools, shops, offices, etc. It proved economical since the water capacity was much smaller in comparison to the conventional pressed steel radiator, with the same heating surface. The aluminium radiator gives a greater heat emission than its pressed steel counterpart.

DESPITE even the aluminium radiator briefly outlined, the ideal radiator to-day seems to be the heater incorporating convection and radiation as well as fan assisted units. Room air enters the heater near the floor level. The air is then evenly warmed by means of hot water or steam and thence distributed by means of a fan. The fan assisted heater may be used where space permits or aesthetic conditions suggest. The units are end-

less in finish and design and are available as cabinet or skirting models.

Hot water is still the most popular medium for heating panels, radiators and unit heaters in the domestic field, while high temperature hot water and principally steam is mostly favoured in the industrial and commercial field. Steam heated forced air unit heaters are the best form of heating in workshops and factories. The warm air streams can be directed by means of the fan through the louvres in the unit heaters. One major point in favour of the unit heaters for factories and workshops is that they are "space savers," since they are suitable for wall mounting or ceiling mounting.

The above mentioned systems might only be called a "bird's eye view" of what is available. There are, of course, convector wall strips, sill strips, Rayships, radiant heating panels, fan convectors, tubular units, etc., on the market.

In this equipment review

we take a long look at new

developments in the fields

covered by this special review.

(All claims are those of the manufacturers).

AS a result of careful evaluation of requests from the trade for a valve which combines ease of installation with high efficiency, B.S.A. Harford Pumps Ltd., Cockfosters, Herts., have now introduced a new twin action radiator valve. Designed for use with low pressure hot water central heating systems, the new valve is basically similar to the earlier model except that the pipe connection end

Continued page twenty-three.

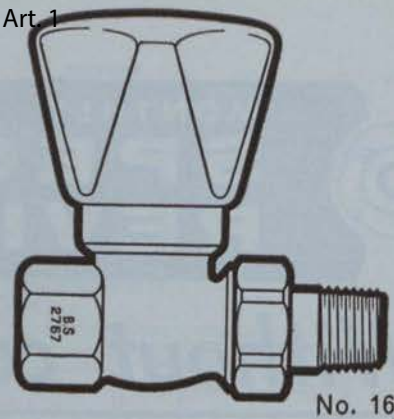


This special review
article was compiled
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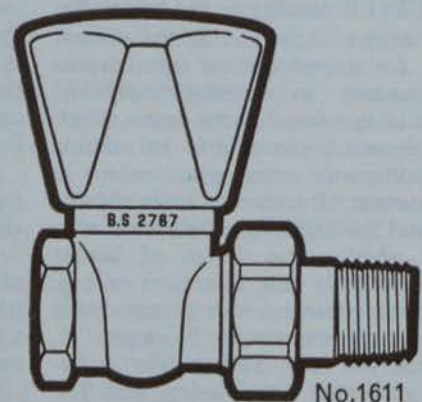
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All finishes available



No. 650

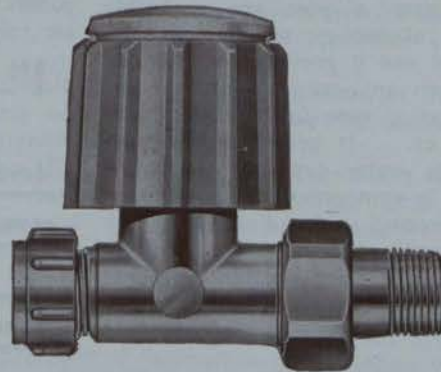


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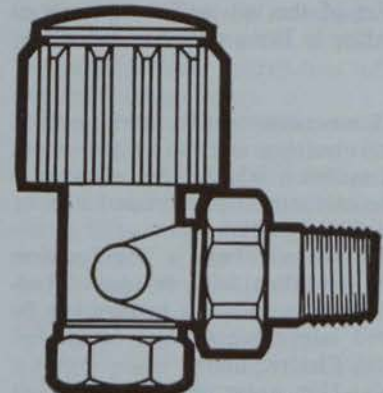
BARWELL



BARWELL-DAMETA.
New Regulating Valve.
with Preset feature.
Sizes $\frac{1}{2}$ " - $\frac{3}{4}$ ".
Available Tapped B.S.P.
or with Copper
Compression fitting.



No. 651 S (TAPPED B.S.P.)



No. 651 A (TAPPED B.S.P.)

This newest addition to the Barwell range incorporates all the features of a compact attractive valve with the functional advantages of "one turn" operation providing a heat emission factor directly proportionate to the handwheel position. Also incorporated is a preset limiting device to control maximum output for balancing purposes.

PAT. APP. FOR.

JAMES BARWELL LTD., GREAT HAMPTON STREET, BIRMINGHAM 18. Telephone: Nor 1307 pbx
Telegrams: BARBELLS, BIRMINGHAM. LONDON Office and Warehouse: 23 GREAT SUFFOLK STREET, LONDON S.E.1.

PRODUCT REVIEW

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has been modified to a 1/4 in. B.S.P.T. male thread pattern.

The internal construction of the valve is of interest since it not only ensures effective and positive regulation of the heat output of a radiator but, by virtue of the special design of the spindle and seat, this heat output is in direct proportion to any setting position of the handwheel. It is also possible to pre-set the maximum position to which the valve will open, thus limiting the flow through the radiator—usually the function of an additional lockshield valve. Valve costs can therefore be cut by half since it is only necessary to fit one valve to each radiator.

Pre-setting may be carried out as follows. On first commissioning the system, all the valves should be adjusted until a correct balance is obtained throughout the system. Without the handwheel setting being altered the valve retaining screw should be slackened through approximately two turns, and the handwheel lifted (to free it from the taper on the spindle) and turned to its limit in an anti-clockwise direction. The spindle position must not be altered during the latter operation. After the retaining screw has been re-tightened, the valve may be used in the normal manner but will not open beyond its pre-setting point.

Also from B.S.A. Harford is their wide range of panel radiators available in four heights (11, 18, 24, 30 ins.), and a wide range of size up to 96 ins.

* * *

THE CAPITAL line of radiators from International Boilers and Radiators Ltd.—Monsell, Mitchell & Co. Ltd. are agents here—combine high efficiency with good looks.

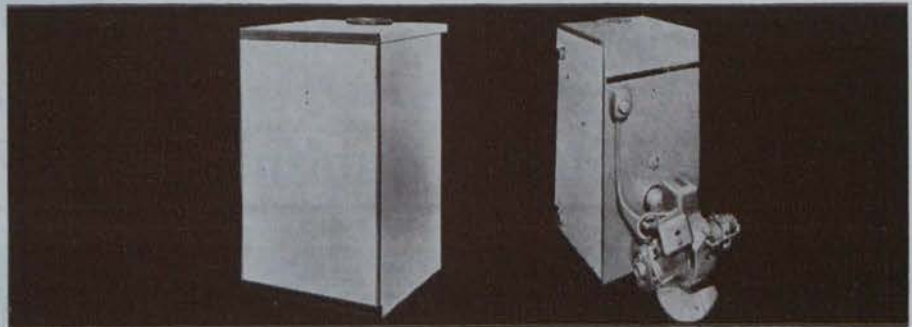
Manufactured to B.S. 3528, they are tested up to 100 p.s.i. A new feature is that angled rads from this range can now be supplied to order.

* * *

HOW to heat large areas of full size plate windows has always been a problem, but one that can be solved by the Happel finned convector which can be sunk below floor level. The attractive roll-up grilled cover makes access simple and the heat output tables available change guess-work into well established figures not available here before.

