

Table 16

Induction Costs of Primary Products Divided among the Distilling Steps of the Synthesis

	Water-gas Production		Preparation of Synthetic Gas		Oxygenation		Fining and CO <sub>2</sub> Under Pressure		Synthesis		Distillation of Gas	
	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951	1952
Wages, etc. in units	2,751.74	256.57	528.30	285.57					1,515.58			
Actual charges connected with salaries	149.4	15.4	36.4	15.4					87.4			
Water-gas production	13,745.75	4,633.66	50,402	4,551.44			1,152,408		5,795.44		1,504.4	
Actual charges connected with wages	1,170.15	358.4	40,000	130.4			87.4		490.4		109.4	
Total	17,755.54	3,532.63	1,274.67	1,953.04			1,159.05		7,511.92		1,613.44	
Pre-oxidation gas		110.20		1,701.35							121.60	
Residual gas		3,520.30		7,997.18							476.80	
Total		5,290.50		9,698.53							598.40	
Power	8,123.6		20,508.4	41,585.4					5,110.4		7,214.10	
Electricity	11,481.06	4,349.4	548.4	2,805.4			10,740.4		32.4		263.4	
Compressed air	2,152.11		860.4	1,279.25			257.65		511.37		61.75	
Total, Power & Water	95,905.17	4,345.4	12,150.4	45,633.25			40,997.65		4,113.90		2,116.05	
Maintenance and Repairs	32,100.4	4,100.4	7,000.4	7,807.4			500.4		6,000.4		500.4	
Working Materials									11,100.4			
Carbide		17,000.4										
Active Carbon												
Gas Purification Material												
Alloy												
Residuals	210.4	200.30	2.70	101.10					150.10			
Loss Materials	4,731.09	913.77	25.4	803.06			31.95		846.57		154.38	
Other	27.4		30,000.4	1.4			3.4		240.03		1.4	
Total	5,976.56	17,607.52	10,000.40	597.74			34.94		82,553.42		930.78	
Other Working Costs												
Transport	2,102.4	303.4										
Insurance Costs	5,100.4	1,811.4	172.4	708.4			532.4		1,315.4		177.4	
Total	5,202.4	1,681.4	172.4	708.4			532.4		1,503.4		177.4	
Total Working Costs	164,010.05	23,200.50	21,263.31	62,280.23			11,205.00		100,557.50		4,216.17	
Total Working Costs per Tonne Synthetic	30.57	3.11	6.11	15.10			3.11		24.07		1.16	

Table 36.

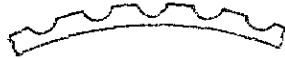
3. Divided among the Individual Steps of the Synthesis. Hoesch-Benzin, January 1942.

Washing out CO <sub>2</sub> under pressure	Synthesis	Distillation of Wax	Condensation under pressure	Separation plant	Active Carbon Plant and Residual Gas Holder	General Cracking	Stabilization	General Despatch etc.	
RM	RM	RM	RM	RM	RM	RM	RM	RM	
	1,543.52 80.-		665.75 34.-	896.77 46.-	742.01 38.-		471.18 24.-	832.62 43.-	382.02 20.-
1,052.08 87.-	5,798.40 490.-	1,301.44 109.-	1,640.25 138.-	1,613.80 136.-	758.01 64.-	210.- 16.-	Credit 13.11	1,422.06 119.-	3,720.15 307.-
1,139.08	7,911.92	1,410.44	2,478.-	2,692.89	1,602.02	226.-	482.07	2,416.68	4,436.17
		121.60 476.90							
		598.50							
10,740.- 257.65	3,210.- 132.- 321.39 750.51	1,210.10 263.- 640.75	520.- 2,428.55	5,615.- 137.- 576.90	8,915.- 6,511.- 2,000.43		192.83	1,960.- 2,933.0 98.02	564.- 220.-
10,997.65	4,413.90	2,113.85	2,948.55	6,328.90	17,426.43		192.83	4,991.02	784.-
600.-	6,400.-	500.-	3,700.-	1,600.-	2,000.-	500.-	2,600.-	500.-	1,362.-
	81,180.-		4,451.10	672.25	6,409.-				
31.96 3.-	332.10 806.57 218.05	131.38 1.-	77.40 1,041.17 1.-	70.97 63.54	108.71	120.70 43.25 28.- Credit 11.06	10.26	34.10 620.15	
34.96	82,536.72	132.38	5,570.67	806.76	6,517.71	191.95	-0.80	654.25	
532.-	1,595.-	177.-	163.- 2,304.-	886.-	886.-			354.-	1,052.74 387.19
532.-	1,595.-	177.-	2,567.-	836.-	886.-			354.-	1,439.93
13,303.69	102,857.54	4,932.17	17,264.22	2,314.55	28,432.16	917.95	3,274.10	8,915.95	8,022.10
3.11	24.07	1.16	4.04	2.88	6.65	0.21	0.77	2.09	1.88

- (13) BIOS/DOCS/2505/1160/13 Process costs for January 1942 (Dortmunder Paraffinwerke).
- (14) BIOS/DOCS/2505/1160/14 Flow sheet for plant of Dortmunder Paraffinwerke.
- (15) BIOS/DOCS/2505/1160/15 Yields and costs for 1943 and 1944 relating to manufacture of fatty acids (Deutsche Fettsäurewerke, Witten).
- (16) BIOS/DOCS/2505/1160/16 Report on tests of suitability of edible fat (Deutsche Fettsäurewerke, Witten).

(17) BIOS/DOCS/2505/1160/17 Report on tests of suitability of edible fat (Deutsche Fettsäurewerke, Witten).

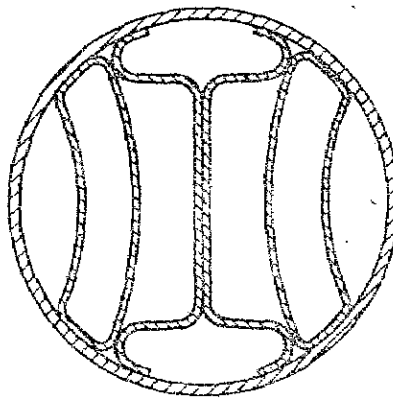
\* These documents can be consulted at the Technical Information and Documents Unit, Board of Trade, 40 Cadogan Square, London S.W.1



