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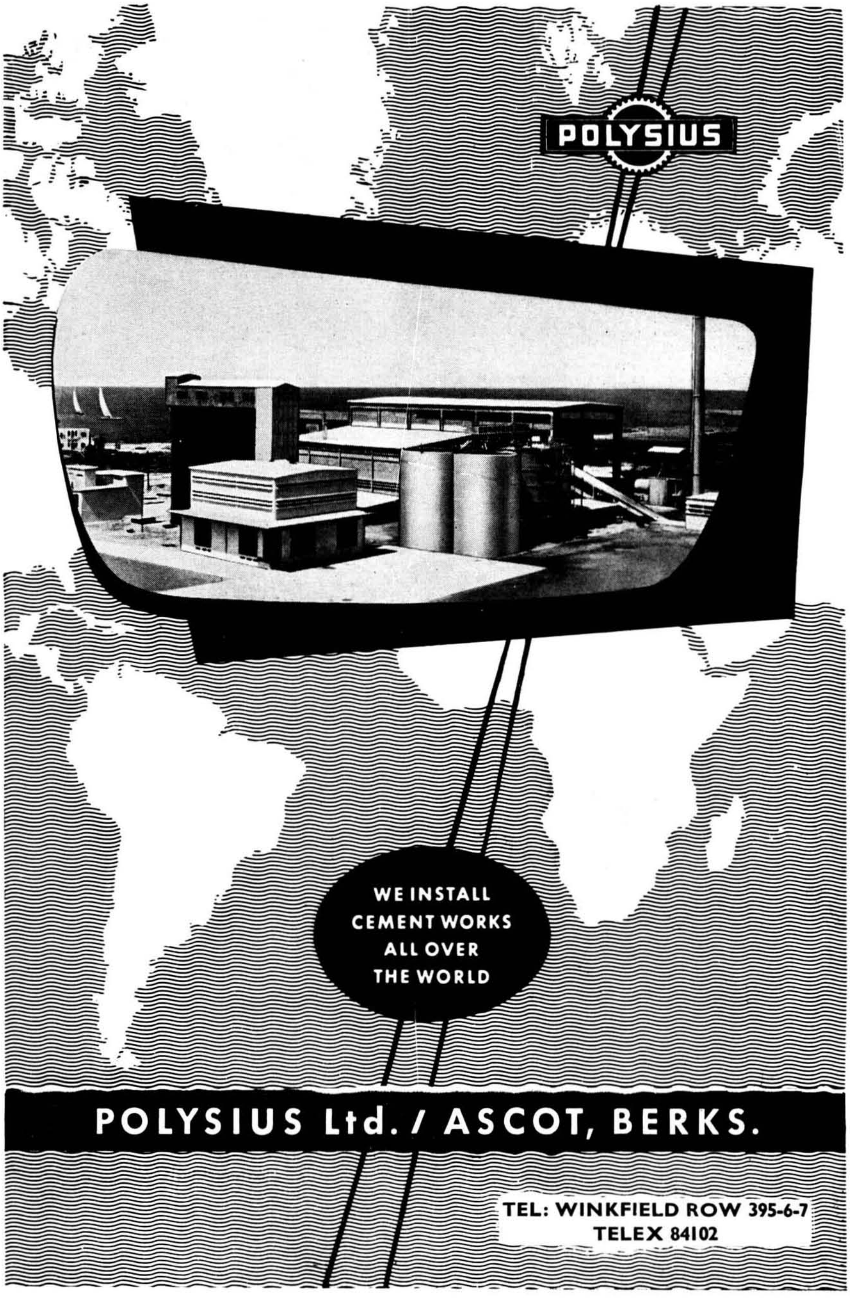
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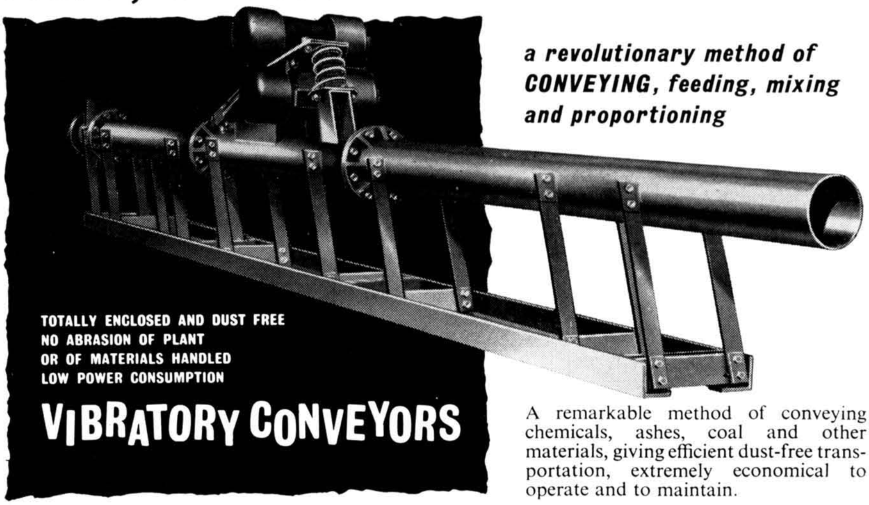

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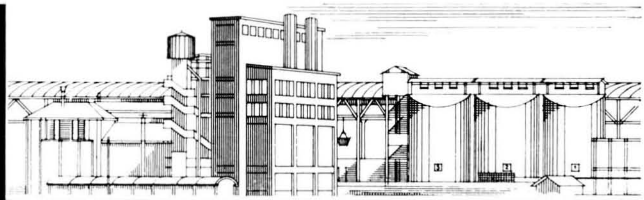

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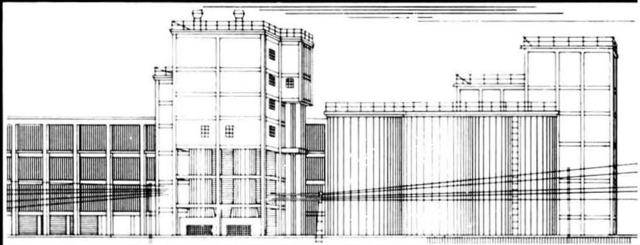

100 000 long tons/year

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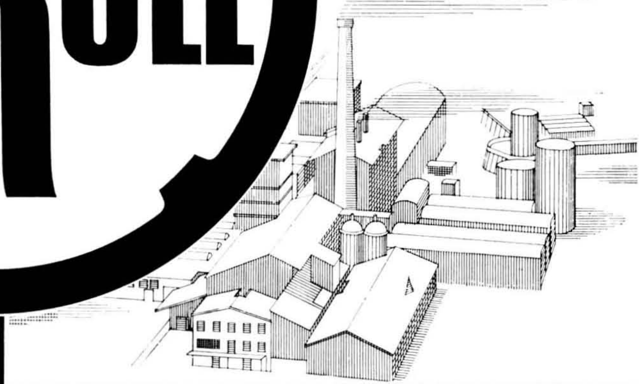
50-300 000 long tons/year



100 000 long tons/year

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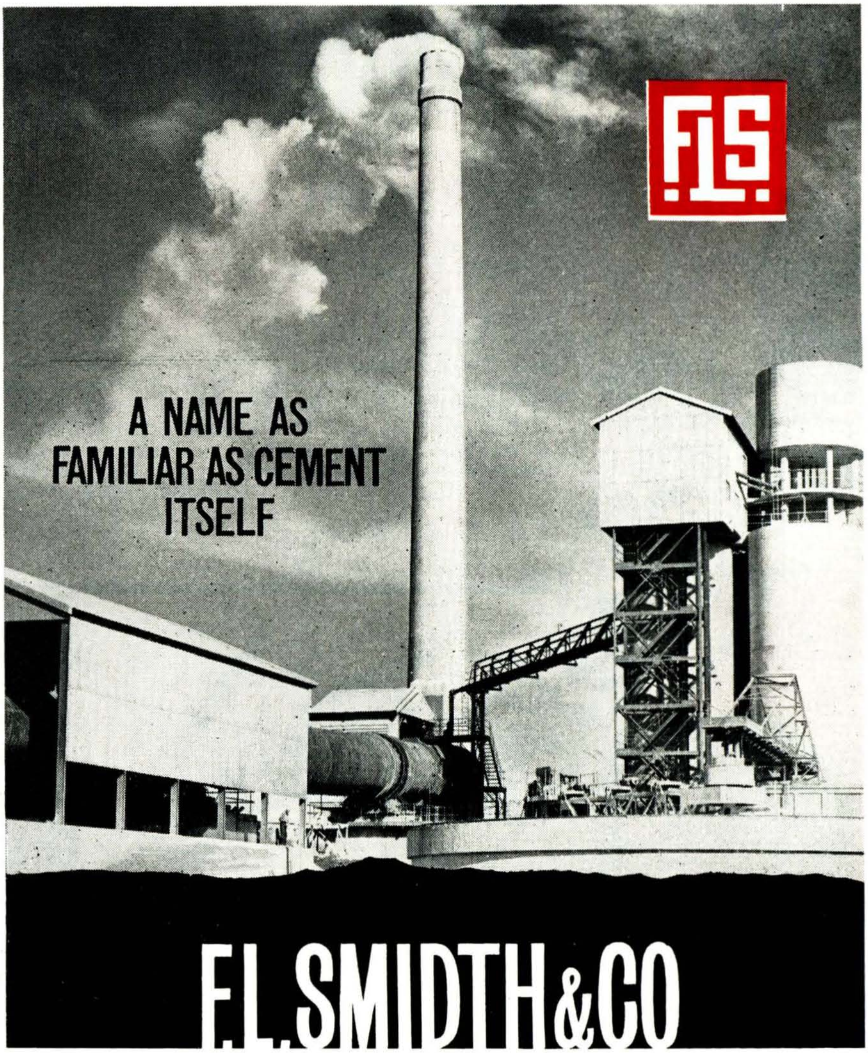
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VOLUME XXXV. NUMBER 6. NOVEMBER, 1962

A New Oil-fired Shaft Kiln for Lime.