They don't let you **D O W N** at Wilsons

Every Wilson oil-fired boiler is fired and tested for you before it leaves the works. The outputs are guaranteed, *tested* outputs into water. Every Wilson radiator has a guaranteed emission figure—a figure calculated to B.S. : 3528 : 1962 by the Heating and Ventilating Research Association, Bracknell. All boilers are very accessible for your checking and cleaning—saves you time on the job. And if there *is* trouble with a Wilson installation, we do want to hear about it. Because it is not our custom to assume that the installer must be at fault.



Wilson Wallframe. Five models available with outputs from 45 to 150 thousand B.T.U. Advanced technical design without frills. The biggest selling wallframe boiler in the country.

Wilson Boiler/Burner Units. Pressure-jet fired. Outputs from 70 to 800 thousand B.T.U. Larger models now with Wilson Cosytube baffle for maximum corrosion-free life.



Wilson Radiators. Their extra slim design makes them favourites with housewives. 816 sizes with standard popular range for quick delivery.



Full details from

Henry Wilson & Co. Ltd.

Sales & Service Office, George A. Reid Esq.,

16, Fade Street, Dublin.

Telephone: 76009.

Introducing Happel Convectors and GEA Unit Heaters of the Continental centrifugal fan type (with their high heat output and fan pressure available for ducting) has been an important development for Quadrant Engineers. The technical specification is surpassing

and delivery is outstandingly good. Additional information and prices are available from the sole agents, Quadrant Engineers, 167 Strand Road, Sandymount, Dublin 4.

Continued page twenty-five

Twenty-three

Installer - Builder - Consultant - Architect

**For Expert Technical Assistance
Ask TEDCASTLE'S HEATING &
AIR CONDITIONING DIVISION**

- ★ **POTEZ** Ducted Warm-Air System and Space Heaters.
- ★ **POWELL DUFFRYN** Boilers, Radiators & 'Housewarmers'
- ★ **PARKRAY** 'Open Fire Behind Glass'.
- ★ The revolutionary **KONUS** 'No Pressure' Boiler. Heat without water or steam.
- ★ **'THERMALON'** Cavity Insulation.



POTEZ MODEL 732. Output 37,440 BTU/hr.

7 D'Olier Street, Dublin. Tel. 79972, Telex-Dublin 224

INTERNATIONAL **Capital** PRESSED STEEL RADIATORS

In Single and Double Panels

- ★ Manufactured in accordance with British Standard BS 3528 and tested to 100 lbs. per square inch (7 Kg/cm²).
- ★ Suitable for use on closed circuit heating installations only, and should not be used on direct domestic hot water circuits or on steam.
- ★ Made from 18 swg (1.219 mm) steel specially supplied for the purpose.

EX STOCK DUBLIN

- ★ Also — THERMOPAK, SILENTFLO, MULTIFLO and THERMOFLO Accelerator Pumps from stock.
- ★ We also carry large stocks of Radiator Valves by all leading makers.



**Price list and illustrated
leaflets on request**

Sole Agents for Republic of Ireland:

MONSELL MITCHELL & CO., LTD.

67-73 TOWNSEND STREET, DUBLIN, 2. 'Phone 76282.

A MAJOR new development announced by Ideal-Standard Limited of Hull is the introduction of a new oil-filled electric radiator. This new radiator is available in three sizes, having loadings of $\frac{1}{4}$, 1, and $1\frac{1}{2}$ Kilowatts, and is permanently sealed. Accordingly it requires no attention of any kind. The radiators comprise a slim panel on neat, but nevertheless stable feet, producing a simple, clean-lined unit that will blend well with either traditional or modern decor. With regard to finish, the radiator is stove enamelled cream. The heat output from the radiator may be varied to suit individual requirements, the thermostat knob giving fingertip control. The simple control panel also features two pilot lights, one of which glows permanently while the radiator is electrically connected, and the other glows only when current is actually being used.

* * *

RADIATOR valves by Sanbra Fyffe Ltd. include the Setflo and the Lokflo. The former is primarily designed for use with small bore systems, the ends being machined for direct connection to either the adaptor or $\frac{1}{2}$ " domestic copper tube, but prior to despatch one nut and ring is pre-assembled on the plain shank of the adaptor.

The maximum opening or closing of the Setflo is through a wheel rotation of 180° , i.e., half a turn, but the actual flow control is regulated from full to almost zero through 90° .

The Lokflo valve is introduced for inclusion in small bore heating installations when two valves per radiator are considered desirable. Similar in function and general design to the Setflo, the principal alteration is the replacement of the handwheel by a dust-proof easy-clean cover.

* * *

THE THERMALRAD is a successful blending of radiator and convector, less than half the size of the old style pressed steel radiator; which, because of its unique internal design and system of wall mounting, this smaller unit has a thermal output greater than radiators twice its size.

Another factor which provides for a greater efficiency with the Thermalrad is that the water content is only a fraction of that of conventional radiators, making the units particularly responsive to thermostatic control, and allowing for greater flexibility throughout the system. The whole room reaches full temperature more quickly owing to the high convector component. Coupled with the Thermalrad convector radiator is the

PRODUCT REVIEW

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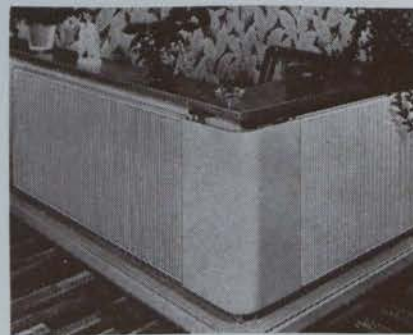
Ranco Thermostatic Radiator Valve. Irish agents are Heatovent Supply Co.

* * *

IT IS a challenge, say Quadrant Engineers, to offer steel column radiators in a market well supplied with panel radiators of all types and sizes, but the truth about it is that steel column radiators are still a quick and easy solution in many heating problems. Where space is important, or low height, or quick delivery with the right size of radiator, they are again coming into their own.

These finely proportioned Buderus radiators often fit more gracefully into large old houses than the more functional type of plate radiator. And for the more robust uses, for churches, factories, public houses and similar applications their other qualities become more apparent with the small space they occupy and their reasonable price.

All sizes from the twelve inch high to forty inches, and in widths from four inches to ten inches are available ex Dublin stock of Quadrant Engineers, 167 Strand Road, Sandymount,



AN example of the way in which Glow-Line radiators can become an integral part of any decorating scheme. Here two double panels have been linked to form a neat and unobtrusive corner unit. With a total of 384 different sizes—64 single panel and 64 double panel, all in three different heights—it is possible to adopt Glow-Line to every central heating scheme.

Dublin, sole agents for Buderus boilers and radiators.

* * *

THE NEW Barwell-Dameta regulating radiator valve by James Barwell Ltd., performs two distinct functions and has been specially designed for use where accelerated thermostatically

Continued overleaf



Pour OXYPIC, the **guaranteed** leak repair preparation, into a hot water installation and seal leaks, no matter where they are, in **30 minutes!**

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

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

Full details from:

H. Pickup Ltd.

Dept. I.P.C.3, Roscoe Works,
Scarborough. Tel. 4997/8/9.
3 Charlton St., York, Tel. 24611
Established 1892.

Supplies obtainable from:

K. W. Talbot

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



THE new twin action rad valve by B.S.A. Harford (see review).

controlled central heating systems are installed. It can be pre-set to a known flow-maximum to balance systems, at the same time providing a radiator heat emission factor in direct relation to any position of the hand wheel.

For the most efficient and econom-

PRODUCT REVIEW

from previous page

ical operation, no radiator valve should be opened more than is absolutely necessary to provide maximum required heat. The Barwell-Dameta valve ensures the achievement of peak efficiency; its regulator feature enables the flow in the radiator to be precisely set to reach and maintain that condition.