(a) PART OF FORMER FOR SCHIFFCHEN CATALYST



(b) FINISHED GRANULE OF SCHIFFCHEN CATALYST



(c) KRUPP WIDE TUBE

FIG. 1

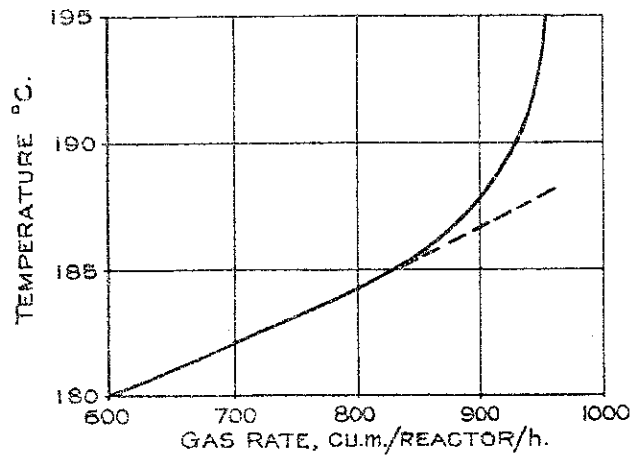


FIG. 2

THE TEMPERATURE-GAS RATE RELATIONSHIP  
USED BY ESSENER STEINKOHL

— ATMOSPHERIC PRESSURE WITH STAGE II SYNTHESIS GAS, WITH 55-60% CO+H<sub>2</sub> AND H<sub>2</sub>/CO=2

- - - MEDIUM PRESSURE WITH STAGE III SYNTHESIS GAS, WITH 47-50% CO+H<sub>2</sub> AND H<sub>2</sub>/CO=1.5

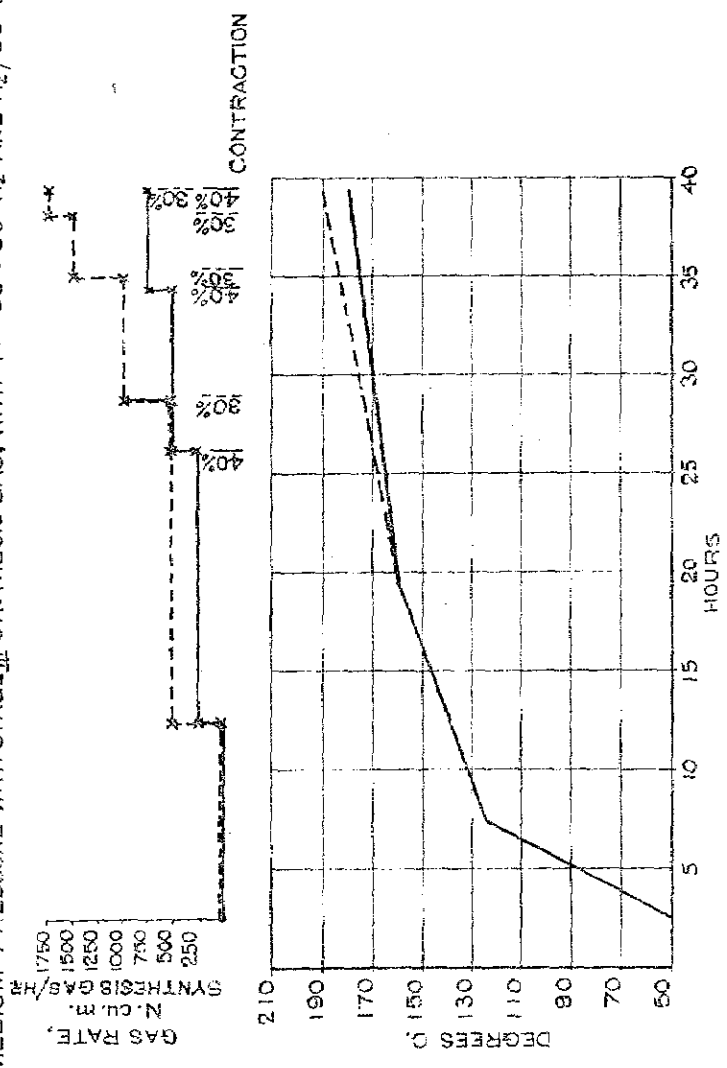


FIG. 3 STARTING UP FRESHLY CHARGED REACTORS, ATMOSPHERIC PRESSURE AND MEDIUM PRESSURE

800 N.C.U.M. SYNTHESIS GAS/HOUR --- 80% CO+H<sub>2</sub> IN SYNTHESIS GAS, H<sub>2</sub>/CO = 2.0 --- 50% CONTRACTION

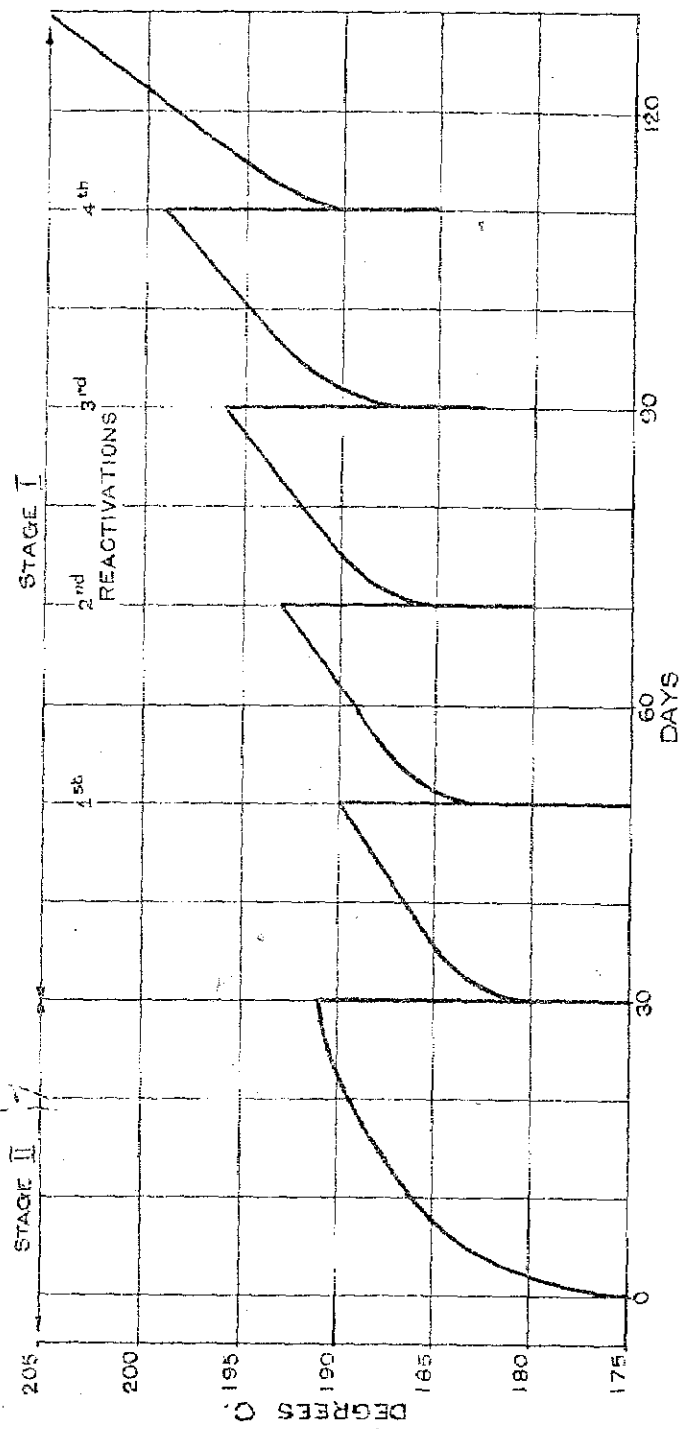


FIG. 4 METHOD OF CONDUCTING ATMOSPHERIC PRESSURE SYNTHESIS

1,000 Nm<sup>3</sup> SYNTHESIS GAS/HOUR — 88% CO+H<sub>2</sub> SYNTHESIS GAS, H<sub>2</sub>/CO=1.5 — 55% CONTRACTION