THE oil-fired shaft kiln (*Figs.* 1 and 2) for the production of lime, installed recently by Beswick's Lime Works Ltd., is claimed to be the first of its kind in the United Kingdom. At the works of this Company, which was established on the site at Hindlow, near Buxton, in 19[illegible]2, there are also nine Spencer-type coal-fired kilns, a battery of five of which is shown in *Fig.* 3.

The new process is based on the Catagas system of oil gasification. The kiln, which is of conventional gas kiln design with the Catagas units fitted at the bottom of the burning zone (*Fig.* 2), has a straight shaft of 7-ft.-6 in. nominal internal diameter. The rated output is 50 tons of lime per day, which is in excess of 1 ton of lime per sq. ft. per day. The kiln is designed to ensure free movement of the charge without any need for rodding. It is a prototype design and the results obtained are reasonable in comparison with the design estimates; development is continuing to show further improvements in working efficiency under the conditions obtaining at this works.

Raw Material and Charging of Kiln.

The limestone from the quarry adjacent to the Beswick's Co.'s works is a high-calcium material containing 98 per cent. of carbonate. It is brought from

CHANGE OF ADDRESS

Concrete Publications Ltd., the publishers of this journal, announce that

FROM JANUARY 1st, 1963

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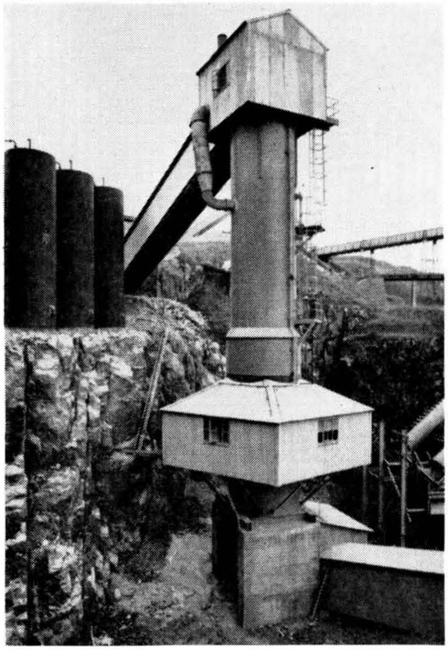


Fig. 1.—Oil-fired Lime Kiln.

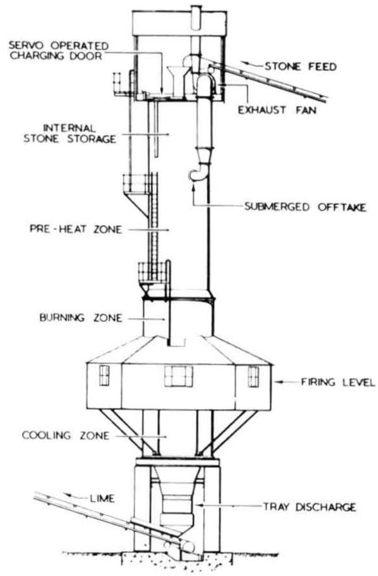


Fig. 2.—Principal Components.

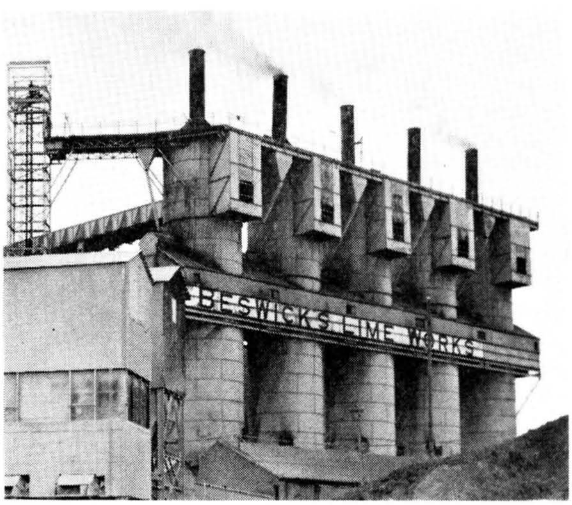


Fig. 3.—Battery of Coal-fired Kilns.

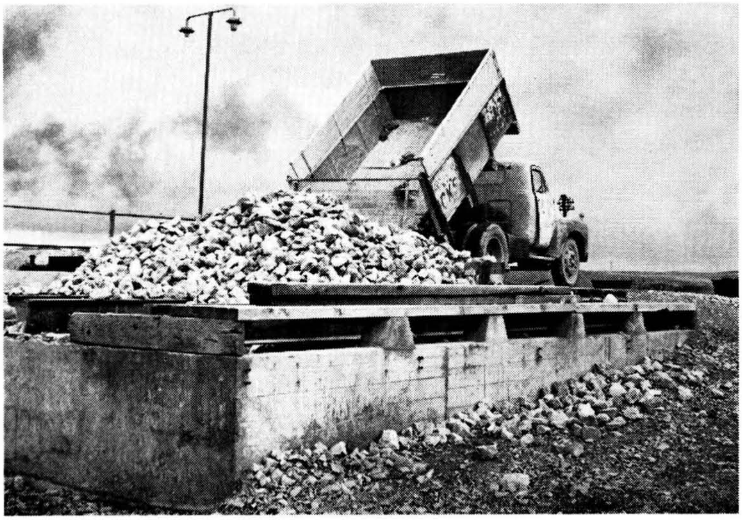


Fig. 4.—Discharging Limestone from Quarry.

the quarry in 12-ton tipping lorries to a crushing and screening plant, from which the material is transported and discharged (*Fig.* 4) through a rail-grid into a reinforced concrete feed-hopper having a capacity of 250 tons. The stones are from 3 to 5 in. in size and are fed from the outlet of the hopper on to an inclined 27-in. belt-conveyor, the base being in a concrete-lined pit under the hopper (*Fig.* 5). The stone is carried to the top of the kiln by this conveyor, which is installed in the enclosed gantry seen in *Fig.* 8, and which has a normal working capacity of about 100 tons per hour.

The kiln is charged through a horizontal servo-operated sliding gate (*Fig.* 6) which is remotely controlled. The Sirocco fan for the induced draught is installed on the gate platform over the kiln.

The Kiln.

In its passage down the kiln, the material passes through four successive stages. The internal storage zone above the off-take is about 12 ft. deep and is contained in the top section which can accommodate stone sufficient for six hours working on full load. The next 20 ft. downwards is the pre-heating zone, below which is the 15-ft. burning zone in which burning is completed. Below this is the 15-ft. cooling zone and at the bottom is the discharge gate (*Fig.* 2). Except for the top section, the steel shaft of the kiln has a refractory lining which varies in construction to suit the temperature in each zone. The diameter inside the lining is 7 ft. 6 in. throughout except in the cooling zone where it is 8 ft. 3 in.

The lining of the pre-heating zone is about 15 in. thick with 9-in. firebrick backed by insulation. In the burning zone 70-per cent. alumina materials are used and the thickness of the working lining is increased to 13½ in., an additional 4½ in. of high-temperature insulation being provided to give an overall thickness of refractory material of about 24 in. In the cooling zone, the thickness of the working lining is 9 in. but the full backing of insulation is provided.

There are five retractable fuel injectors (*Fig.* 7) arranged radially around the shaft at the bottom of the burning zone. Heavy oil is flash vaporised in the carburetting chambers and the gasified oil passes directly into the stone where cracking and gas formation is completed. The oil is fed into a ring-main below the burners at a pressure of about 80 lb. per sq. in. and a temperature of 220 to 230 deg. F.

The quality of the gas is controlled by regulation of the amount of air and re-circulated waste gases admitted. All release of heat takes place inside the kiln. The waste gases are extracted through an off-take, the entrance to which is submerged in the charge at the top of the pre-heating zone. The waste-gas duct is seen on the left of the shaft in *Fig.* 1. To maintain the correct temperature, some of the waste gases are recirculated by being collected above the pre-heating

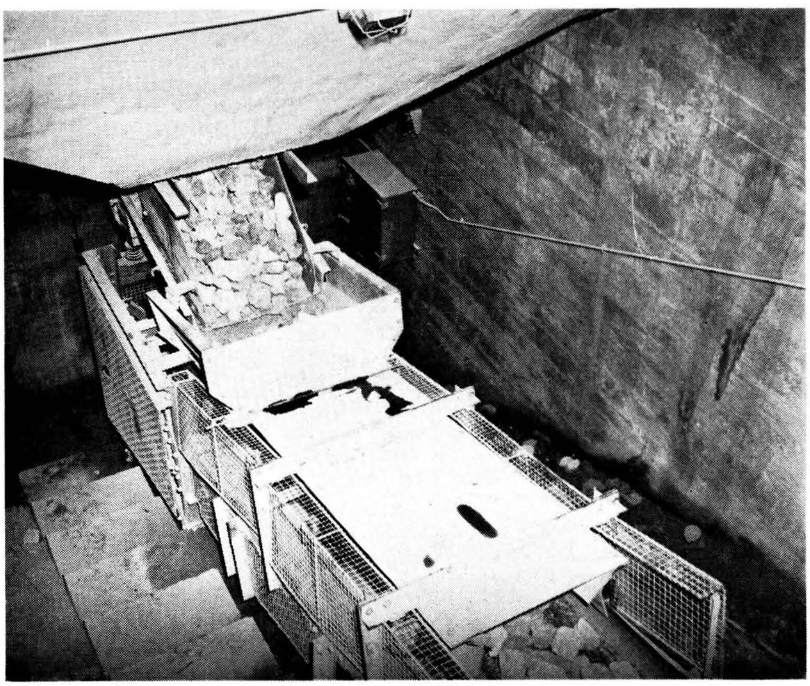


Fig. 5.—Discharging Limestone from Hopper on to Conveyor.