* * *

COPPERAD Ltd. have announced the introduction of a new range of convectors. Not only have the units been restyled but it is also claimed many new technical advances have been incorporated. For the first time a range of convectors is available with two distinct types of heating elements—Series Tube (Type S) with copper tail connections or Parallel Tube (Type P) with screwed connections. The convectors are available in three casing styles.

The Type S elements are designed for direct coupling to small bore systems without the expense of adaptors. These elements are specifically designed for use with hot water

systems. The tubes are in series (2 circuits in four tube sizes) connected with return bends. Flow and return connections are half inch bore to P.S.659 (0.596 in O/D) for two tube and three tube and ¼-in. bore (0.846 in O/D) for the four tube. The plain copper tails may be connected to systems with standard capillary or compression valves and fittings.

The conventional element—parallel tube (Type P) with two, three or four tubes brazed into steel headers, are provided with outward and downward connections at each end screwed ¼-in. B.S.P.T. female. Plugs are provided for the connections not used and a plug socket ¼-in. in B.S.P.T. female is provided to take an air vent if required. The parallel tube element is suitable for use on steam or hot water (low and high temperature).

* * *

NEW from Powell Duffryn is their range of Housewarmer warm air units which can be wall mounted, free standing or featured in built-in ducted air systems.

These units are small but efficient and range in output from the wall mounted WA-6, with thermostic control (6,000 B.t.u./hr.) to the WA-35D

on the site, Plumbers fit . . .

the first choice **Sanbra Fyffe**



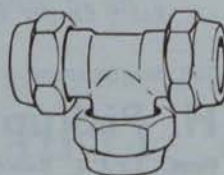
'SETFLO' RADIATOR VALVE

PLUMBERS' BRASSWARE, TAPS & FITTINGS

for ALL requirements in Plumbing and Heating Services.

THE SANBRA FYFFE RANGE INCLUDES:—

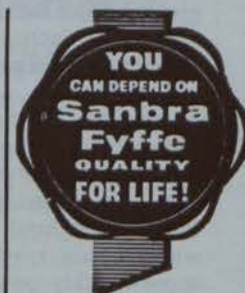
- CONEX-INSTANTOR Compression Joints and Fittings for Copper Tube.
- Valves, Stopcocks and Drawn Copper Traps.
- SANBRA FYFFE Brassware — including the renowned 'Easilyne' and 'Aqualyne' Luxury Taps and Fittings — as well as Pillarcocks, Bibcocks, Wastes, Plugcocks, etc.



TEE-PIECE.



'Aqualyne' Highnecked Pillarcock



SANBRA FYFFE LTD., CONEX WORKS, SANTRY AVE., DUBLIN, 9.
Telephone: Dublin 375131 (5 lines). Telegrams: Sanbra, Dublin. Telex 5325.

(35,000 B.t.u./hr.), designed for warm air distribution by duct to two or more adjacent rooms.

Also from P.D. is their low water content HE hot water radiator. Irish agents: Tedcastle McCormick & Co. Ltd., and in N.I. John Kelly Ltd.

* * *

THE POTEZ warm air generator 1542 provides central heating by ducted warm air, and this unit, which stands 6ft. 6ins. high, has a maximum burner output of 71,500 B.t.u./hr. and maximum effective output of 60,000 B.t.u./hr.

The unit has finned heat exchanger and strict safety features. A slow moving blower gives silence in operation. One of its key features is the 1542's rapid lightning-delivery of warm air within 15 minutes of lighting. Sole concessionaires are Tedcastle McCormick & Co. Ltd.

* * *

THE RANGE from Dunham-Bush Ltd. of Portsmouth, Hampshire, features convectors of both natural or fan-assisted type. The natural models comprise cabinet and multi-purpose types while continuous line convection is provided by the Fin-vector heating system. Fan assisted units are available in the series M and series G heaters.

Also available from Dunham-Bush is their radiant strip and double and single sided radiant panels.

* * *

STELRADS have been manufactured in Southall since 1936 and are made on special machines employing the patented oxy-acetylene welding process which has been perfected by AGA of Stockholm. Until a few years ago the demand was mainly for column types and to-day Stelrads can still offer a very large range of different heights and widths.

Of recent years there has been a continuing increase in the demand for Panel radiators. To meet this demand, two new factories have recently come into production. By use of these up-to-date techniques Stelrads are now able to offer to the trade, panel radiators manufactured in continuous lengths of steel, thus avoiding any unsightly vertical joining weld and giving a strong, straight radiator and were able to cut the selling price.

In order to help overcome the Heating Engineers' difficulty in providing sufficient heating surface with panel radiators, they offer the Nuvello in two widths. The N.60 at 2½" wide gives 100% increase in heating surface over a similar sized panel radiator, and the N.40 at 1½" wide, an increase of 50%.

PRODUCT REVIEW

from previous page

HANDLEY PAGE permanently-sealed oil-filled electric radiators, providing controlled warmth with safety, form an efficient central-heating system when used as the sole means of heating. No maintenance is required with normal use.

Approved by the B.E.A.B. and complying with specification B.S.3456, this radiator is attractively styled. Its tapered vertical flutes give exceptional slimness and, with its thermostat contained unobtrusively within the basic shape. Panels are pressed from first-quality mild-steel sheet and are seam-welded electrically between the flutes and around the outside edges.

Slim and distinctive styling harmonise with either period or contemporary decor in the Handley Page high-quality pressed-steel hot-water radiators range. Construction of these radiators is similar to that of the oil-filled variety, being of first quality 18 gauge mild-steel seam-welded electrically at the edges and between the flutes and tested to 100 p.s.i.

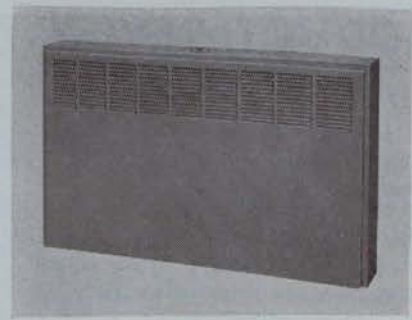
These radiators are offered at an economical price in a range of popular sizes, 12, 18, 24 and 30 inches high. Single panels are only 1.35 in. wide and double panels 3.25 ins. wide. Thirteen standard lengths are available from stock and panels of special lengths can be made to order.

* * *

THE HALCYON F45 by William Sugg & Co. Ltd., is a fan circulation air heater, conventionally flued, for use with short run duct set giving controlled warm air outlets to two or more rooms. The construction is of mild steel and aluminium, cast iron and chromium diffused steel heat exchanger. The controls feature the Sangamo clock control and TMPU16 thermostat, and ignition is automatic from pilot. The unit's gas input is 45 cu. ft./hr. (500 c.v. gas), and it provides an output of 17,000 B.t.u./hr. Five other Halcyon units are available.

* * *

REVOLUTIONARY design features have been incorporated in the new Bestflo radiator valve, now being introduced by Meynell & Sons Ltd. They include a unique double seal to eliminate any possible leakage when the Bestflo valve is installed, and an easy method of pre-setting on a numbered scale. This is clearly visible in a window type inset on the handwheel. The handwheel itself is of strong plastic construction with a comfortable easy grip.



ONE of the new Copperad Convectors (see review)

USING similar basic components to those of their well-known cabinet heaters, Fenton Byrn make the VE and VF range of fan convectors which have found universal favour in school and office building. Centrifugal fans only are used in these models, and units may be concealed, free-standing, or "under-bench." Front, rear, or top access may be provided, and in addition a system can, if need be, be built up as required from basic units.

Skirting heating is the latest addition to the comprehensive Fenton Byrn range. Comprising a multi-fin copper tube heating element, fixed in continuous circuit at the base of the wall, the system is simplicity itself. Particular attention has been paid to design. There is no loss of wall space, and operation is economical through rapid response to thermostatic control.