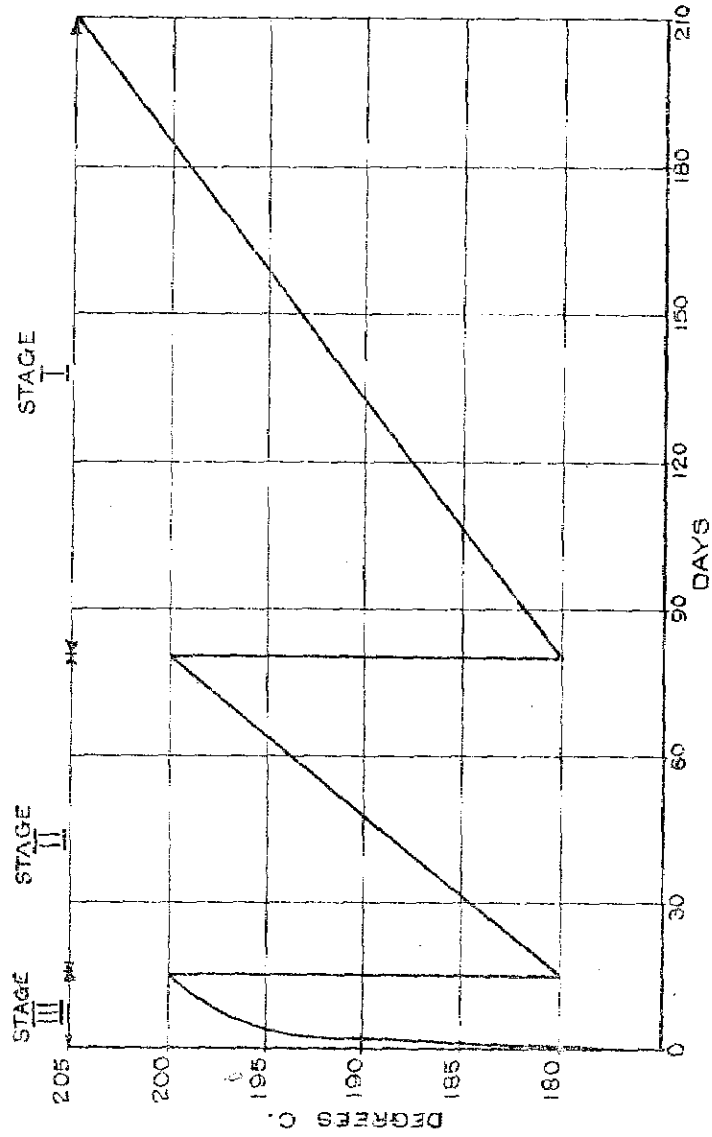


FIG. 5 METHOD OF CONDUCTING MEDIUM PRESSURE SYNTHESIS



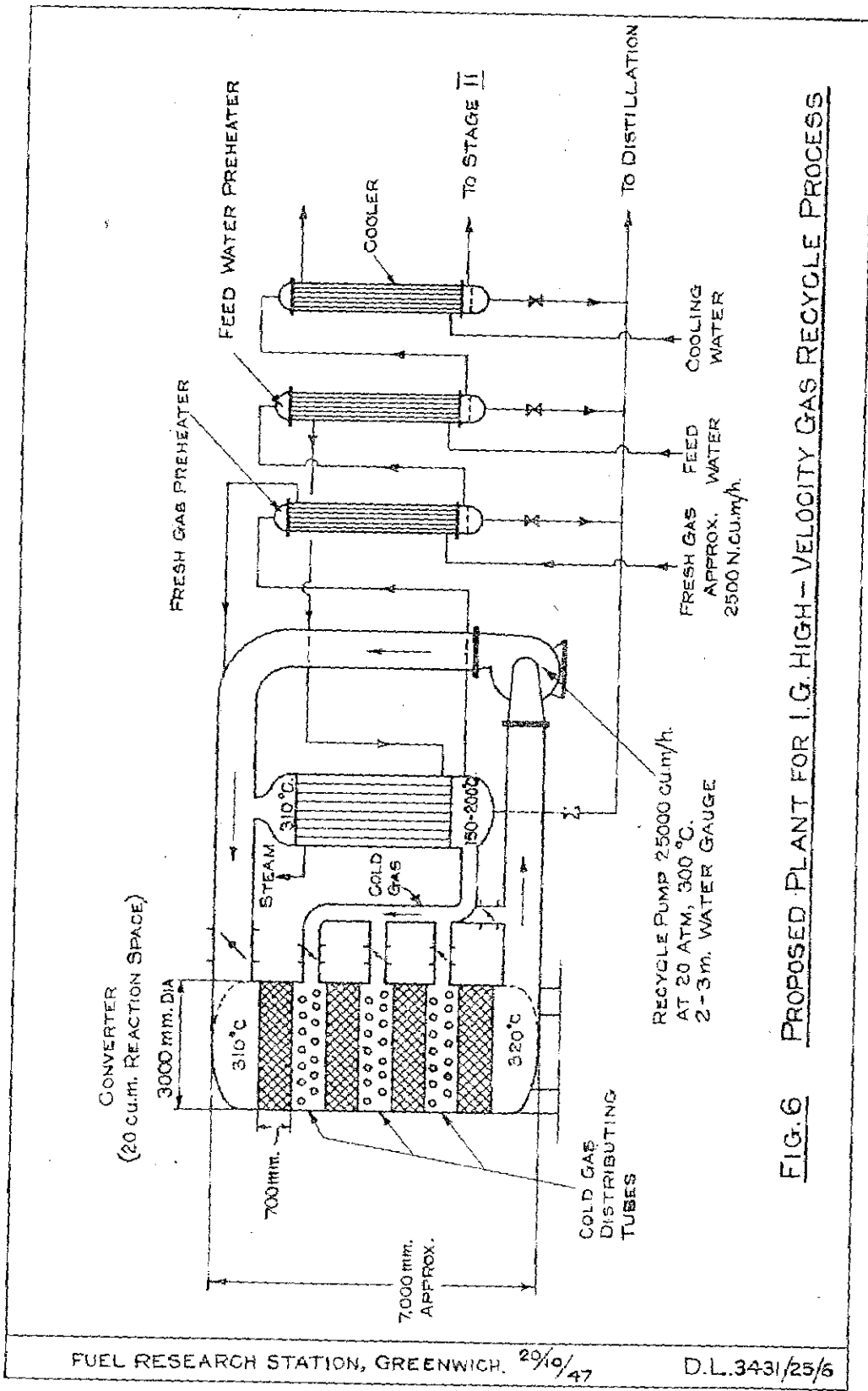
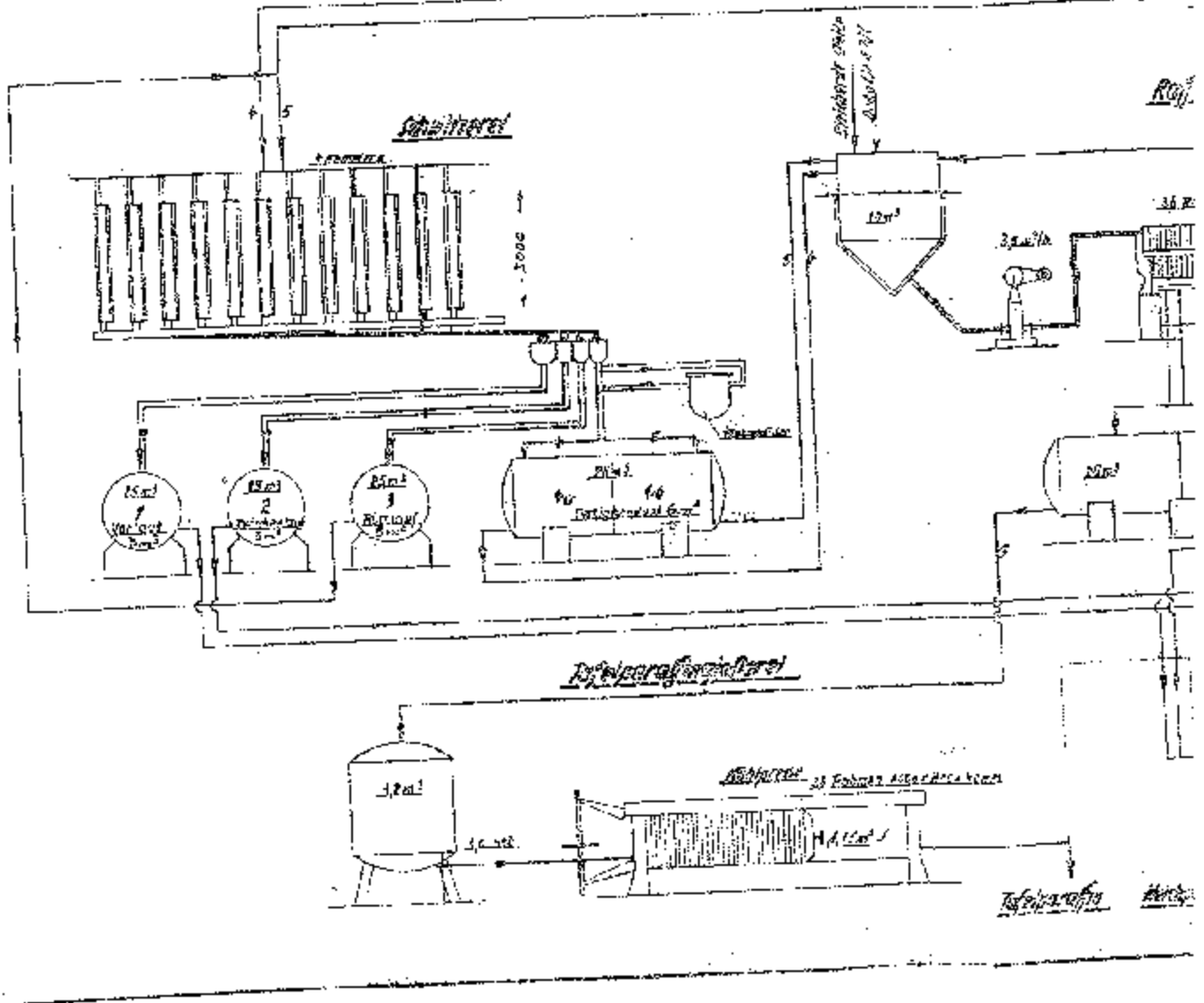
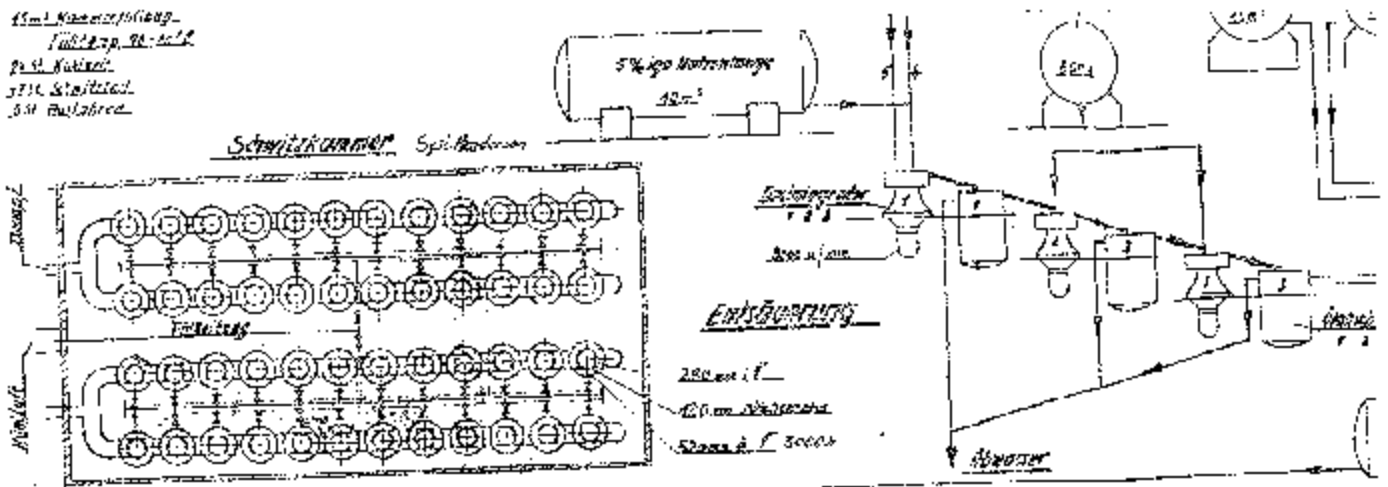