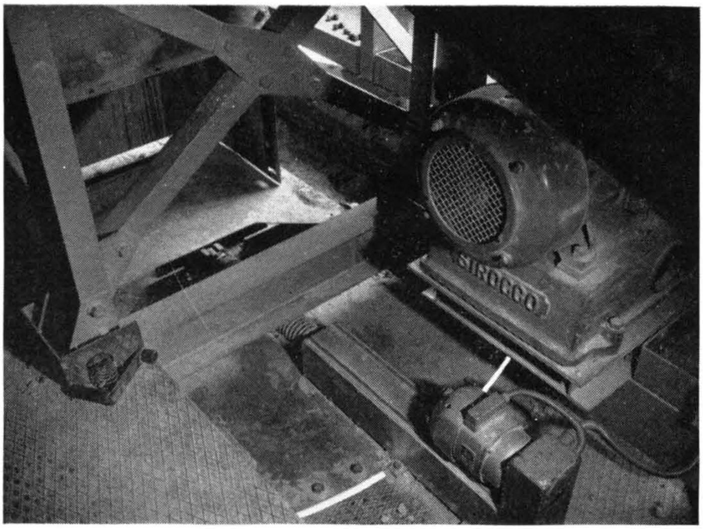


Fig. 6.—Charging Gate.

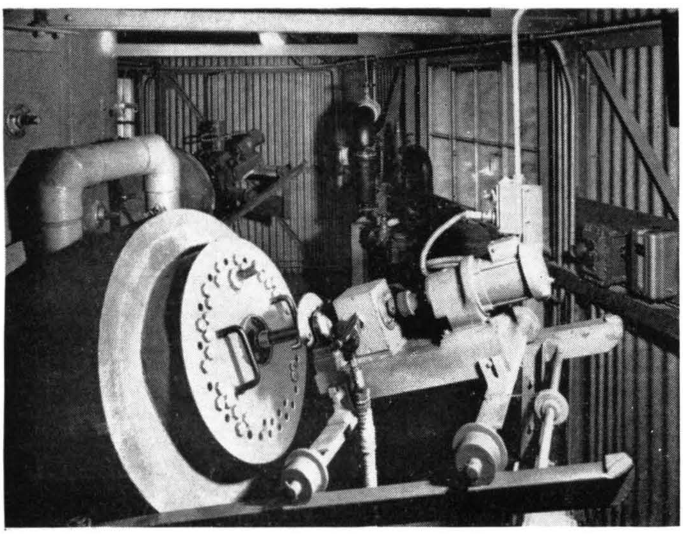


Fig. 7.—A Burner.

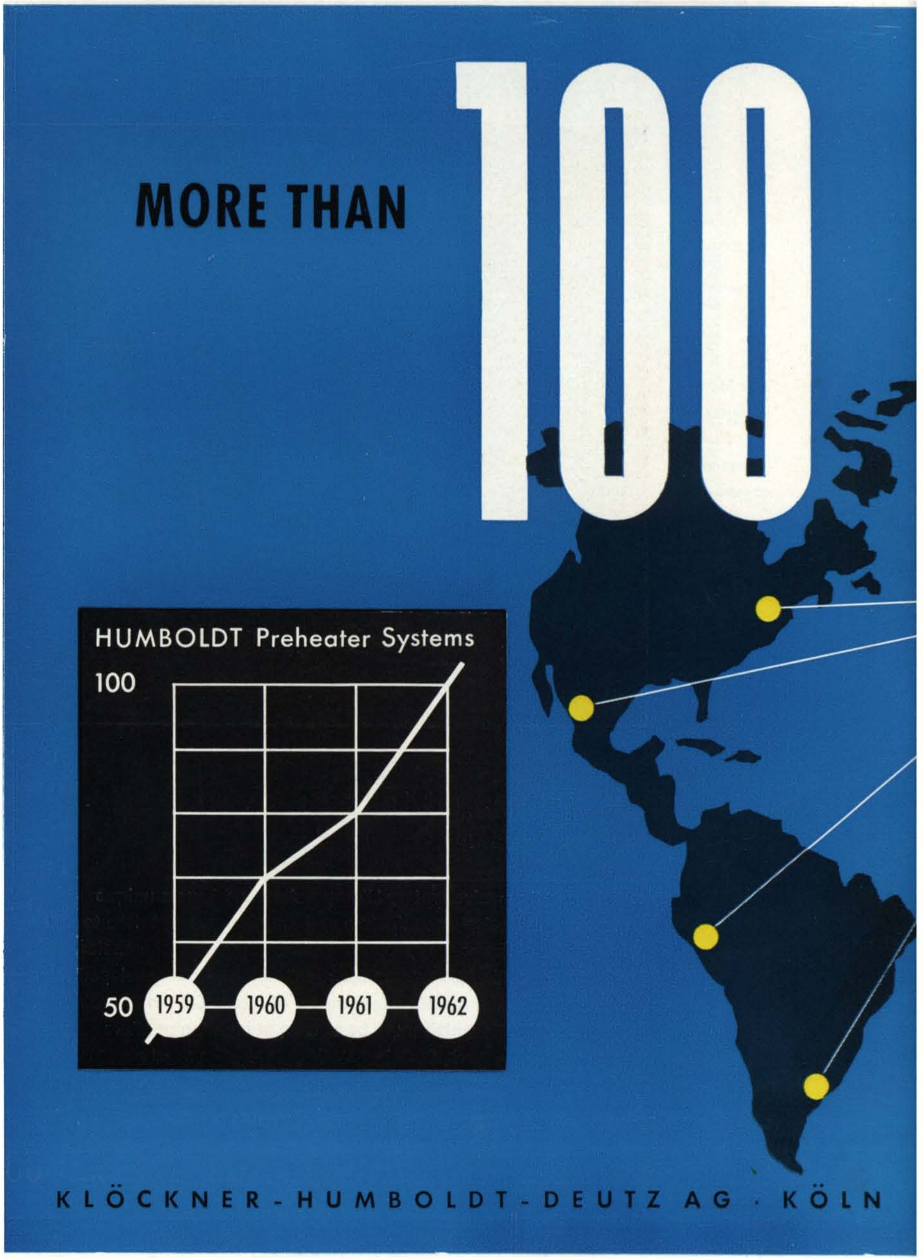
Fig. 8.—View of Kiln showing Raw Material Conveyor Gantry.

zone and carried through the external duct, seen in *Fig.* **8**, to a ring-main and discharged into the kiln at the bottom of the burning zone. This gas, which is inert and is principally nitrogen and CO_2, dilutes the gases in the hot zone of the kiln. The kiln is operated by one man on an enclosed platform (*Fig.* 10) at the level of the injectors. Within the housing around the platform are the oil-heating equipment, oil-pumps, switchgear, instruments, and the controls of the injectors and gas and air intakes. The instruments record, among other data, the pressure and temperature of the oil, the draught suctions, and the temperature of the exhaust gases.

Discharge and Screening.

The fully cooled burnt lime is discharged from the bottom of the kiln through an adjustable gate on to a reciprocating vibrating tray feeding a 24-in. belt-conveyor (*Fig.* 11). Discharge, or " draw," takes place every $1\frac{1}{2}$ hours throughout the day and night. The inclined conveyor ascends from the bottom of the kiln to the screening house (*Fig.* 9) where all material less than $\frac{3}{4}$ in. in size is removed by a Jenkins vibrating screen.