* * *

THE SALES of Hattersley central heating regulators has now reached the million mark. The new style regulator with long life efficiency is available in an enlarged range of sizes.

With the working pressure of 150 ft. head at 200°F., together with the use of tough Delrin for the headwork, the new range is suitable for all low pressure hot water heating installations. Long life efficiency assured by employing the highest manufacturing standards and the use of Pioneer Nulip glandless sealing rings guaranteed leak-proof for a minimum of five years' service.

Also from Hattersley (Ormskirk) Ltd. is their Floseal lever operated sleeve valve which gives bubble-tight closure on air at pressures up to 300 p.s.i., and the Delflo rad valve range. Irish agent is W. H. Leech & Son.

* * *

LAST MONTH we pictured the handsome Con Stor free standing storage heater by Bastian & Allen Ltd.

Continued overleaf

The Irish Plumbing and Heating Engineer.

PRODUCT REVIEW

from previous page

The fully automatic units are available in four models, with connected Kw. load of 2, 3, 4½ and 6.

* * *

THE FINRAD steel panel wall radiator range is available in either single or double panels in a wide variety of sizes. Steel manufactured by the cold rolled process, they are tested to a minimum of 80 p.s.i. with high pressure rads getting a 140 p.s.i. test.

These are available through the Irish agents, Patton Engineering Enterprises, 30 St. Annes Road, Drumcondra, Dublin, as are Strebel steel radiators and Nilovent rad air vents, manufactured by Thermia-Verken.

* * *

SOLACOUST heated ceilings by Richard Crittall & Co. Ltd. provide heat by low temperature radiation, which method has been proved to have particular merits. This system possesses low heat storage, and thus satisfactorily responds to thermostatic control and changes in temperature of the heating medium. Irish agent: Heatavent Supply Co.

Generally, the thermal and suspension components, excluding feeder mains, can be accommodated within a void depth of 7"—8", leaving any further depth of void available for feeder mains and other services, such as ventilation, etc.

Solacoust ceilings can be supplied incorporating metal or plaster tiles, both perforated and non-perforated, and in the case of plaster the patterns available give a wide choice of decor. A number of patterns are finished with a fine milled surface. This is particularly pleasing where non-perforated tiles are used, and offers opportunities of forming a checkered pattern by arranging the milled face on the tiles alternately at 90°. Where required, Solacoust ceilings can have a marginal surround of in-situ plaster forming a cove, with the perforated or non-perforated plaster tiles forming a panel. Also available is Sunstrip radiant heating.

*Please remember
those subs*

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W A R M E X

ECONOMIC

CENTRAL HEATING

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With Warmex there's no waiting for off-peak periods. It provides instant heat WHEN AND WHERE YOU WANT IT, evenly controlled by time switches and automatic controls and surpassing the economy of electric storage heaters—without their bulk. The Warmex System can be easily installed at a very moderate cost. Furthermore, Warmex radiators are guaranteed for five years.

- This unique construction is fully patented.
- Easy payment plan. Personal loans available.
- Installation takes only an average of two days without any structural alterations.
- Time clocks set to your own particular requirements.
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**Synchronous
Time
Switches**

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LTD.**

Timekeeping is controlled by high quality gears made to the best Swiss standard and the time switch is enclosed to prevent interference or damage from dust or dirt.

GUARANTEE

The WARMEX system is guaranteed for five years.

Sole Concessionaires in the Republic of Ireland, to whom all enquiries should be addressed:

20th CENTURY ELECTRONICS

(Ireland) LTD.

38/39 Grafton Street, Dublin. 'Phone 70939.

SMALL SIZE ANTHRACITE FOR CENTRAL HEATING

SOME years past this article would have argued the case for domestic central heating itself. It is now superfluous to do so as the tremendous strides made shows that the breakthrough has been achieved and that people fully accept the need for such. This general acceptance, however, the hardest part of the problem to be overcome, does not complete the good work. While people have been persuaded that central heating is not a luxury but a rational addition to the home, they still have to be convinced of this in practice.

Capital and operating costs are the two talking points of any sales approach and unfortunately some insincerity in this regard has caused considerable trouble in the past. We hold that our programme to promote the use of small size anthracite has always tried to achieve the correct balance in this regard and we are satisfied that we have been fully justified.

There are certain clichés which it is essential to scotch in this article. Firstly, all systems, whether small bore, gravity, etc., are common to whatever boiler or heating medium is used. We emphasise this because some advertising gives the impression that certain advances in methods are exclusive to one type of fuel. The basic real difference is operating costs, and irrespective of the system small size (Irish) anthracite is the most economic, both in operating and (most important) maintenance costs, of all the available systems. This has been established and we welcome any opportunity to prove this conclusively.

Other criticisms of solid fuel simply do not apply to small size anthracite systems. Modern magazine boilers allow for minimum labour and maintenance and maximum cleanliness and efficiency.

There are other arguments which we could use, such as our fuel being a national product, the large employ-

ment given by the industry, balance of payments, etc. These are considerations we certainly should not lose sight of, and we hold that our product will stand up to any competition, and that our real claims, of quality and efficiency, is how we finally want to be judged.

COST PER USEFUL THERM:

Coke, at 10/- per cwt., burned at 60% efficiency; costs 1/3¼ per useful therm.

Anthracite Grains at 9/- per cwt., burned at 75% efficiency; costs 11¼d. per useful therm.

Gas at 1/8½ per therm burned at 80% efficiency; costs 2/4 per useful therm.

Electricity at 1/1 per unit, used in an immersion group at 100% efficiency costs 2/8½ per useful therm. No allowance has been made for standing charge.

Electricity at 0.8 per unit used in underfloor heating at 95% efficiency, costs 2/1 per useful therm. No allowance has been made for any standing charge.

Oil in low pressure jet burner at 1/5 per gallon and 75% efficiency, costs 1/1½ per useful therm.

Oil in vapourising burner at 1/8 per gallon and 75% efficiency, costs 1/5 per useful therm.

PRODUCT REVIEW

from page twenty-eight.

Quadrant Engineers, 167 Strand Rd., Sandymont, Dublin 4, are sole agents for these Buderus boilers.

* * *

INTERNATIONAL Boilers & Radiators Ltd. manufacture a range of gas fired boilers from 35,000 B.t.u./hr. output to 100,000 B.t.u./hr. output. Their Gas-Pak 35 boiler is only 36" x 14" x 15½", yet gives 35,000 B.t.u./hr. heat output which can be used for domestic hot water supplies or for small house central heating, and is suitable for Estate development and packaged deal systems. The Gas-Pak 50 is of similar design and is rated at 50,000 B.t.u./hr.

The Capital range of small bore units has been styled by one of Britain's top industrial designers, and all units are fully automatic with built-in small bore pump, electric time clock with day and night shut down, push button ignition, glass lined flue ways, and are available as standard or balanced flue models. The Capital units are manufactured in four sizes with outputs of 35,000 and 50,000, 70,000

and 100,000 B.t.u./hr.

The range has only recently been accepted by the Council of Industrial Design and models are now on display in the Design Centre, Haymarket, and the Scottish Design Centre. All models are available with a choice of four attractive coloured door panels, and stainless steel working tops which are offered as optional extras.

Latest information is that the 35,000 and 50,000 models of the Capital have now been approved for Se-Duct application. The basic boilers are unaltered but for Se-Duct use are fitted with stainless steel rectangular ducts for combustion air inlet and flue product outlet.

* * *

THE LATEST addition to the well known Perkins Mini-gas fired boiler range is the M.G.35, a 35,000 B.t.u./hr. wall-mounted boiler with balanced flue terminal.