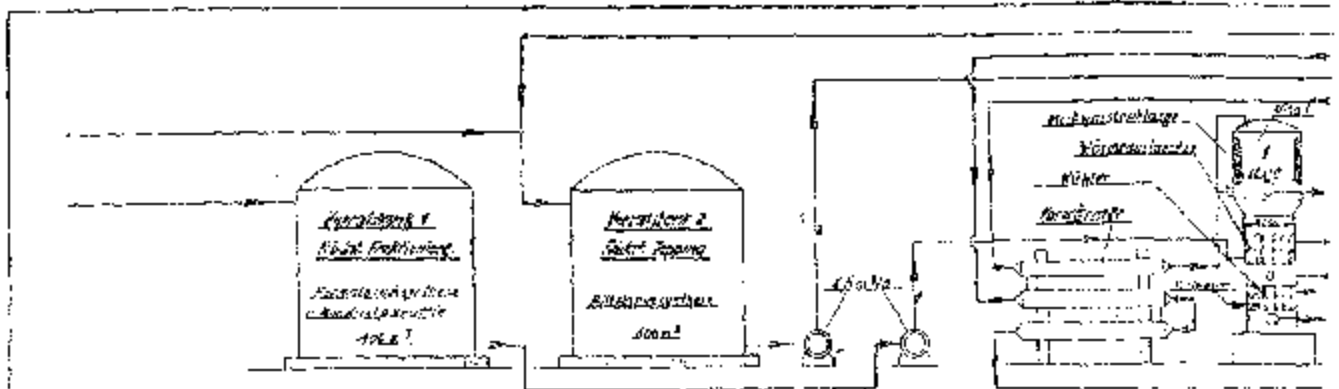
FIG. 6 PROPOSED PLANT FOR I.G. HIGH - VELOCITY GAS RECYCLE PROCESS

FUEL RESEARCH STATION, GREENWICH. 29/10/47

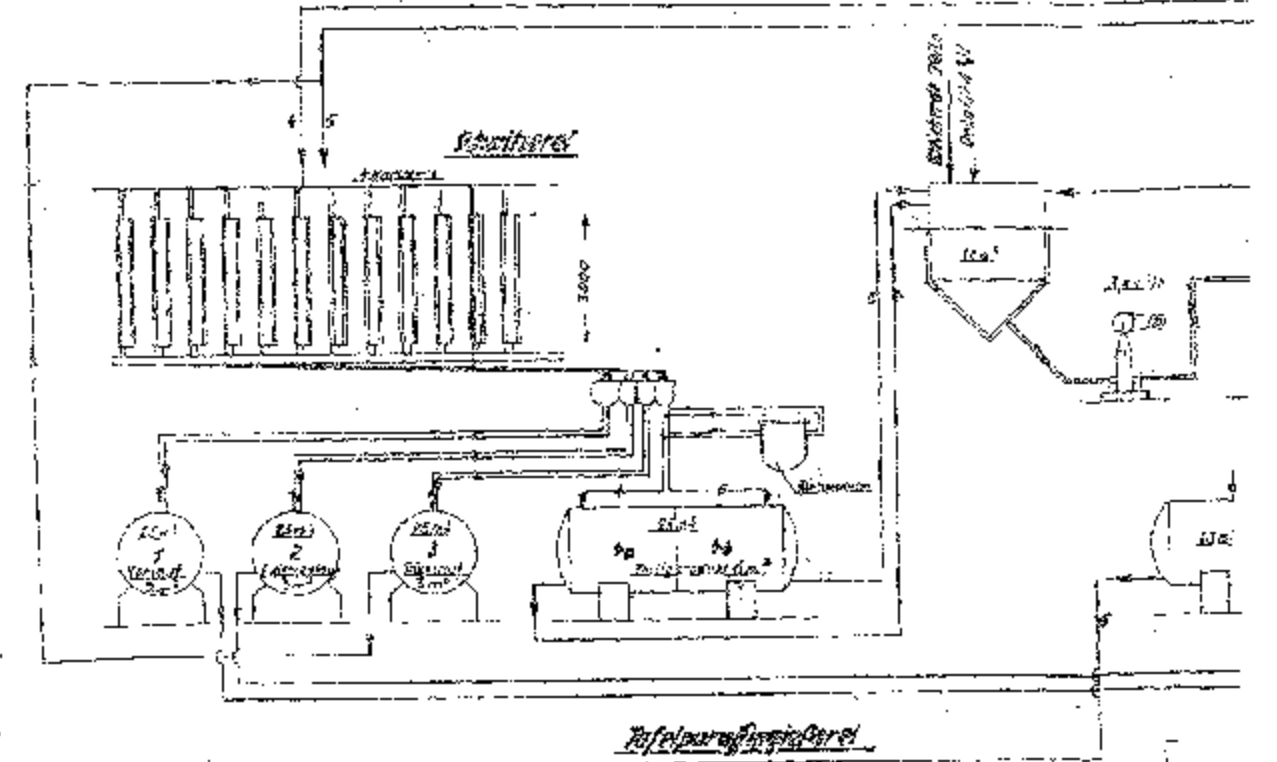
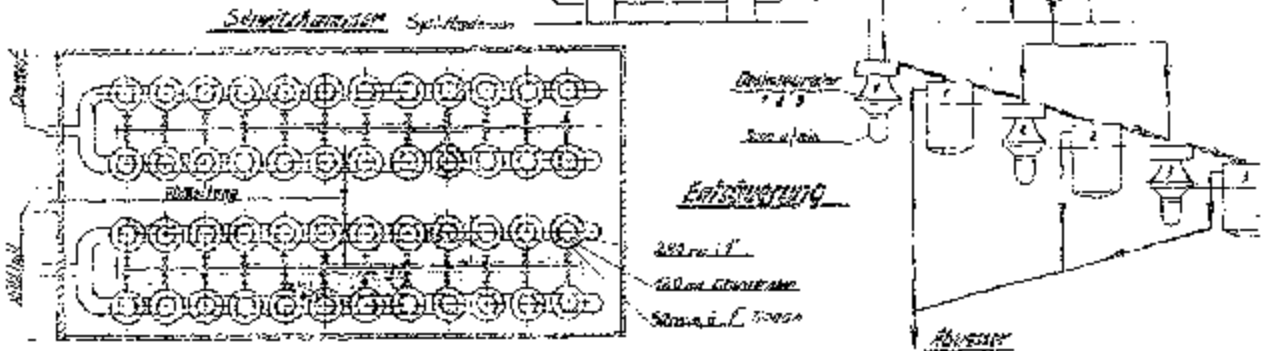
D.L.3431/25/6

15ml Wasserleitung  
 Filterapp. 90-100  
 2. St. Kessel  
 3714. Steiltad.  
 3. St. Pulver.