Continued on page 99.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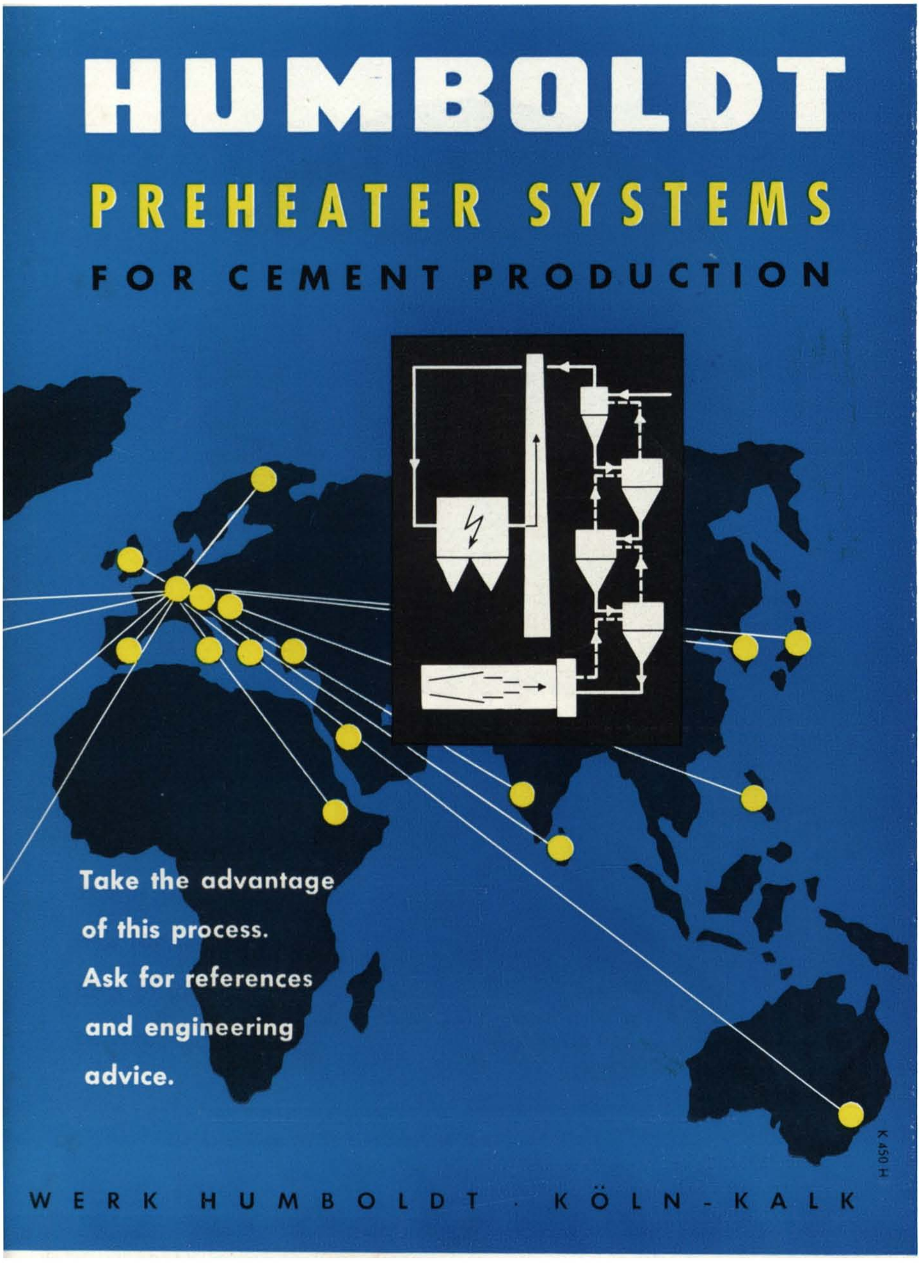
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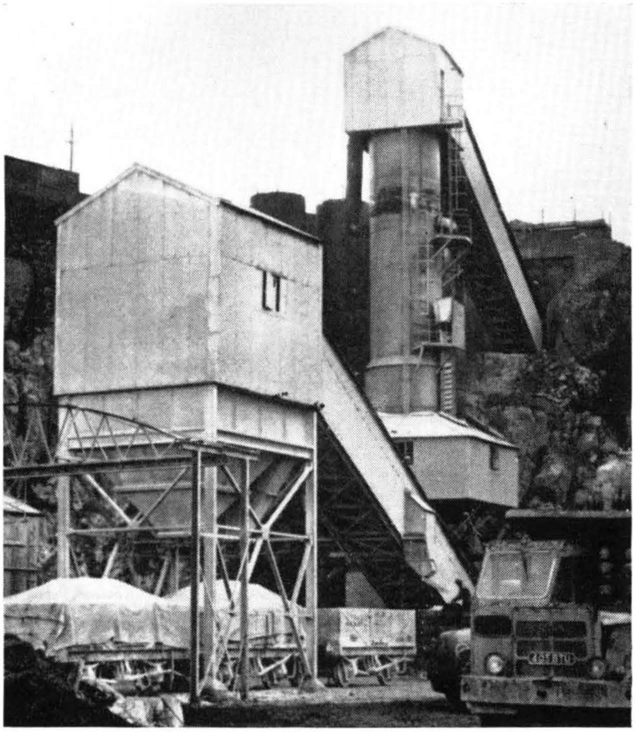


Fig. 9.—View of Kiln showing Screen House and Wagon-loading Hoppers.

The screened material is fed into two steel bins below the screening house and above a rail track on which wagons are loaded directly from the bins (*Fig.* 9).

Performance.

At present, the productive capacity of saleable lime from the kiln is about 330 tons per week. The injectors are designed to operate with the cheaper grades of residual oils (2500 to 3500 sec. Redwood No. 1) having a thermal value of 1·7 to 1·8 therms per gallon. The thermal efficiency is high, with heat inputs of less than 5,000,000 B.t.u. per ton of lime. It is necessary to have two operators on each shift, but two men could easily operate a second kiln. Fuel costs represent 25 to 30 per cent. of the total costs but this would be less if the tax imposed recently on fuel oil was rescinded.

The advantages claimed for oil-fired kilns include: a considerable reduction of the smoke emitted; a product of low sulphur content and free from ash ; low cost of fuel ; and easy handling of fuel. For the Catagas system, it is also claimed that there is direct visual control of burning without elaborate instrumentation, and the ability to burn closely-graded stone down to 3-in. minimum size. Full pro-

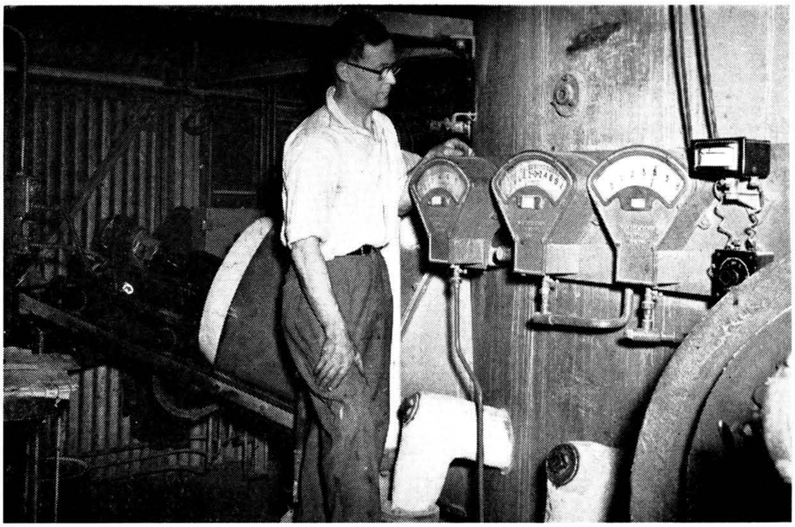


Fig. 10.—Operating Platform.

**Fig. 11.
Discharge from
the Kiln.**

duction is said to be possible within five to six days from starting up from cold, and within twenty-four hours after a temporary shut-down.

Acknowledgements.

The kiln was designed by West's Gas Improvement Co., Ltd., in collaboration with Catagas Ltd., and was erected for Beswick's Lime Works Ltd., which is a subsidiary of the Staveley Group, by West's Works Ltd. Ancillary work, such as the reinforced concrete feed hopper and the foundation, was designed and erected by West's Piling & Construction Co., Ltd. The control gear was supplied by Tully Engineering Co., Ltd., another member of the West's Group of Industries.

Specifications for Portland Cement *(concluded).*

TABLES giving the requirements regarding the strengths of Portland cement in accordance with standard specifications of certain countries were given in this journal for July and September last (*Table* III). Tables for Chemical Composition (*Table* I) and Setting Time and Soundness (*Table* II) were published in this journal for May last. Tables for Fineness (*Table* IV) are given on pages 102 and 103 of the present number. The data is up to date to 1961. The notes in the following apply to *Table* IV (Fineness).

TYPES OF CEMENT.—Abbreviations denote the various types of cement as follows: H.S., high strength; L.H., low heat; S.R.-L.H., moderate sulphate resistant and low heat; S.R., sulphate resistant; R.H., rapid hardening; O., ordinary; A.E., air entrained.

FINENESS.—The standards for the following countries, which are omitted from this table, contain no requirements for fineness; Chile, Finland, France, India, Sweden and Uruguay.

Sieve references given as 900 and 4900 are the numbers of apertures per square centimetre; references given as 170 and 200 are the number of apertures per linear inch.

With this number, the tables giving Standard Specifications for cement throughout the world are complete as regards chemical composition, setting time, soundness, strength and fineness. These tables are reproduced in the current edition of the " Cement Chemists' and Works Managers' Handbook " (published by Concrete Publications Ltd.).

The Cement Industry in Malaya.

The installation mentioned on page 79 of the number of this journal for September last, is a grinding plant only and is located at the Harbour Board, West Wharf, Singapore. The installation includes two 5000-ton clinker silos and a 1000-ton gypsum silo.

TABLE IV.—FINENESS OF PORTLAND CEMENT.

(For Notes see page 101.)