This introduction followed the success of the Perkins Boilers Mini gas-fired type MG.60, with a 60,000 B.t.u./hr. capacity. In addition to the

Continued page thirty-one.

Replacement stocks have now arrived, among them a small range of coke boilers, C.22W type (illustrated).

These may later be changed over to oil without difficulty, and some installers have found that the Dual-Fuel PC 22W series proves attractive to their clients for instant fuel change to oil or solid fuel according to circumstances.



The
Buderus
C.22W.

GAS

CENTRAL HEATING

•

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Engineers,
Builders*

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TECHNICAL INFORMATION
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GAS HEATING CENTRE

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PRODUCT REVIEW

from page twenty-nine

M.G.35 introduction is that of the Twin (120,000 B.t.u./hr.).

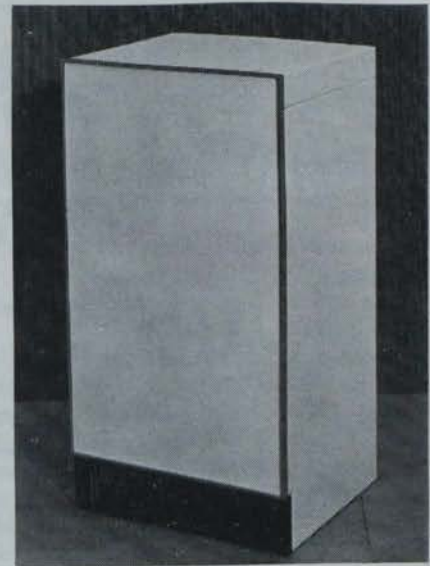
Also from Perkins is the Paramount gas-fired small bore boiler. Models are available here with 50,000, 75,000 and 100,000 B.t.u./hr. ratings.

* * *

THERE are three new Aga gravity feed boilers burning anthracite grains, from Allied Ironfounders Ltd. They feature sleek new cases and bigger hoppers.

A new, quick acting immersion thermostat underlines the well known ability of these boilers to operate with precision when connected to the most up-to-date heating systems. The integral flue draught stabiliser has been enlarged so that these sophisticated boilers can match all but the most extreme flue conditions without the need for any other chimney modifications. A choice of colours is available.

These additions of the Aga range



Pictured here are (on left) the Trianco P55/65 boiler and the International Boilers and Radiators Gas-Pak (see review).

now provide a wide choice of solid fuel boilers from Allied ranging—from 12,000 B.t.u./hr. SF.12 to the "twenty radiator house" GF.125,

which provides 100 gallons of hot water and 525 sq. ft. of radiation surface.

* * *

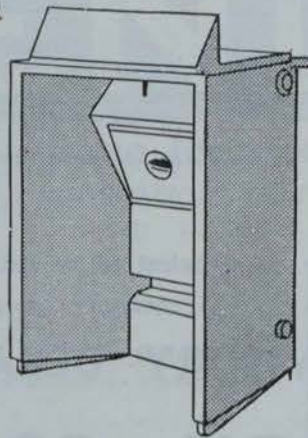
THE BELL TYPE 'D' HIGH OUTPUT BACK BOILER

DOMESTIC HOT WATER
(HIGHEST OUTPUT)

PLUS

CENTRAL HEATING
(SIMPLEST FIXING)

The Bell Type D HIGH OUTPUT Back boiler unit has been designed to suit 16" Bell Supaheat under-floor draught fires or Bell Raised Metal Fires. These fires will provide heating for a room of 1,500 cub. ft. and more and at the same time the boiler will provide hot water for all domestic purposes plus space heating by radiators in several other rooms.



The Bell Type D High Output boiler is of welded steel construction and is pressure tested and guaranteed. It is an all round boiler with self-contained flue, damper and throat unit. There is an access door for easy flue cleaning. The whole unit is in one piece for exceptionally easy fixing.

BACK BOILER OUTPUT: Domestic hot water and space heating by radiators—Domestic hot water plus 100 sq. ft. of radiator and piping surface. An indirect cylinder of 25/30 gallons must be used.

Central Heating only—125 sq. ft. of radiators and piping surface.

A. BELL & Co. (Eire) Ltd.

Rep. 136 BOTANIC RD., GLASNEVIN, DUBLIN

Telephone: 373611/2

A NEW domestic gas-fired boiler, fully automatic in control and yet not dependent on electricity, has been designed by Thomas Potterton Limited, a member of the De La Rue Group. The new boiler, the Potterton 30 + 3, provides all domestic hot water and has the capacity to serve up to four average-size radiators (80 to 100 sq. ft. of radiating surface), plus releasing sufficient heat to warm the kitchen—hence its name.

Usually, with automatic boilers, it is necessary to have a radiator to do this. Thirty thousand B.t.u./hr. heats the water and 3,000 B.t.u./hr. is heat into the air. Running costs will be competitive with operating a solid fuel boiler of comparable size. Convenience and economy are two main features. By the simple setting of tappets on a clock controller, the boiler may work for as little as two hours a day to provide hot water, and even with central heating will rarely extend to 12 hours. In the summer the boiler can do its work early in the morning and at the end of the day.

THE Powell Duffryn domestic solid fuel boilers, 21/60, Thermatic 22, and Super Thermatic, are suitable for domestic hot water supply and/or background heating plus domestic hot water. They will burn Anthracite, No. 3 size coke, Sunbrite or any of

Continued page thirty-three

**FOR AUTOMATIC
CENTRAL HEATING
IN SCHOOLS, COLLEGES
AND INSTITUTIONS
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SMALL SIZE ANTHRACITE
at £9 per ton**

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(1) LIGHT FUEL OIL	£1 10 0	(3) ELECTRICITY (Night Storage)	...	£2 18 0
(2) MEDIUM FUEL OIL	£1 5 0	(4) ELECTRICITY (Day Rates)	...	£3 8 0

For costings and technical advice contact:

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BALLINGARRY COLLIERIES
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Gurteen, Coalbrook, Thurles, Co. Tipperary

Tel.: BALLINGARRY (Thurles) 5 and 6.

PRODUCT REVIEW

from page thirty-one.

the manufactured fuels, also dry kitchen refuse.

Heat outputs are: 21/60, 12,600 B.t.u./hr.; Thermatic 22, 13,000 B.t.u./hr.; Super Thermatic, 15,000 B.t.u./hr.

* * *

THE CRANE Cavalier is among the recently introduced gas-fired boilers. Three boilers are available in this range, with ratings of 30,000, 45,000 and 60,000 B.t.u./hr.

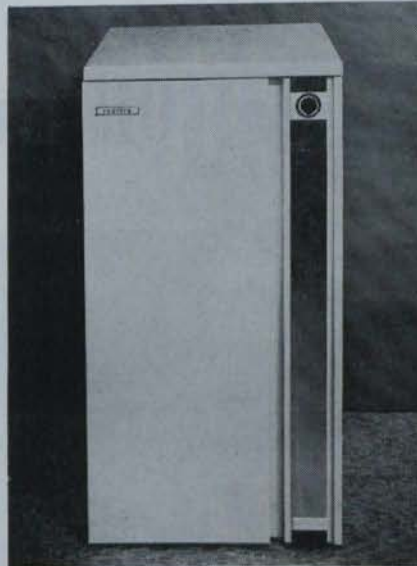
These smart looking units are built to fit flush with standard size kitchen units and are available in a choice of two-tone colour combinations.

The automatic Cavalier features push-button ignition and comprehensive control centre.

* * *

THE TYPE D high output back boiler by A. Bell & Co. Ltd., of rere 136 Botanic Road, Glasnevin, Dublin 9, has been designed to suit the 16-inch Bell Supaheat underfloor draught fires, or Bell raised metal fires.