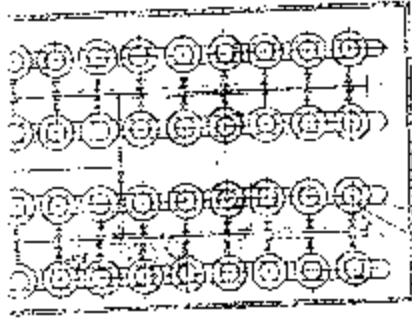




1. Kesselwerk  
 2. Kesselwerk  
 3. Kesselwerk  
 4. Kesselwerk  
 5. Kesselwerk  
 6. Kesselwerk

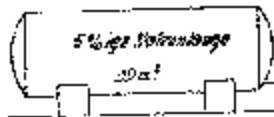


Spezialkammer Spalt-Reaktion

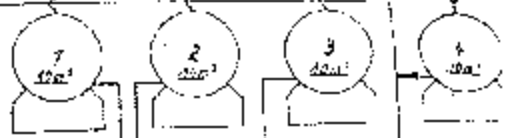


Entsorgung

180 m<sup>2</sup>  
 400 m<sup>2</sup> Reaktor  
 50 m<sup>2</sup> f. 10000



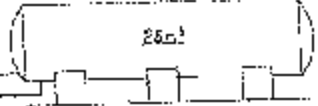
Ausströmler



Reaktor

100 m<sup>2</sup>

Reaktor

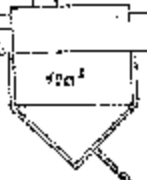


Spezialkammer



Reaktion 1

Spezialkammer  
Reaktor



3.0 m<sup>2</sup>

15 Reaktor 1000 m<sup>2</sup> Reaktor  
500 m<sup>2</sup> Reaktor

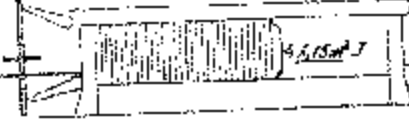


Tafelreaktor

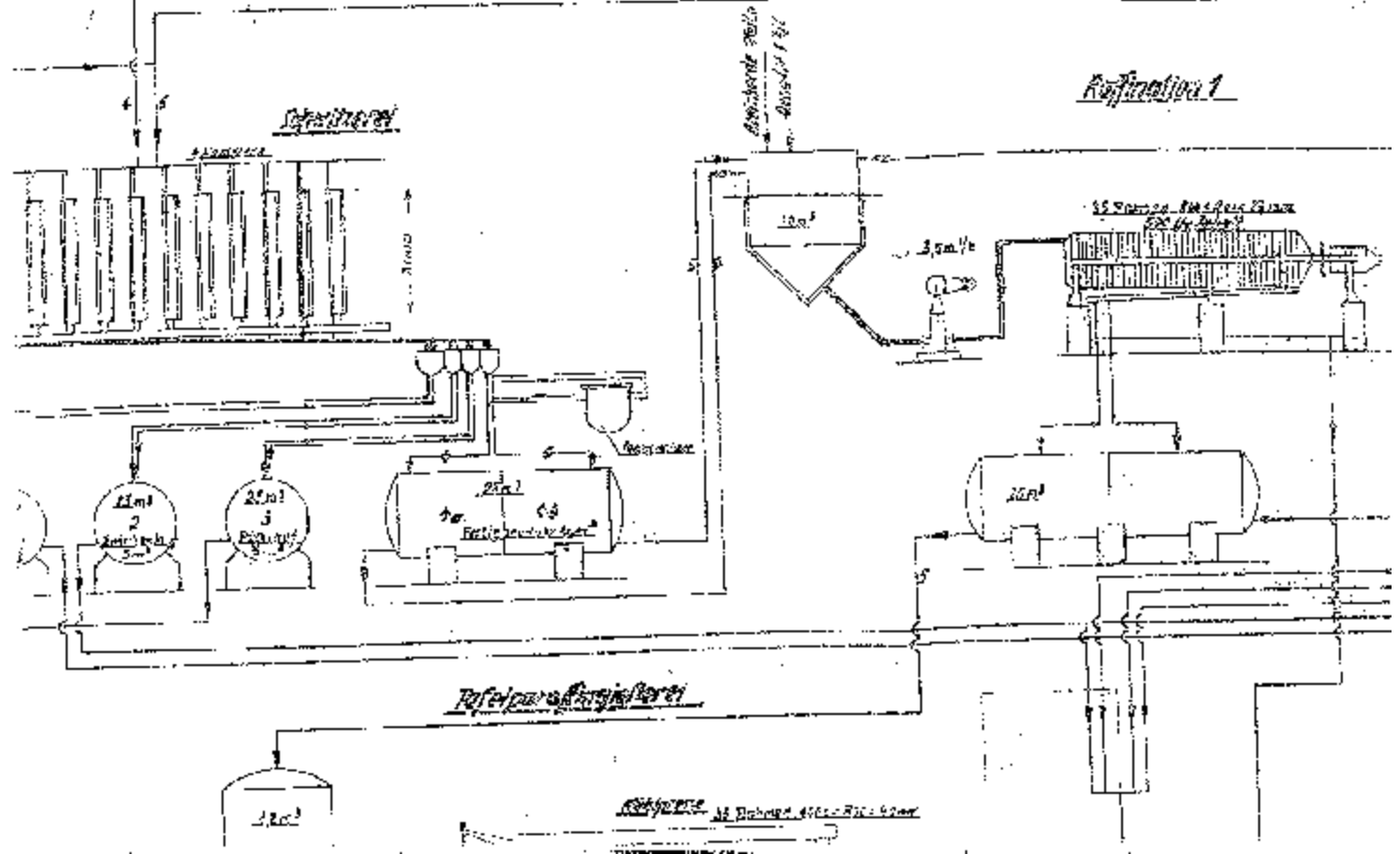
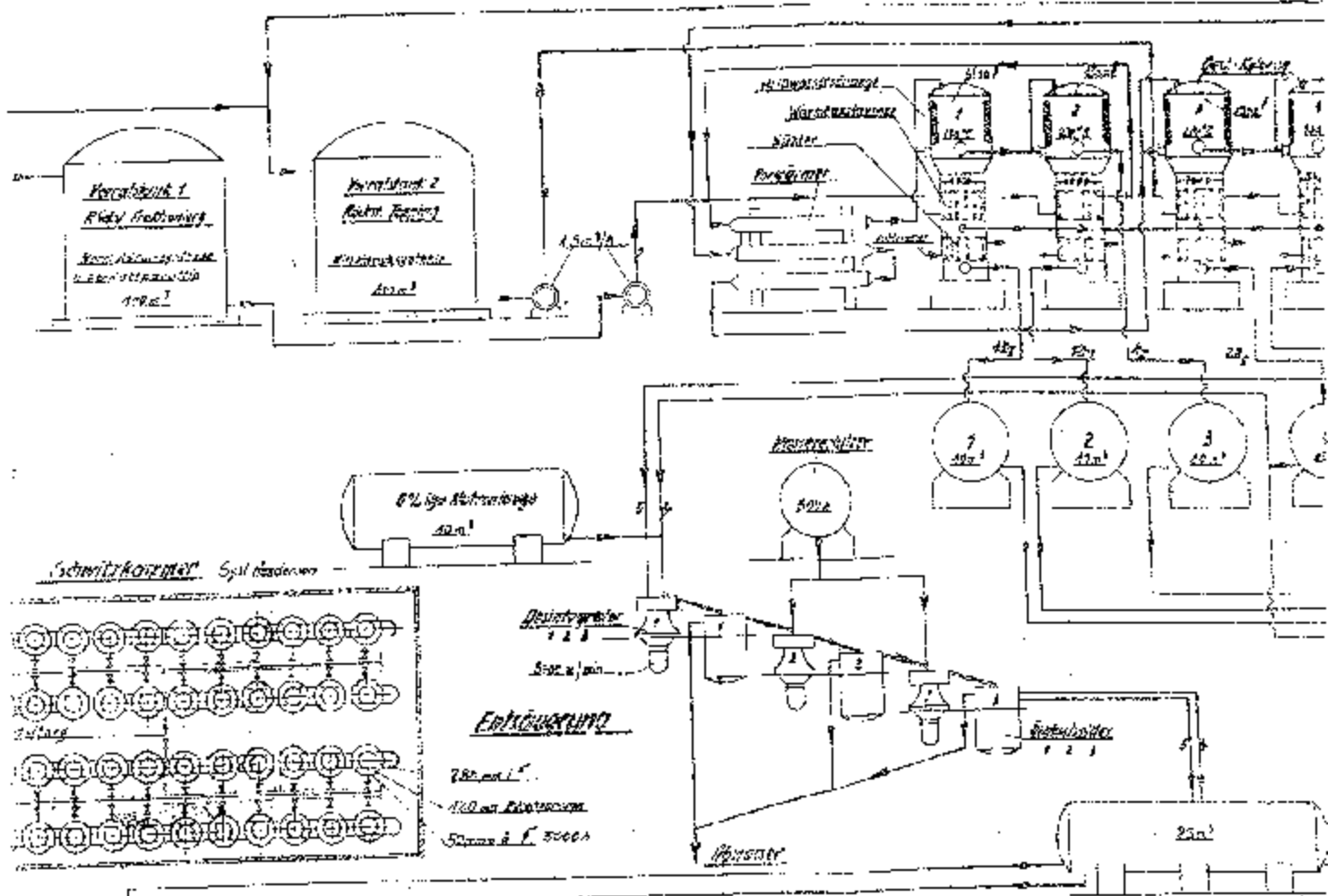