Country	Type of Cement	Sieve Analysis				Specific Surface	
		Sieves	Aperture (mm.)	Diameter of wire (mm.)	Maximum residue (per cent.)	Minimum (sq. cm. per gm.)	Apparatus A = Air permeability T = Turbidimeter
Argentina	O.	900	—	0·15	1	—	—
		4900	—	0·05	15	—	—
	R.H.	4900	—	0·05	10	—	—
Australia	L.H.	—	—	—	—	≮ 2800 ≯ 4200	A.
Belgium	O.	—	0·088	—	18	—	—
	R.H.	—	0·088	—	10	—	—
	H.S.	—	0·088	—	14	—	—
Brazil	O.	—	0·075	—	15	—	—
	R.H.	—	0·075	—	6	1900	T.
Britain	O.	—	—	—	—	2250	A.
	R.H.	—	—	—	—	3250	A.
	L.H.	—	—	—	—	3200	A.
Bulgaria	All types	900	0·200	—	2	—	—
		4900	0·088	—	25	—	—
Canada	O. and S.R.	200	0·074	—	18	—	—
China	All types	4900	—	—	15	—	—
Cuba	O., S.R./L.H., L.H. and S.R.	200	—	—	18	2600 individual, 2800 average	A.
Czechoslovakia	All types	900	0·200	—	1·5	—	—
		4900	0·090	—	15	—	—
Denmark	All types	900	0·200	—	1·5	—	—
		4900	0·086	—	10	—	—
Eire	O.	170	0·089	—	10	—	—
	R.H.	170	0·089	—	5	—	—
Germany (East)	O.	4900	0·090	—	15	2500	A.
	R.H.	4900	0·090	—	15	3000	A.
Germany (West)	All types	4900	0·090	—	20	—	—
Greece	All types	4900	—	—	20	—	—
Hungary	All types	900	—	—	2	—	—
		4900	—	—	20	—	—
India	O.	IS No. 9	—	—	10	2250	A.
	R.H.	IS No. 9	—	—	5	3250	A.
	L.H.	—	—	—	—	3200	A.
Israel	O.	170	0·089	—	10	—	—
	R.H.	170	0·089	—	5	—	—
Italy	All types	900	0·200	—	2	—	—
Japan	O.	—	0·088	—	10	2300	A.
	R.H	—	0·088	—	10	3000	A.
	L.H.	—	0·088	—	10	2700	A.

Mexico	O.	—	—	—	—	1500 2600	T. A.
	S.R./L.H.	—	—	—	—	1600 2800	T. A.
	L.H.	—	—	—	—	1700 3000	T. A.
	S.R.	—	—	—	—	1700 3000	T. A.
Netherlands	O.	N480-d-0·09	0·090	—	15	—	—
	R.H.1	N480-d-0·09	0·090	—	10	—	—
	R.H.2	N480-d-0·09	0·090	—	5	—	—
Norway	All types	4900	0·090	—	10	—	—
Poland	O.1	—	0·080	—	20	—	—
		—	0·200	—	2	—	—
	O.2	—	0·080	—	15	—	—
		—	0·200	—	1·5	—	—
	H.S.	—	0·080	—	10	—	—
		—	0·200	—	1	—	—
Portugal	O.	4900	—	—	10	1500*	T.
Roumania	O.1, O.2, and H.S.	4900	—	—	15	—	—
	E.B.	4900	—	—	9	2250	A.
South Africa	O.	B.S.72	—	—	1·2	2250	A.
	R.H.	B.S.72	—	—	0·5	3250	A.
Spain	O.1	4900	—	≮ 0·045 ≯ 0·065	16	—	—
	O.2 and S.R.	4900	—	≮ 0·045 ≯ 0·065	14	—	—
	R.H.	4900	—	≮ 0·045 ≯ 0·065	6	—	—
Switzerland	O.	—	—	—	—	2400	A.
	R.H.	—	—	—	—	3500	A.
Taiwan	O.	—	—	—	—	2600 individual 2800 average	A.
	S.R./L.H.	—	—	—	—	2800 individual 3000 average	A.
Turkey	O.	900	0·200	—	1	—	—
	R.H.	4900	0·090	—	14	—	—
U.S.A.	O., S.R./L.H. L.H., S.R. O.(A.E.), S.R./L.H.(A.E.)	—	—	—	—	1500 individual 1600 average 2600 individual 2800 average	T. A.
U.S.S.R.	All types	No. 90	—	—	15	—	—
Venezuela	All types	200	—	—	20	—	—
Yugoslavia	O.1	—	0·090	—	15	2400	A.
	O.2	—	0·090	—	15	2400	A.
	O.3	—	0·090	—	15	—	—
	R.H.	—	0·090	—	15	3500	A.

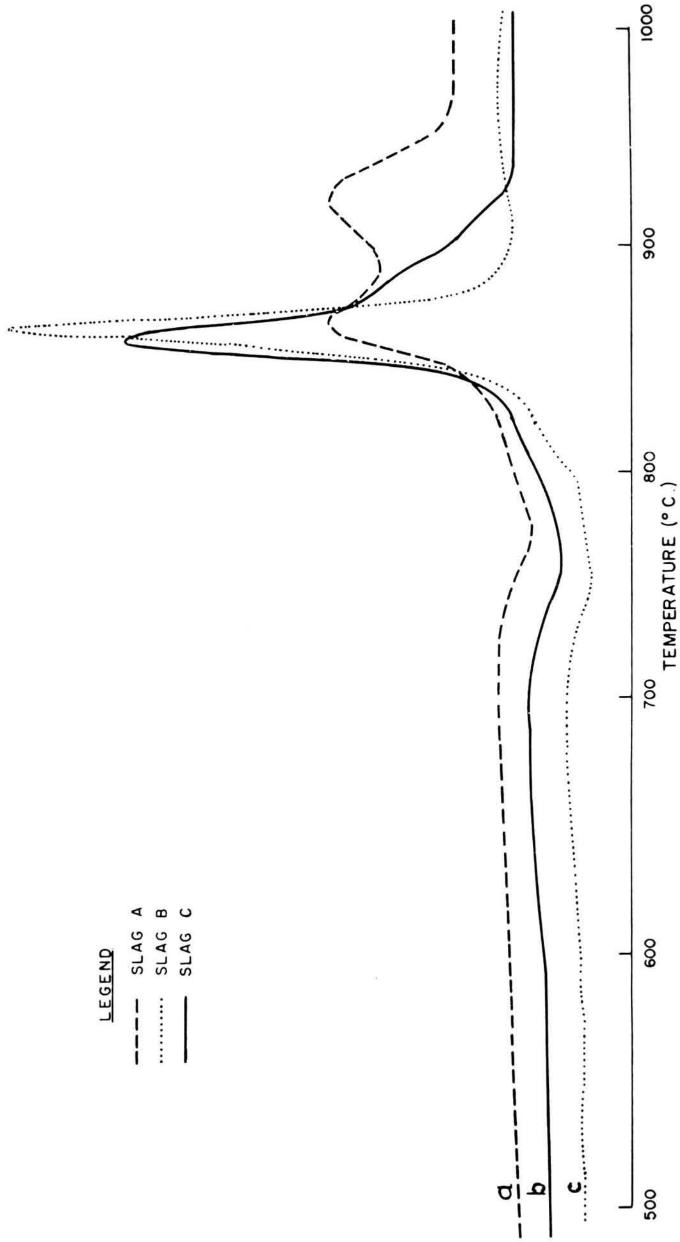


Fig. 1.—D.T.A. Curves of Three South African Blastfurnace Slags.

(See facing page.)

The Use of D.T.A. for Estimating the Slag Content of Mixtures of Unhydrated Portland Cement and Ground Granulated Blastfurnace Slag.

By J. E. KRÜGER*.

Differential thermal analysis curves of typical South African granulated blastfurnace slags characteristically show irreversible exothermal peaks at about 860 deg. C., due mainly to devitrification of the slag. With a view to using the area under the devitrification peak for estimating the slag content of mixtures, the relationship between peak-area and slag content was investigated in mixtures containing these slags and Portland cement, for example, Portland blastfurnace cements.

Three granulated blastfurnace slags A, B and C were milled to finenesses corresponding to 4250, 4200 and 4100 sq. cm. per gramme respectively. Weighed samples of each of these slags, unhydrated Portland cement and mixtures of each slag and Portland cement containing 10 to 90 per cent. of slag by weight (in ten per cent. increments), were subjected to differential thermal analyses. The multi-hole nickel sample holder, described by Webb[1], was used with calcined α-alumina as reference material. The thermograms (a), (b) and (c) obtained for the undiluted slags are presented in *Fig.* 1.

The areas under the peaks were used as criteria for estimating the slag contents of the mixtures. As an example, the delineation of the area for the undiluted slag A is shown in *Fig.* 2. The area was arbitrarily delineated by extending the linear part of the record LM (base line) before the peak until it cut the curve at P_1. A line parallel to the direction of the travel of the chart (that is parallel to the temperature-axis) is extended from P_1 until it cuts the line CD at P_2; CD is drawn at 45 deg. to the direction of the chart-travel touching the thermogram at P_3. Similar delineations were employed for all other thermograms under consideration.

The results showing the peak-areas as functions of the weight of slag in the mixture are presented graphically in *Fig.* 3. for the three slags. Linear regression lines were calculated[2] using the d.t.a. data. *Table I* reflects some of the parameters calculated from these data, which give an indication of the correlation between the area under the devitrification peak and the slag content of the mixture, and also an indication of the accuracy of the method.