Continued page thirty-five



WITH an output of 65,000 B.t.u./h. this latest addition to the Redfyre range of gas-fired central heating boilers fits into the same size cabinet as the 45,000 B.t.u./h. Autogas 45. A small bore unit, this Redfyre Autogas 65 incorporates a variable head circulating pump and electric time clock with the Adatrol gas control and electric glow coil ignition to light the pilot flame.

BIG GAS INSTALLATIONS

SINCE the Dublin Gas Company opened their new Gas Heating Centre early this year and introduced

* * *

the special low gas tariff for central heating, it has made considerable impact in Dublin.

Included among the recent Gas Central Heating installations are:—

The new R.D.S. Sales Ring at Ballsbridge.

The new B.E.A. offices at Westmoreland Street.

The new C.I.E. heating installations at Inchicore.

Blocks of flats at Sandymount, Dartry Road and Zion Road.

Wates Limited also have incorporated a gas central heating system in their new "Powerscourt Major" houses at Dundrum Heights.

And the indications are that we can look out for further developments from the Gas Heating interests.

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—INTRODUCE THE LATEST, MOST ECONOMICAL CENTRAL HEATING EQUIPMENT FOR THE HOME

A Large Range Available From Stock, including:—

POTTERTON Jet Fully Automatic Oil Fired Boilers. Sizes for Industrial use available to special order.

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WILSON Wall Flame Ditto.

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CRANE Ditto.

TRIANCO Solid Fuel Automatic Boilers.

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Capel Street, Dublin. 'Ph. 76711 (15 lines)

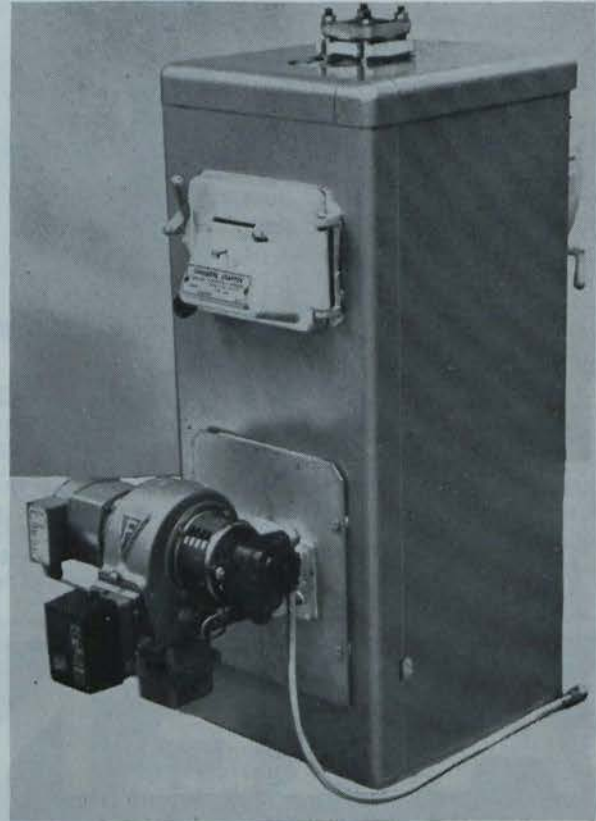
FC 204 Pressure Jet Oil Burner Boiler

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 £116-0-0.



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

from page thirty-three

The back boiler will provide domestic hot water plus 100 sq. ft. of radiator and piping surface or, in the case of central heating only, 125 sq. ft. of rad and piping surface.

* * *



THE two new gas-fired warm-air central heating units recently introduced by Radiation Central Heating Ltd., the Ductair G.2301 (conventional flue model) and the G.2303 (available for balanced flue and SE-Ducts), are exceptionally quiet in operation. The air circulating centrifugal fan and motor assembly are resiliently mounted and the motor is capable of voltage adjustment by a slide wire resistor to reduce fan power where an application calls for a very short warm air ducting.

SEVEN out of every 100 homes in Britain now have some form of central heating. Of these, about one-third use electricity—most of the electrical systems having been installed during the last five years. These are among the findings reported in the latest survey carried out on behalf of "Woman" magazine by the Odhams Press Research Division of the International Publishing Corporation.

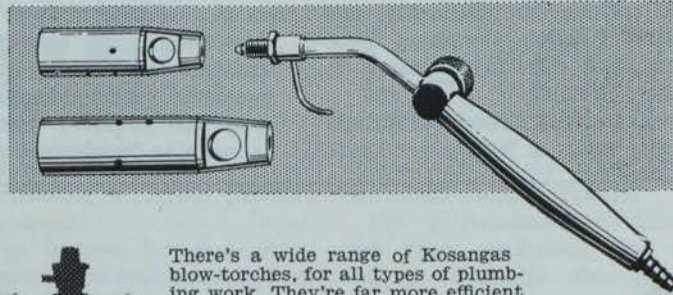
**REPORT ON COMPETITION
FOR A TOWN
SOCIAL CENTRE**

The response to the invitation to compete was very disappointing. Only two entries were received and, regrettably, the Assessors were unable to recommend the issue of any awards, as certain important conditions and instructions were disregarded and therefore both entries had to be excluded from the competition.

● Mr. Crampton was the sponsor of this competition and he wishes to announce that the Assessors have kindly consented to act for another competition with altered conditions. Details will be announced in the press some time next spring.

Kosangas Blow-Torches

for every plumbing job!



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

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

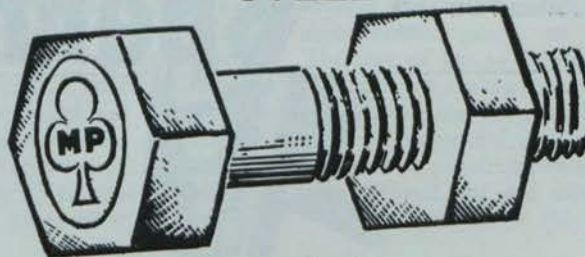
The Bullfinch Mark II has a full range of heads, including soldering attachment. Use Kosangas blow-torches, with the small Kosangas portable cylinder, also for *roof-felting, jointing of plastic pipes, and other heating needs.*

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

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BIG NEWS FOR OUR NORTHERN IRELAND READERSHIP

PLANS are now complete for the launching with next month's I.P.H.E. of our centre Supplement on tinted paper which will be devoted entirely to Domestic and Industrial Heating, Plumbing, Ventilating and Air Conditioning in Northern Ireland.

This new, extended section will include a greatly enlarged Northern "Trade

Topics" coverage and specially commissioned technical articles by leading trade personalities in the area.

This development follows representations from trade interests who are anxious that the journal should provide a wider coverage in keeping with the extensive nature of the industry in Northern Ireland, and it

represents another stage in the editorial development of the I.P.H.E.

The new section will introduce a contributors' panel of well-known figures in the industry. The panel will include: Mr. W. H. Tanner, President of the Heating and Plumbing Employers' Association of Northern Ireland; Mr. F. R. McBride, A.M.I.Mech.E., M.Inst.F.; Mr. J. A. Willis, President Northern Ireland Master Plumbers' Association, and Mr. Bill Maginnis.

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We conclude here J. L. Fitzgerald's special review survey of . . .

DUST AND WASTE COLLECTING PLANT

IV. Elimination of Fly Ashes With Incinerators.

THE elimination of smoke and fly ashes from incinerators is a delicate problem.

The careless operation, chiefly by incompetent help, calls for extra precaution in designing. Also, the fact that the prime benefits of these furnaces rest with the removal of waste, at least expense, with the least amount of labour and in the shortest possible time, greatly increases the difficulties. Feeding the incinerators at adequate intervals and in correct amounts is an Utopia! However, the arrangement for settling of fly ashes and also smoke prevention must be based on sound technical principles. The following is a guide to what is needed and how the fly ash problem can best be curbed.