3.0 m<sup>2</sup>

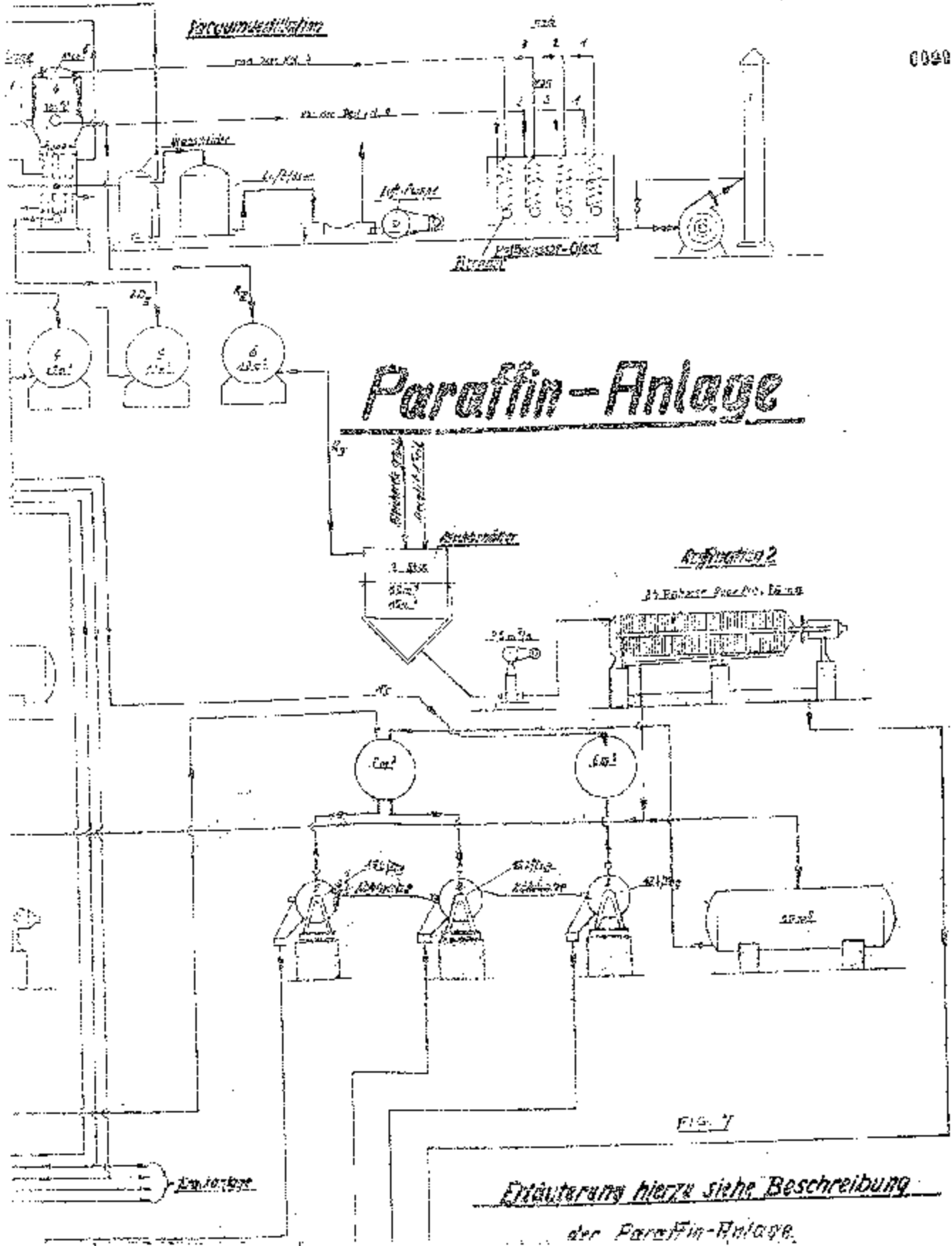
Reaktor 15 Reaktor 1000 m<sup>2</sup> Reaktor



Tafelreaktor Reaktor Paraphenylol Reaktor  
 Reaktor



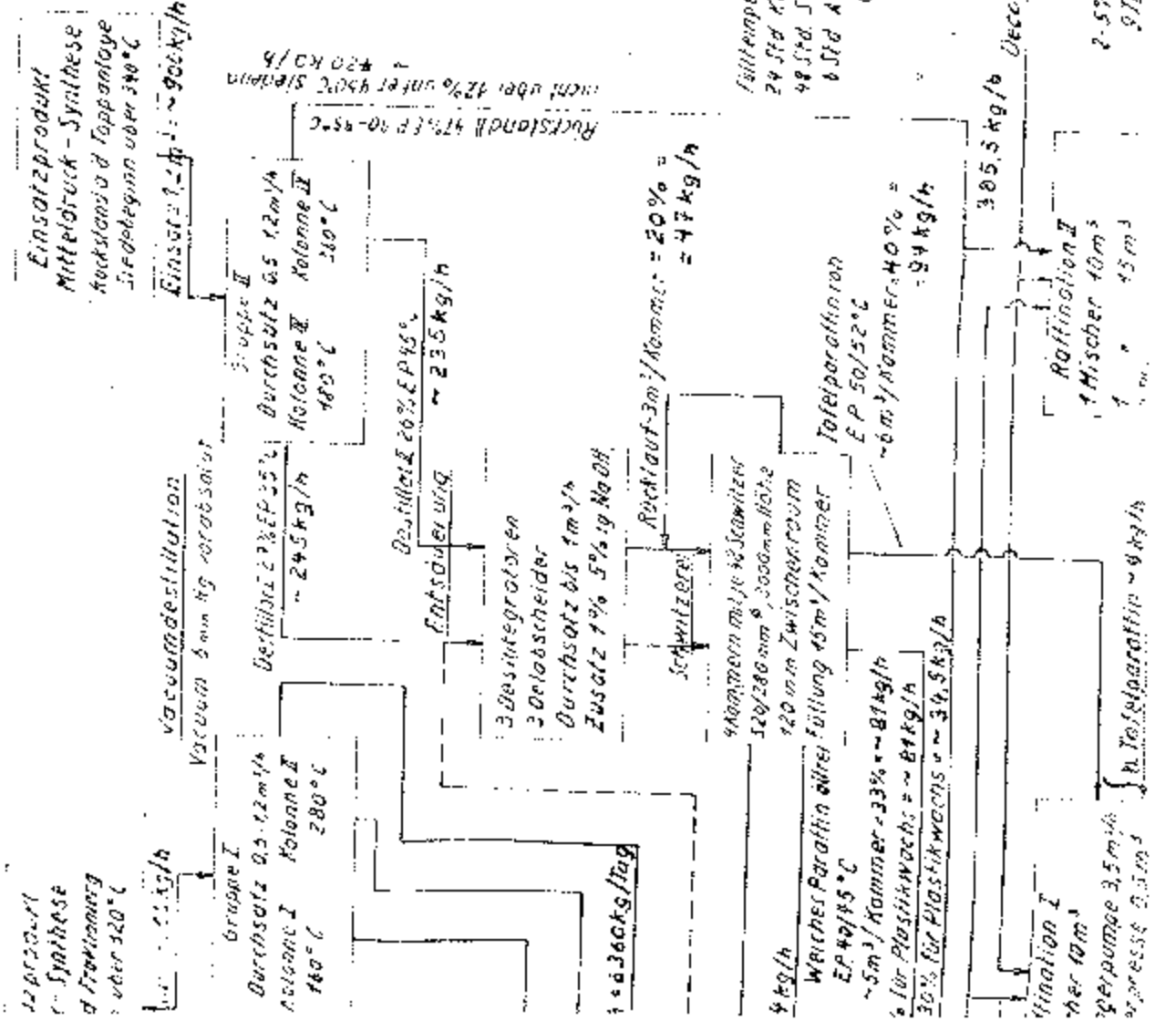




# Paraffin-Anlage

FIG. 7

Erläuterung hierzu siehe Beschreibung der Paraffin-Anlage.

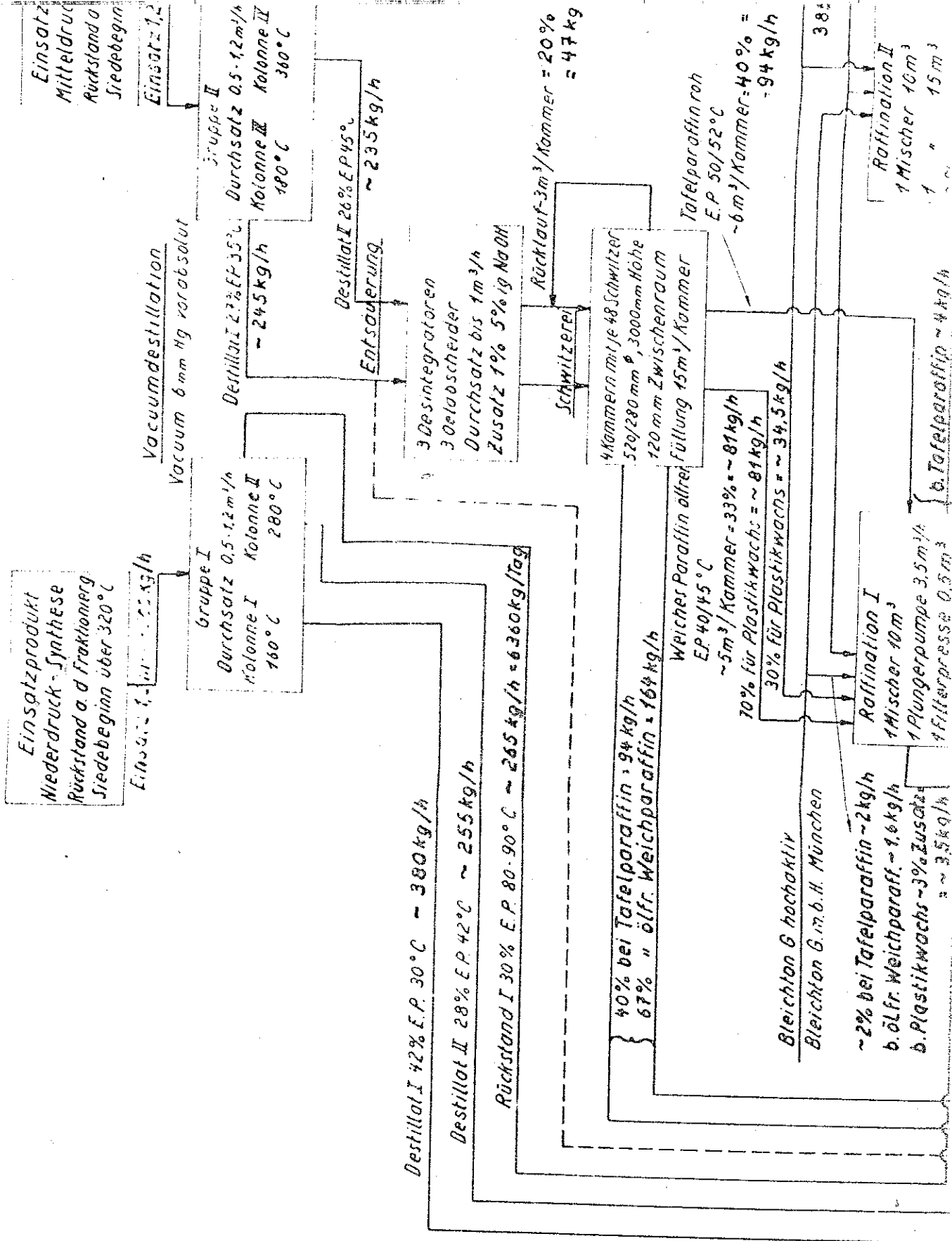


Fülltemperatur 70-80°C  
 24 Std. Kühlzeit 5-10°C unter d. EP  
 48 Std. Schwitzzeit  
 1 Std. Ausfahren bei 140 EP 45-48°C  
 (offen)

Lurgi Gesellschaft  
 für Wärme-technik  
 Frankfurt a. M.