From the results it appears that there is a linear relationship between the peak-area and the weight of the slag in each mixture. On the basis of *Table I* and the results in *Fig.* 3, it is concluded that, for a peak-area of 10 sq. cm., the slag content of mixtures can be calculated (as in the example below) from *Fig.* 3, at the 95 per cent. confidence level, to within $\pm$ 5·5, $\pm$ 8·4 and $\pm$ 6·1 per cent. of the total weight of the mixtures for slag A, slag B and slag C respectively. Combining the results for the three slags, it can be seen that, for an area of 10 sq.

(*Continued on page 168*)

*Materials Division, National Building Research Institute, South African Council for Scientific and Industrial Research, Pretoria.

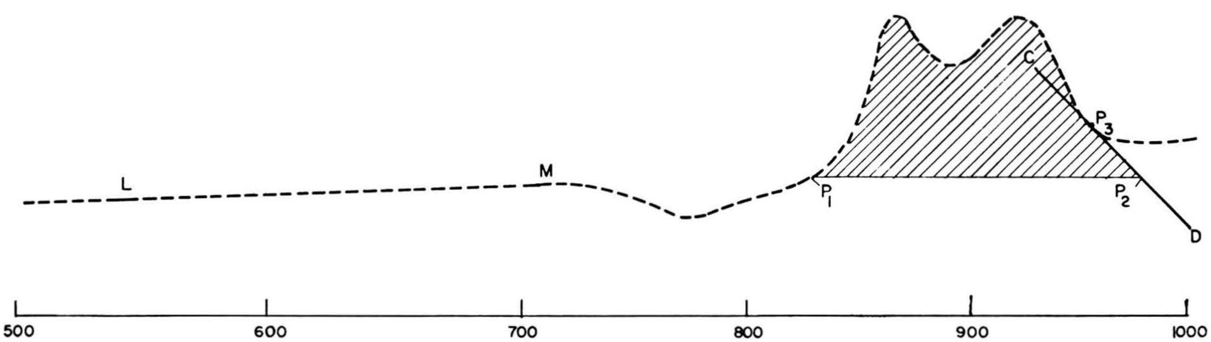


Fig. 2.—Method of Delineation of the Area under the Devitrification Peak of Blastfurnace Slag A.

TABLE I.—LEAST SQUARES STRAIGHT LINES, CORRELATION COEFFICIENTS AND CONFIDENCE LIMITS.

Slag	Least Squares Straight Line. A = peak-area. W = weight of slag in mixture	Correlation coefficient r	95 per cent. Confidence Limits of W (at A = 10) expressed as a percentage of the total weight of the mixture
A	$A = 3{\cdot}41\ W - 0{\cdot}06$	0·9959	±5·5
B	$A = 2{\cdot}88\ W - 0{\cdot}11$	0·9914	±8·4
C	$A = 3{\cdot}15\ W - 0{\cdot}05$	0·9954	±6·1
Combination of the results obtained for the three slags ..	$A = 3{\cdot}081\ W + 0{\cdot}02$	0·9845	±10·3

(*See page 105.*)

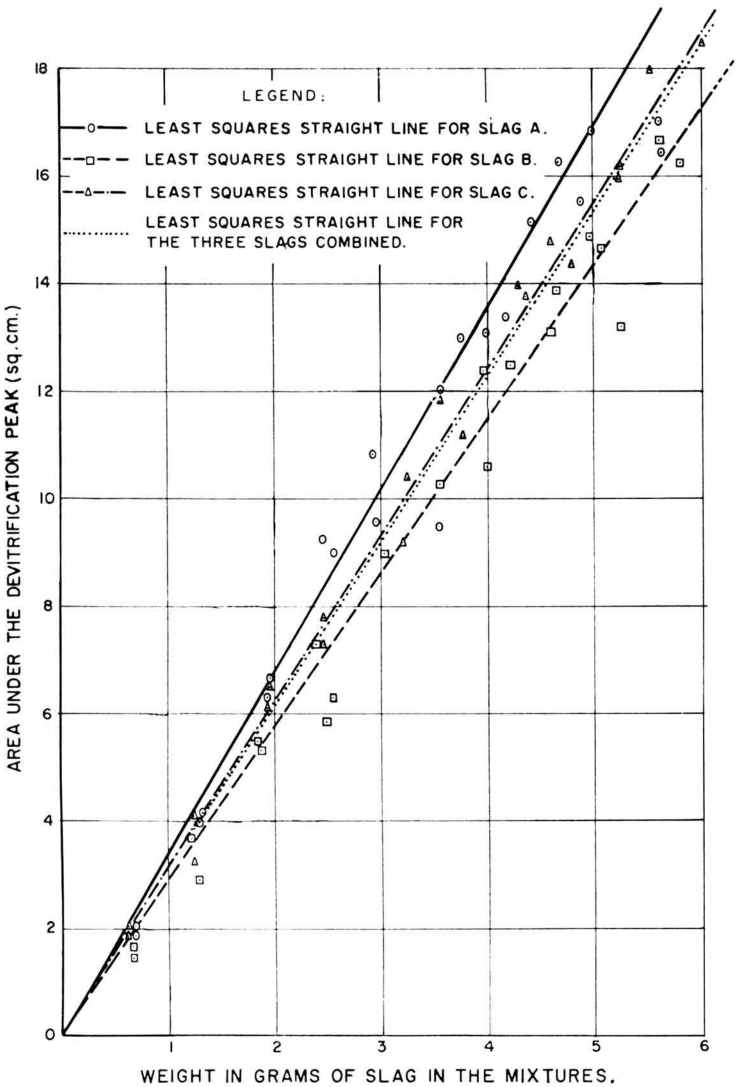


Fig. 3.—Relation between Devitrification Peak-area and the Slag Content of Unhydrated Portland Cement — Granulated Blastfurnace Slag Mixtures. (*See page 105.*)

cm., the slag content of mixtures can be calculated, at the 95 per cent. confidence level, to within 10·3 per cent. of the total weight of the mixture.

EXAMPLE.—Known weight of mixture containing slag A $= W_1$ g.
Peak-area from d.t.a. curve = 10 sq. cm.
Therefore the weight of slag read off *Fig.* 3 = 2·95 g.
Therefore the percentage of slag in mixture $= \left(\frac{2{\cdot}95 \times 100}{W_1}\right) \pm 5{\cdot}5$

The bulk density of the Portland cement-slag mixtures analysed increased from approximately 1·4 to 1·6 g. per ml. for decreasing slag contents, but did not seem to affect the linear relationship of area to slag content significantly.

Low areas obtained for the undiluted slag A are attributed to the shrinkage which occurred when the undiluted slag was heated during the d.t.a. In view of this, the results obtained for the undiluted slag A were not used in the present calculations.

From statistical considerations, it should be possible to improve the accuracy of the d.t.a. method for estimating the slag content of unhydrated Portland cement-blastfurnace slag mixtures by

(a) Increasing the number of determinations.

(b) Selecting values of slag weight for which the area values are near the mean area of the regression line which will be used in the estimation; in the case of mixtures having a high slag content this could be achieved by dilution with a known weight of unhydrated Portland cement.

(c) Increasing the slope of the regression line; this could be achieved by amplifying the output from the differential thermocouples, provided that the variation in peak area for a given weight of slag is not increased by the same magnitude as the amplification factor.

Further work on this technique is in progress.

REFERENCES

1.—" Contributions to the technique and apparatus for qualitative and quantitative differential thermal analysis with particular reference to carbonates and hydroxides of calcium and magnesium " By T. L. Webb, D.Sc.Thesis, University of Pretoria, Pretoria, 1958.

2.—" Statistical Theory and Methodology in Science and Engineering." By K. W. Brownlee. (John Wiley, 1960) Paragraph 11.5, pages 284-288.

A New Cement Works in Saudi Arabia.

THE description of the new cement works in the Province of El Hasa for the Saudi Cement Co., which was given in the number of this journal for September 1962, was based on information supplied by Henry Pooley (Consulting Engineers), who also supplied the photographs and a plan of the works from which the diagram in *Fig.* 3 (page 74) was produced.

Developments in Cement in Russia.

VARIOUS aspects of the development of new cements and of the cement industry in general in the U.S.S.R. are described in the following.

New High-alumina Cements.

Recent investigations at the cement research institute Niitsement have led to the development of new types of high-alumina cement, namely, A, an iron-alumina cement, and B and C two mixed-slag cements. The compressive and tensile strengths of these new cements, when ground to a specific surface of about 3000 sq. cm. per gramme (Blaine) are given in *Table* I.

Cement A is made by melting in a converter, similar to a Bessemer converter used in the steel industry, a mixture of bauxite and limestone. The charge is melted under oxidizing conditions and hence the finished clinker contains no sulphur because all the sulphur present in the raw materials is burnt away during the melting of the charge. The chemical composition of the clinker is as follows: SiO_2, 4 to 6 per cent.; Al_2O_3, 39 to 43 per cent.; (Fe_2O_3 + FeO), 16·5 to 18 per cent; CaO, 31 to 33 per cent.; and TiO_2, 2 per cent.

In order to extend the range of raw materials used in the manufacture of the

TABLE I. STRENGTHS OF NEW HIGH-ALUMINA CEMENTS.

NOTE.—Strengths are in kilogrammes per square centimetre and are of 1:3 mortar specimens.