There are two principal ways of settling solids out of air and gas streams (except some very minute particles that require elaborate apparatus, which is beyond the scope of discussion). One is change of direction and the second change of velocity of the medium. The underlying effective force for both is the momentum of inertia (centrifugal force).

Change of direction is only effective in conjunction with change of velocity of the gas stream. This principle is illustrated by the analogy with sedimentation of impurities in water.

IN a pipe of a given internal area, no matter whether a straight run or coil is used and practically independent of the length (save for reduction of velocity through friction), practically no sedimentation of solids takes place. Enlargement of a section of such coil—whether straight run or curved section—will effect sedimentation. The amount settled out depends (considering particles of same size and specific gravity) mainly on the reduction of

velocity of the stream and arrangement of retaining separated particles in settling space.

The same is true for flue gases. Here we may state that the length of the travel of the gases is of very little influence on the settling process. The most important feature is the change of velocity. A repetition of velocity changes—provided adequate provision is made for retention of the settled particles—has proven far superior to directional changes.

Fig. 1 arrangement has proven the most efficient. It offers the best chance for sedimentation and also practically prohibits the re-entering of once eliminated particles in the flue gases.

Close observation of the aforementioned points and proper dimensioning of the various passages and chambers will provide reasonable elimination of fly ashes to a practical inoffensive degree.

Of particular importance, also, is the relation of the distance the gases must travel through each pass (a) to the cross section (x). In fig. (2) arrangement (1) the velocity of the gas stream will not be materially reduced when the dimension (a) is small in comparison to the cross section (x). In fig. (2), arrangement 2, the proper relation seems to be that the dimension (a) shall be at least equal to the

square root of the cross section (x). (see illustrations opposite).

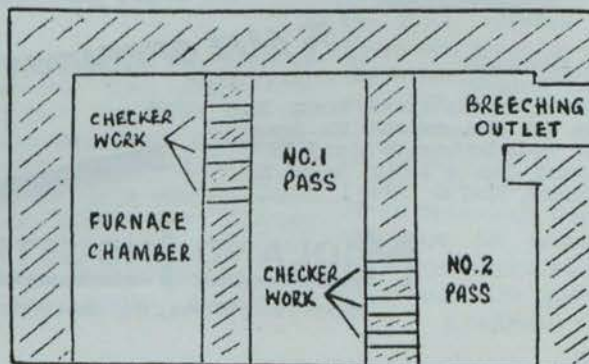
For extraordinary conditions, the are other mechanical and electrical means obtainable—flue gas washer, electronic sedimentation, etc. Such are only suggested in special cases.

V. Gas—An Ideal Auxiliary Fuel for Incinerators.

THE fuel value of the average mixture of refuse is sufficient to maintain proper incineration, at least in the majority of cases. However, there are times when the moisture content of the refuse increases to such a degree as to inhibit combustion or even stop it. Such conditions occur in the average installation. So provision must be made to allow the use of additional fuel—preferably gas, though oil is often used. The intermittent use of additional fuel, often necessary for only short periods, indicates the use of gas as the most practical form of auxiliary fuel. Furthermore, a cleaner and more convenient fuel than gas cannot be found, since bottled gas is so widely used. The cost of gas as an auxiliary fuel is not high, as incinerators properly designed for this purpose can be operated very economically.

There are certain conditions that must prevail for the efficient use of
continued page thirty-nine

FIG. 1.



NEW ARIC TANK CONTENTS GAUGE WITH REMOTE READING UP TO 100 FT.



ARIC TRANSMITTING PRESSURE GAUGE WITH STAINLESS STEEL DETACHABLE DIAPHRAGM



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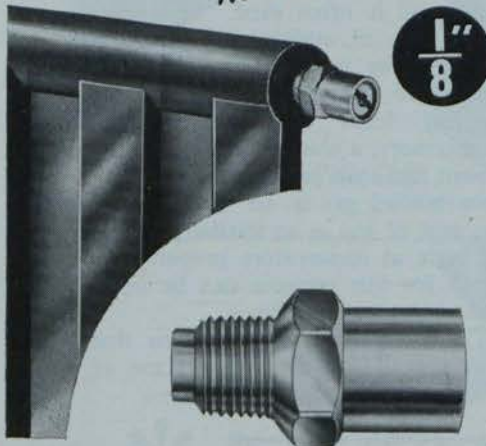
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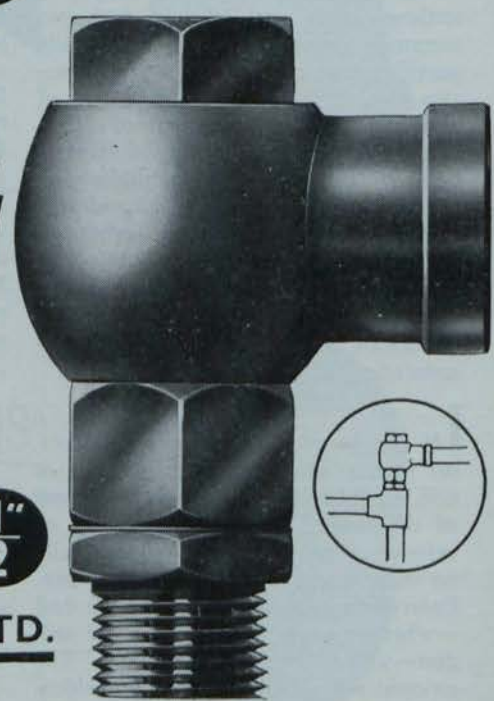
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The 1/8 in. Automatic Air Eliminator is especially suitable for domestic and commercial radiators, retails at 7s. brass, 8s. chromium plated. The 1/2 in. size, suitable for heavy duty, at only £1 19s. 1d. costs between 30% and 100% less than any other—and does a better job! No mechanical parts to corrode, bind or freeze!

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<https://arrow.tudublin.ie/bsn/vol4/iss9/1> Heath Town Works, Wolverhampton. Tel: 23901

DOI: 10.21427/D7XQ4B

MIDLAND INDUSTRIES LTD.

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gas in an incinerator.

To bring the heat from the gas flame into intimate and prolonged contact with the refuse, it was formerly the custom to locate the gas burners below the grates. This location had undesirable features. It tended to burn out the grates. Further, it provided no ignition for the gases arising from the top of the fuel bed. Finally, it made the use of safety controls impractical.

MODERN practice is to place the blast type gas burner in the side of the incinerator. This practice provides radiant heat to dry out the wet materials and also ignites the unburnt gases from the fuel bed after these gases have had a chance to mix with the necessary secondary air to make them combustible. These burning gases further heat the brickwork which gives more radiant heat to help in drying.

In order to efficiently utilize the heat from a gas burner, located at the side of an incinerator, it is most important that efficient control of draught is effected. Flue-fed incinerators are notorious for their excessive draught and it is extremely important that a barometric damper at least equal in chain to the inside dimension of the flue be installed in the flue in order to keep the draught to a minimum, so that a maximum of the available heat is retained in the incinerator. Due to the declining use of the flue-fed incinerator, because of rulings forbidding the use of this type of incinerator by Air Pollution Control Departments, further review of such equipment is not indicated.

Larger destructors, Class III. and IV., are best equipped with blast furnaces. These may be located above the grate area, directing the flame into the fuel bed. However, special means should be provided to utilize the heat value of the gas flame most efficiently.

Currently the burner is placed slightly over the normal fuel bed and located to assure combustion of gases from fresh refuse as well as accelerate evaporation of moisture. Location of burner towards rear of incinerators also assures ignition of unburnt volatiles.