2-5% Biomischung  
 9 Teile Steariton G





Einsatzprodukt  
Niederdruck - Synthese  
Rückstand a. d. Fraktionierung  
Siedebeginn über 320°C

Einsatz  
Mitteldruck  
Rückstand a.  
Siedebeginn

Einsatz = 1.000 kg/h

Vacuumdestillation  
Vacuum 6 mm Hg vorabsolut

Einsatz = 1,2

Gruppe I  
Durchsatz 0,5 - 1,2 m<sup>3</sup>/h  
Kolonnen I  
160°C

Destillat I 27% E.P. 35°C  
~ 245 kg/h

Gruppe II  
Durchsatz 0,5 - 1,2 m<sup>3</sup>/h  
Kolonnen II  
180°C

Destillat II 26% E.P. 45°C  
~ 235 kg/h

Destillat I 42% E.P. 30°C ~ 380 kg/h

Destillat II 28% E.P. 42°C ~ 255 kg/h

Rückstand I 30% E.P. 80-90°C ~ 265 kg/h = 6360 kg/Tag

3 Desintegratoren  
3 Oelabscheider  
Durchsatz bis 1 m<sup>3</sup>/h  
Zusatz 1% 5% ig NaOH

Rücklauf 3 m<sup>3</sup>/Kammer = 20%  
= 47 kg

Schmelzerei

4 Kammern mit je 48 Schmelz  
520/280 mm φ, 3000 mm Höhe  
120 mm Zwischenraum  
Füllung 15 m<sup>3</sup>/Kammer

40% bei Tafelparaffin ~ 94 kg/h  
67% " ölfr. Weichparaffin ~ 164 kg/h

Weicher Paraffin ölfreier  
E.P. 40/45°C  
~ 5 m<sup>3</sup>/Kammer = 33% ~ 81 kg/h

70% für Plastikwachs ~ 81 kg/h  
30% für Plastikwachs ~ 34,5 kg/h

Tafelparaffin roh  
E.P. 50/52°C  
~ 6 m<sup>3</sup>/Kammer = 40% =  
~ 94 kg/h

Bleichton G hochaktiv  
Bleichton G m.b.H. München

~ 2% bei Tafelparaffin ~ 2 kg/h  
b. ölfr. Weichparaff. ~ 1,6 kg/h  
b. Plastikwachs ~ 3% Zusatz  
~ 3,5 kg/h

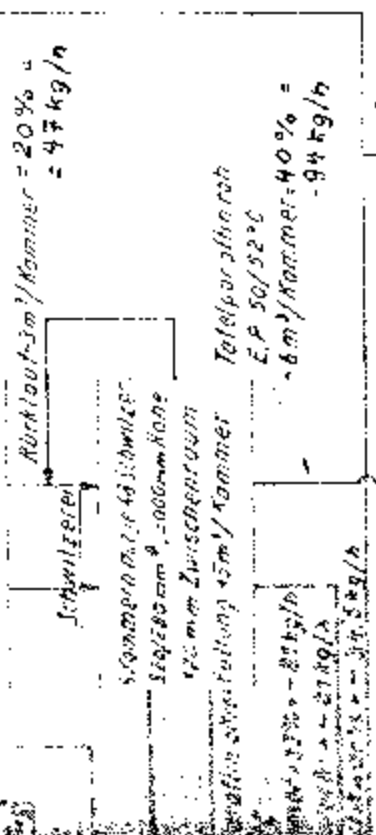
Raffination I  
1 Mischer 10 m<sup>3</sup>  
1 Plungerpumpe 3,5 m<sup>3</sup>/h  
1 Filterpresse 0,5 m<sup>3</sup>

Raffination II  
1 Mischer 10 m<sup>3</sup>  
1 " " 15 m<sup>3</sup>

b. Tafelparaffin ~ 4 kg/h

38%

Zusatz 1% 5%ig NaOH



Kühltemperatur 10-80°C  
 24 Std. Kühlzeit 5-10°C unter d. E.P.  
 48 Std. Schwiltzen  
 8 Std. Ausfahren bei etwa E.P. 95-98°C  
 (ölfrei)

Lurgi Gesellsch.  
 für Wärmetechnik  
 Frankfurt a.M.

Decolite (A-Hilfsstoffe)

2-5% Bleichmischung  
 9 Teile Steariton 6  
 1 Teil Decolite

im Durchsch. 5% Zusatz ~ 41,5 kg/h

~ 23 kg/h mit ~ 11,5 kg Hartwachs

Refinition II  
 1 Mischer 10m³  
 1 " 45m³  
 2 Rührerwagen 35m³  
 2 Filterpressen 0,5m³