Type of Cement	Compressive Strength Age in days			Tensile Strength Age in days		
	1	3	28	1	3	28
Iron-alumina Cement (A)	628	660	750	26·5	27·3	27·9
	560	615	760	24·5	27·3	30·5
	610	630	610	32·5	31·4	29·6
	510	520	590	24·6	26·2	29·1
	416	460	550	25·1	21·9	28·1
	590	600	640	22·8	21·3	24·8
Mixed-slag Cement (B)	488	621	649	25·2	27·3	31·9
	561	602	654	25·0	28·7	31·0
	526	689	654	29·3	35·2	35·2
	527	536	658	26·0	33·2	34·9
	593	593	677	27·5	28·0	32·3
	555	602	733	31·0	31·4	38·2
	601	687	677	33·6	37·0	38·5
	573	557	705	30·5	30·5	38·9
	564	630	620	30·5	30·5	37·8
	677	687	697	31·0	32·5	46·1
Mixed-slag Cement (C)	527	658	652	31·7	34·5	41·5
	526	689	700	32·7	31·0	51·8
	498	642	686	29·7	33·9	45·3
	696	648	696	40·9	37·5	44·1
	610	586	705	37·5	34·9	36·2
	595	583	649	42·5	37·0	45·2
	545	614	608	29·0	31·2	32·5
	608	630	573	32·7	36·7	39·4
	555	608	638	40·8	45·5	44·4

mixed-slag cements, tests were made on raw mixtures consisting of lime-alumina blastfurnace slag enriched with bauxite for cement B, and blastfurnace slag mixed with a lime-alumina slag containing titanium for cement C. For cement B, the slag used contained about 40 per cent. of Al_2O_3 and 50 to 55 per cent. of CaO, and gave a clinker with the following composition: SiO_2, 5 to 7 per cent.; Al_2O_3, 39 to 42 per cent.; Fe_2O_3 + FeO, 8 to 10 per cent.; CaO, 38 to 41 per cent.; and TiO_2, 3·5 to 4·5 per cent.

The cement C had a clinker having the following chemical composition: SiO_2, 2·5 to 4 per cent.; Al_2O_3, 40 to 45 per cent.; Fe_2O_3 + FeO, 2 to 4 per cent.; CaO, 38 to 40 per cent.; and TiO_2, 5 to 8 per cent. The tensile strength of this cement is unusually high and the rate of the development of compressive strength at early ages is also very good. In addition, the cement contains no sulphur and has a low ferric-oxide content. It is claimed that this type of high-alumina cement is particularly good for refractory concrete.

Super-high-strength Portland Cement.

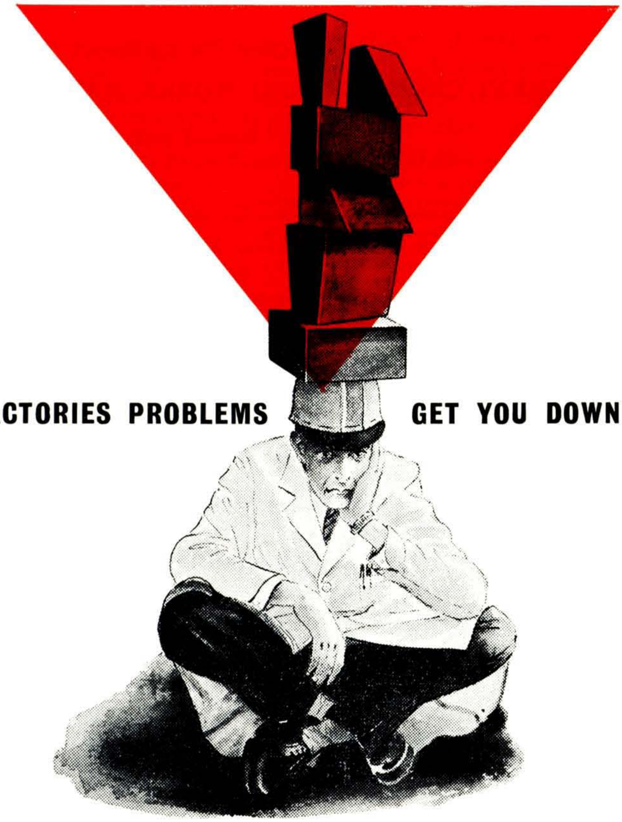
After a series of laboratory and semi-production tests, manufacture was started recently at several Russian cement works of a super-high-strength Portland cement capable of developing a compressive strength of 704 to 159 kg. per sq. cm. (10,015 to 10,810 lb. per sq. in.) at twenty-eight days. The clinker has a tricalcium-silicate content of 62 to 65 per cent., and is ground in a two-stage air-separation mill to a specific surface (Blaine) of 4500 to 5200 sq. cm. per gramme. In 1961, 20,000 tons of this cement were produced for use at precast concrete works in the U.S.S.R. It is stated that the cement is extremely sensitive to moisture absorption and can be stored only for periods not exceeding three months.

The Cement Industry.

In view of the number of authorities concerned with the Russian cement industry there should be no slackening of development. In a recent issue of the Byull. Stroit. Tekniki (No. 5, 1961) some of the measures proposed are described.

The principal bodies appear to be the Central Commission of the C.P.S.U. and the Council of Ministers of the U.S.S.R., who issued recently a document entitled "Measures for Accelerating the Development of the Cement Industry during 1961-1965." Several other authorities are mentioned some of which are criticised for not paying sufficient attention to the problems of the cement industry. It is stated that the production of cement has increased considerably in recent years, production in 1961 being 150 per cent. greater than in 1958. The quality of the product has also improved. Production is still, however, insufficient to meet the growing demand. The capacity of works starting up in 1961-1965 is to be 49,391,000 tons and the total capacity by the end of 1965 should be 84,600,000 tons, which is in excess of the amount planned earlier for this period. Factories at Stavropol, Krasnoyarsk and Bryansk, making plant for cement works, have been instructed to manufacture integrated production lines for cement works. Out-of-date machinery is to be replaced.

The following matters are considered in preparing standard plans for cement



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works. 1.—The use of new high-output equipment, of integrated mechanisation and automation to ensure higher output per worker. 2.—High speed industrial methods of building utilising large prefabricated units. 3.—The installation of rotary kilns, electrostatic-filters and up-to-date plant generally. Slurry pits should preferably be outside the works. 4.—Reduced amount of additives to improve the properties of Portland and other cements.

In collaboration with the Ministry of Geology and Conservation of Mineral Resources, extensive geological surveys are to be undertaken to discover suitable raw materials for cement, especially in the eastern parts of the country, in order to provide new supplies of raw materials for the existing and new works which would otherwise have to use imported and processed materials. In this connection, the output of true Portland cement is to be increased, but that of special types of Portland cement is to be reduced to about half the corresponding output in 1958. The production of true Portland cement is to be raised to 55,000,000 tons by 1965.

The Academy of Building and Architecture is to carry out development work on the production of coloured cements, but using ordinary raw materials. Other developments include the revision of standards for cement analysis, working conditions in cement works, and designs of machinery and equipment. Also included is the development of the autoclave method of cement production base on nephelite slurry, the increased production of binders without cement, new types of equipment for automated and mechanised working, and new plant for clinker burning and cement grinding. Special firms for reconditioning and modernising cement works are to be established. Programmes for new and modernised works are to be strictly observed, especially as concerns the issue of working drawings and complete specifications. Basic information and alternative schemes are to be prepared to assess the productive capacity.

International Standardisation of Cement and Lime.

A Technical Committee formed in 1950 by the International Standards Organization (ISO/TC 74) is preparing world standards for cement, gypsum plasters, and lime. Some of this work, including international recommendations for terminology and definitions, methods of strength tests and chemical analysis of cement, is nearly complete and further progress was made when delegates from twenty countries attended a five-day conference at the British Standards Institution in London, in September last.

It is reported that up to ten years ago, most international trade in cementious materials for building and engineering was between Continental countries, but the position is now changed; Britain's trade in these materials is increasing and, it is stated, is likely to do so even more rapidly if she joins the European Common Market. It is therefore of considerable importance that specifications should be standardised.

The Cement Industry in Europe.

Production and Trade in 1961.

As in previous years, the annual report for 1961, published by the Organization for Economic Co-operation and Development, entitled "The Cement Industry in Europe," contains some interesting statistics, which relate only to the eighteen European countries (or groups of countries) which are members of the O.E.C.D. All quantities are expressed in metric tonnes.

The total production in 1961 was 105,600,000 tonnes which is about 31 per cent. of the world production and an increase of 9·2 per cent. compared with 1960. The increase occurred in all countries except Turkey and Ireland, the greatest increase being in Switzerland where production rose by 20·4 per cent. The increase in the United Kingdom was 6·7 per cent., and this country was fourth in descending order of production, production in Germany being by far the greatest of all European countries since it represents 25·3 per cent. of the total.

The productive capacity was 118,400,000 tonnes (14,700,000 in the U.K.) at the end of 1961, an increase of 8,600,000 tonnes (300,000 in the U.K.). Four new works account for 350,000 tonnes, forty-nine new kilns in existing works account for 7,900,000 tonnes, and improvements in other plant (after allowing for kilns disused). The new works opened in 1961 were one each in Austria, Spain, Italy, and Turkey. The greatest number (eighteen) of new kilns was installed in Germany. Four new kilns were installed in the United Kingdom giving 700,000 tonnes additional productive capacity.