This particular type of furnace has proved extremely efficient in medical institutions and hospitals, where carcases of experimental animals, wet pathogenic matter from operating theatres, etc., are to be incinerated.

sign of J. Goder arrangement, doing away with any need for drying arches, assures complete utilization of all fixed fuel contained in the refuse. This advantage, coupled with the efficient utilization of the heat from the gas burners, reduces gas consumption to a surprisingly low figure.

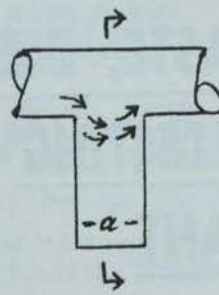
For larger installations multiple burners are preferred and in such cases the location of these in the rear of the furnace has proven most desirable.

A calorific efficiency of up to 60% can be obtained with properly designed and located gas burners. Such efficient utilization of gas reduces the cost to a negligible figure. It has been proved over the past forty years that the use of gas is the cheapest auxiliary fuel for Destructors.

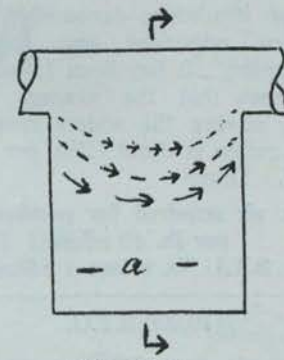
There are many factors to be considered in the location of gas burners in the larger units (Destructors), especially where secondary chamber temperature has to be kept around 1,500°F. to insure smokeless incineration. Effective draught control is accomplished by means of a guillotine or sliding damper in conjunction with a barometric damper, with both dampers being installed in the breeching.

The deep fuel bed of domestic incinerators causes distillation of volatiles in the upper layers of refuse when the burning process starts. These malodorous fumes rising from the fuel bed must be prevented from escaping out of the chimney and contaminating the neighbourhood.

A hollow partition is provided through which these combustible fumes and gases are drawn into the flame, where they burn completely. A gas bypass is provided that leads part of the gas flame into the flame port to assure ignition of malodorous gases as soon as incineration is started. Larger models incorporate the same features and similar gas-burning equipment.



Side view arrangement (1).



Side view arrangement (2).

VI. Fundamentals in Establishing Design Criteria. Standard computations.

As the nature and composition of refuse changes daily or hourly, empirical factors must be found that approximate the variable conditions. To illustrate this by way of example—one pound of combustible may require 10lbs. or 15lbs. of air, while another sample may need far less. Apart from the theoretical air supply, based on the chemical analysis, the physical properties of the heterogeneous material must be considered. This again varies and thus the resistance in the fuel bed and air admission changes.

THE most practical and best way to meet the various changes is to base the air requirements on the B.T.U. contents (not on chemical composition) except in special cases where a definite material is to be consumed.

Considering that one pound of carbon requires approximately 12lbs. of air for complete combustion and that hydrogen requires approximately 135lbs. of air, also that refuse contains some fuel oxygen, nitrogen, sulphur, etc., etc., all in variable quantities, we must conclude that an empirical factor approximating the extreme conditions is desirable, for practical purposes.

A formula used in boiler or oil burner practice is to find the amount of air needed in cubic feet by dividing the B.T.U. contents by 100. This figure may serve for commercial fuel, but it has been found to prove inadequate in incinerator practice due to the changes in the calorific value of the components.

The fact that the thermal efficiency of an incinerator does not need consideration for economical heat recovery, restriction of excess air is less important. The main object is to

Continued overleaf

The Irish Plumbing and Heating Engineer.

achieve conditions favourable for a complete odourless and smokeless combustion. It has been found from experience that the average useful figure, serving the widest range, for mixed refuse is about 15lbs. per 10,000 B.T.U. Thus:—

Lbs. air required for combustion per lb. of refuse

$$(1) = \frac{\text{B.T.U./lb. refuse} \times 15\text{lbs. air}}{10,000 \text{ B.T.U.}}$$

Determination of Temperature.—To determine proper limits for heat release, the nature of the material to be burned must be taken into consideration. The combustion process of an incinerator may be considered as a two-stage process. The first stage comprises desiccation and distillation of the volatile components; the second, combustion of the solid fuel particles and combustion of volatiles. The heat release in a well designed incinerator, due to the predominance of volatile fuels in the refuse (wood, paper, fats oils, etc.) may be as high in the secondary combustion chamber as in the primary chamber.

Since space does not allow us to develop the following formulas for the determination of furnace temperature, we give the simple formula as follows:—

$$(2) T = \frac{H}{.25(1 + b)}$$

Where:

T = Furnace temperature.

H = B.T.U. of refuse per lb.

b = Air for combustion in pounds per lb. of refuse (see formula).

The factor .25 is the average specific heat of flue gases due to their moisture content. The factor 1 represents 1lb. of refuse. Example:—

Formula (1):

Calorific value of refuse = 6,000 B.T.U. lbs.

$$\text{Air needed} = \frac{6,000 \times 15}{10,000} = 9\text{lbs./lb. refuse.}$$

Formula (2):

$$T = \frac{6,000}{.25(1 + 9)} = 2,040^\circ \text{F.}$$

The temperature determination does not take into consideration the losses from radiation; also losses from evaporation of temperature rise of the moisture, nor the losses due to bringing refuse up to the flame ignition

WASTE, DUST COLLECTING PLANT

from previous page

point. Thus formula (2) requires revision:—

Formula (3):

$$T = H - 30\% \text{ where } 30\% \text{ equals average heat loss.}$$

$$.25(1 + 9)$$

Example: Calorific value of refuse = 6,000 B.T.U./lb. less 30% or

4,200 B.T.U./lb.

Air needed = 9lbs./lb. refuse.

$$T = \frac{4,200}{.25(1 + 9)}$$

$$= 1,680^\circ \text{F.}$$

It is evident that the losses increase with the size of the heat-absorbing surfaces, also with the number and size of charging or stoking doors—not to mention the fact that the doors are quite often kept open longer than necessary.

To reduce heat loss, the following points must be considered:—

- (a) Charging arrangement should be designed to offer greatest convenience to allow the refuse to be quickly charged. (Thus finger-tip control).
- (b) Reducing heat-absorbing and transmitting surfaces in the ignition of combustion zone by properly constructed and sized furnace chambers.

The size and volume of the combustion chamber depends also on other considerations. The following points must be kept in mind:—Refuse of low calorific value with a high moisture content calls for a small chamber to reflect heat and reduce heat absorption. On the other hand, for a long flame, fuel such as wood, paper, etc., larger chambers should be provided.

With increased capacity of furnace, these variables decrease or rather can be considered so. It must be considered that an incinerator, to be practically useful, must allow wide variation in fuel consumption and relative quantities. A happy medium must be found.

APPENDIX.

Incinerator Selection Chart.—With the sole exception of incinerators for residences (Class 1) all incinerators are rated in terms of "pounds per hour," and are classified according to use.

To select an incinerator:—

1. Determined Amount (in pounds) and nature (type 1, 2, 3, etc., waste) of refuse to be incinerated daily by "on the site" survey. Divide the number of hours incinerator will be in operation into "total pounds per day" to determine pounds per hour.
2. Select incinerator size nearest to the calculated "pounds per hour" (from an incinerator chart).

Type Waste is clearly defined in I.I.A. catalogue. Generally Type 1 is rubbish.

Type 2 is a mixture of wet and dry material.

„ 3 is garbage.

„ 4 is animal solids and organic wastes.

„ 5 and 6 are special.

Directory of Manufacturers, Agents, Representatives and Distributors

1965

- Readers are requested to notify this office of any additions, alterations or amendments for entries in the 1965 Directory.
- A limited number of copies of this year's edition are available on request for checking.
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