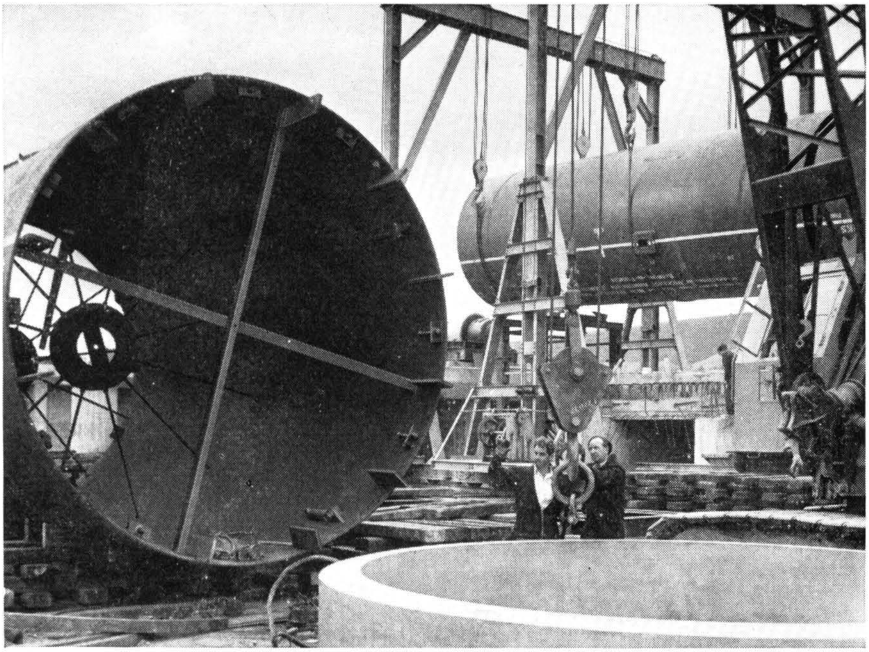
The average number of employees remained stable, there being 109,500 (17,800 in U.K.), but the decrease in the number of operatives is off-set by the increase in the clerical and executive staff.

There was a small continued fall in exports which totalled 4,382,600 tonnes (741,500 from U.K.), a decrease of 461,000 tonnes (330,700 for U.K.). The exports from Norway and Spain were about double that of the previous year, but in all other countries there was a fall, the greatest being that from the United Kingdom.

Imports of cement, solely from European countries, increased by 14·2 per cent. to 2,189,000 tonnes (218,600 into U.K.). About 820,000 tonnes of clinker were traded between European countries, 205,000 tonnes were exported outside Europe and 86,000 tonnes were imported from outside Europe. Imports of clinker into the United Kingdom amounted to 421,000 tonnes, of which 177,000 tonnes were from Ireland and 91,000 from Benelux countries.

Consumption of cement increased by 10·8 per cent. to 103,400,000 tonnes (13,877,000 tonnes in U.K.), the principal increases occurring in Germany and Italy; declines occurred only in Iceland and Norway. The increase in the United Kingdom was 1,331,000 tonnes. In general there was no marked change in price

(Concluded on page xxiv.)



except in Turkey and Italy, where the price fell, and in Denmark and the United Kingdom where there were small increases.

Proposals for 1962 and 1963.

The report gives the following data relating to new installations proposed for 1962 and 1963 during which years the productive capacity of the European O.E.C.D. countries is expected to increase by 18,000,000 tonnes.

New works (capacities in tonnes per annum in brackets) are to be opened in Italy (950,000), United Kingdom (600,000), Spain (460,000), Turkey (385,000), France (250,000), Greece (200,000), and Switzerland (120,000). These works will contain at least sixteen rotary kilns and three vertical kilns. In existing works, at least sixty-four new rotary kilns (including replacing twelve old kllns) and ten vertical kilns. The capacities (in tonnes per annum) of these additions to existing works are as follows: Italy (4,800,000), United Kingdom (1,000,000), France (500,000 in 1962 only), Portugal (410,000), Austria (350,000), Spain (285,000), Switzerland (280,000 in 1962 only), Turkey (180,000) and Denmark (100,000). The total increase of productive capacity of new and existing works in Germany is expected to be 3,000,000 tonnes.

O.E.C.D. Committees for Cement.

O.E.C.D. is to set up Special Committees for each of the main sectors of energy and industry; one of the committees will be for the cement industry. The object of the committees is to establish contact between government delegates and non-governmental circles represented by trade associations and trade union organisations. The main work of the committees will be to study specific problems through international co-operation.

CEMENT AND LIME MANUFACTURE

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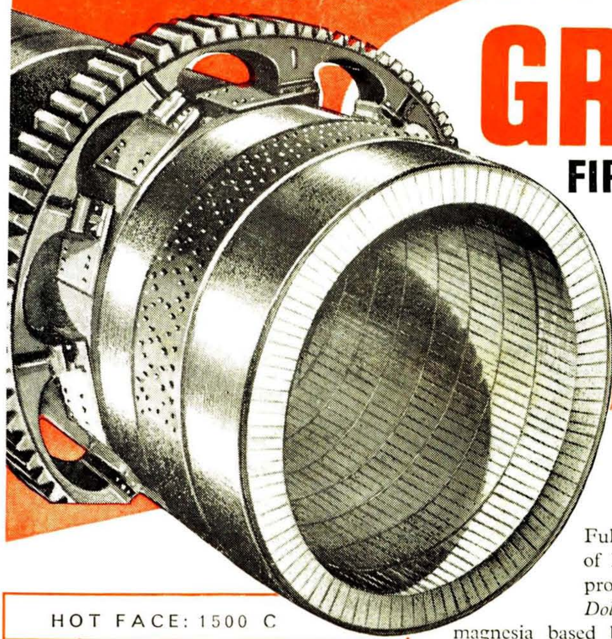

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7″	355	255	380	280
9″	330	230	375	275

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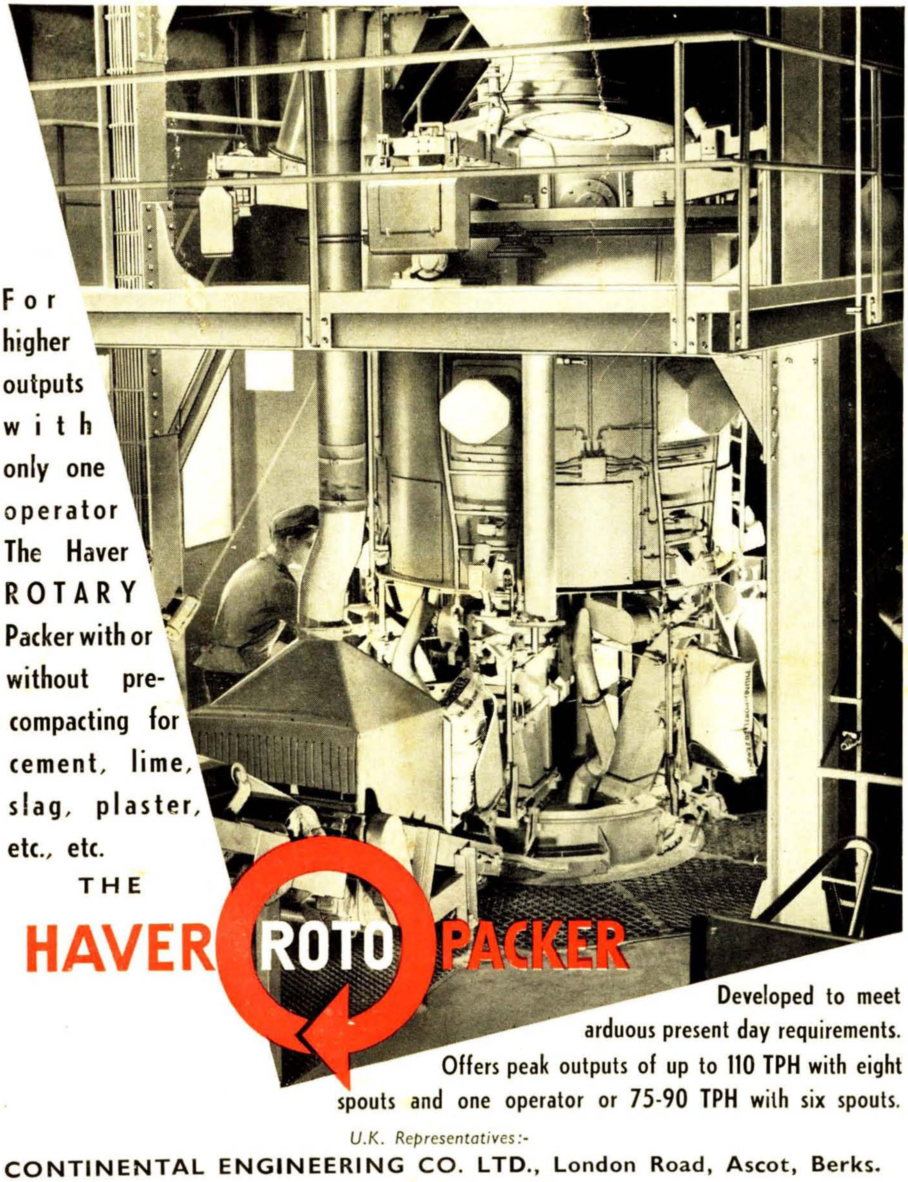

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