~ 374 kg/h

Hartwachs  
 Formgebung  
 2 Kühlwalzen zu  
 je 15 t/Tag

Ausgebrauchte Bleichmischung  
 ~ 50% Paraffin

~ 200 kg/Tag

~ 112 kg/h

~ 374 kg/h = 8976 kg/Tag

Paraffinwachs  
 E.P. 70-75°C  
 ~ 2000 kg/Tag

Kontaktparaffin  
 E.P. 80-90°C  
 ~ 6800 kg/Tag

R.B. Hartwachs  
 E.P. 90-95°C  
 ~ 5228 kg/Tag

Ruhrchemie A-G  
 Oberhausen

Soll 790/503

Verfahrensschema  
 der Paraffingewinnung

Fig. 8

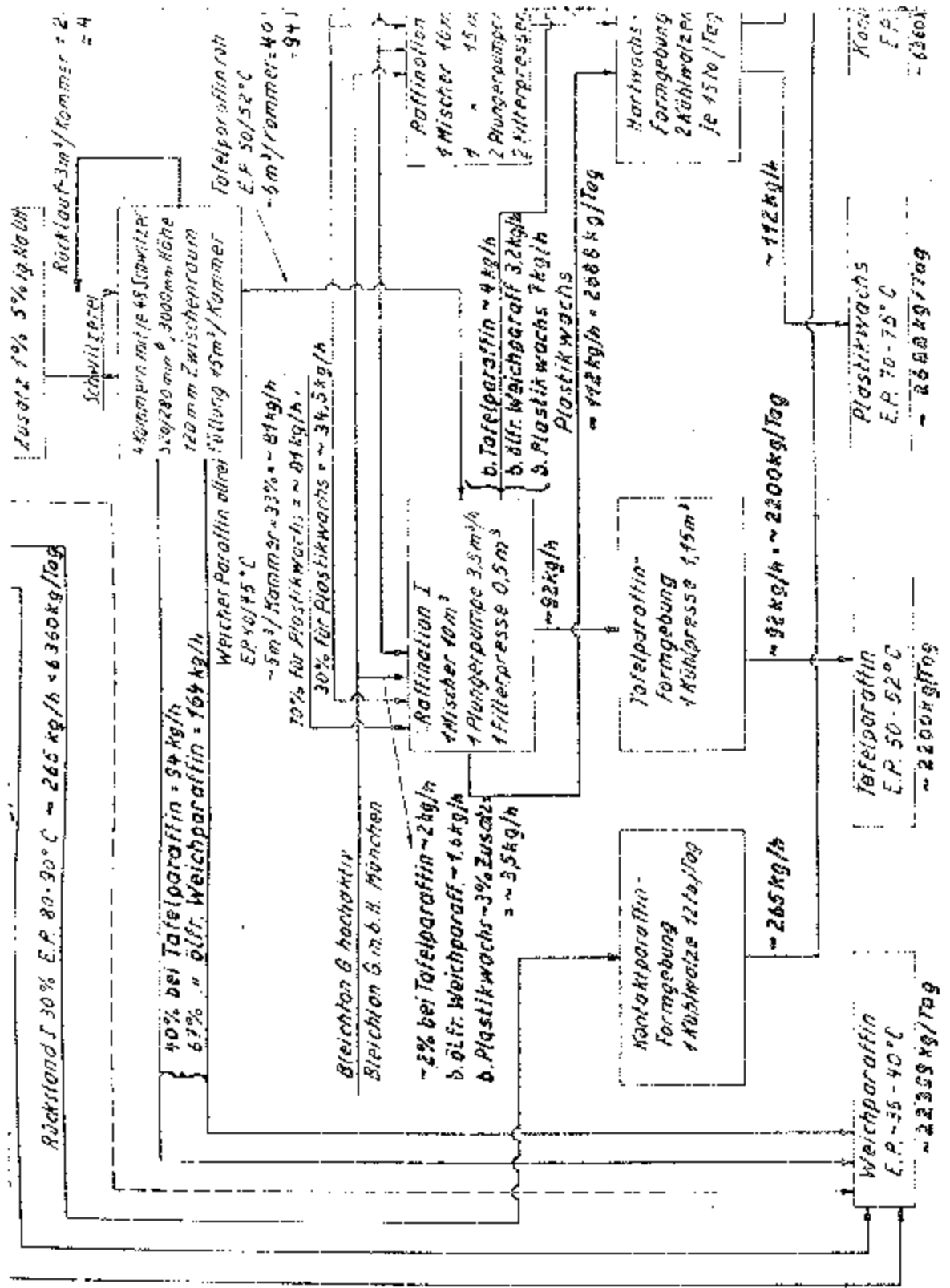


FIG. 8

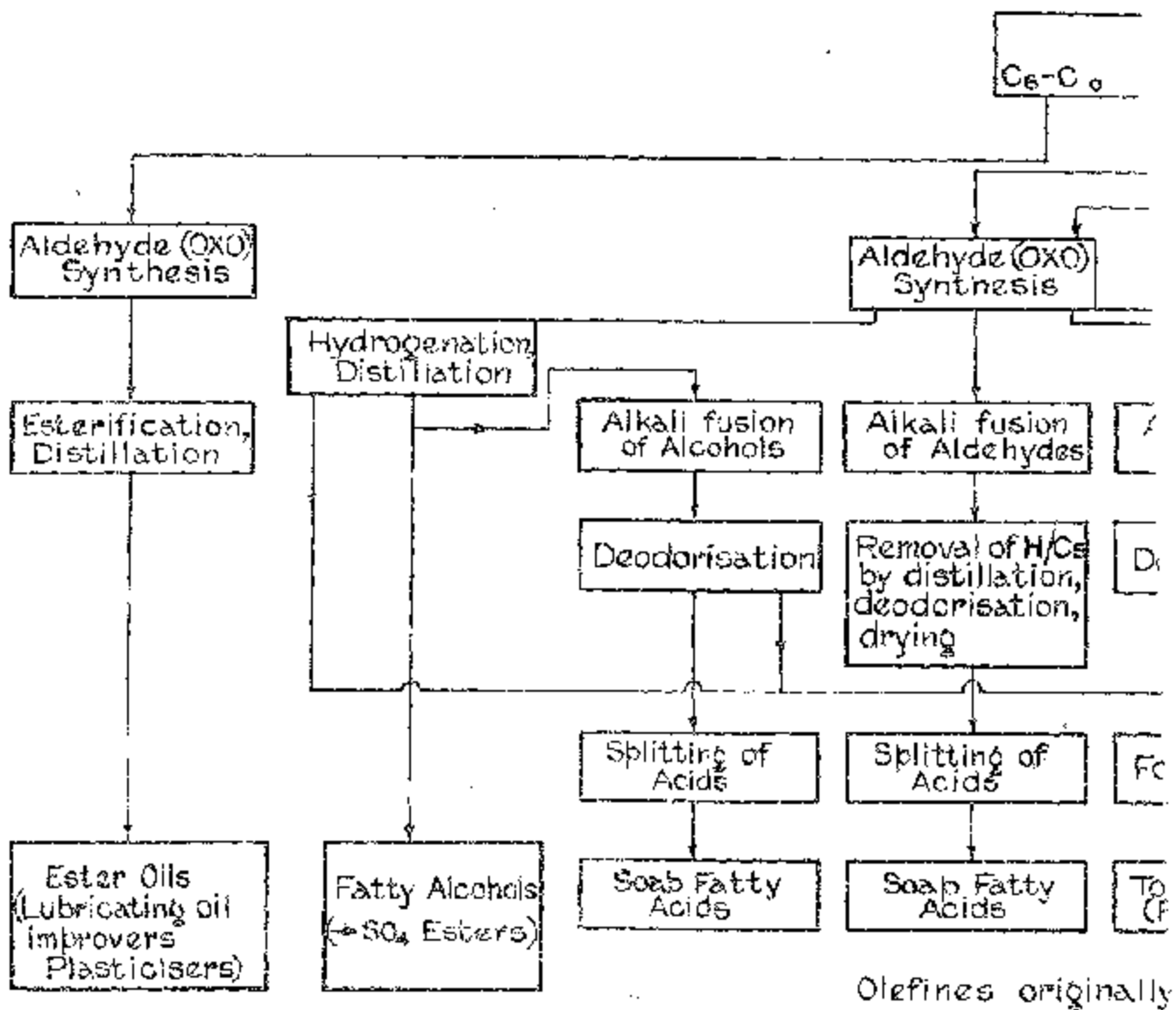
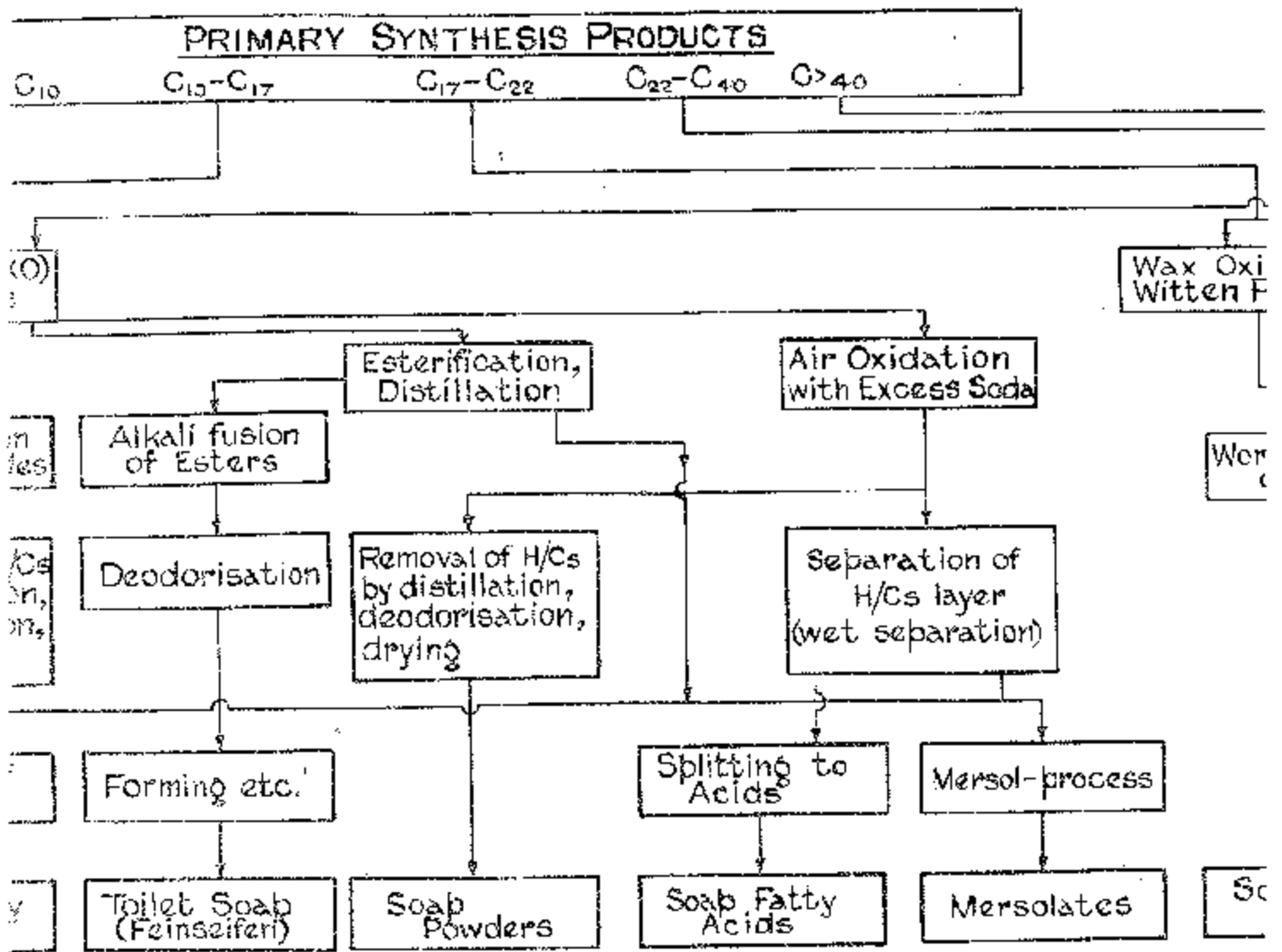
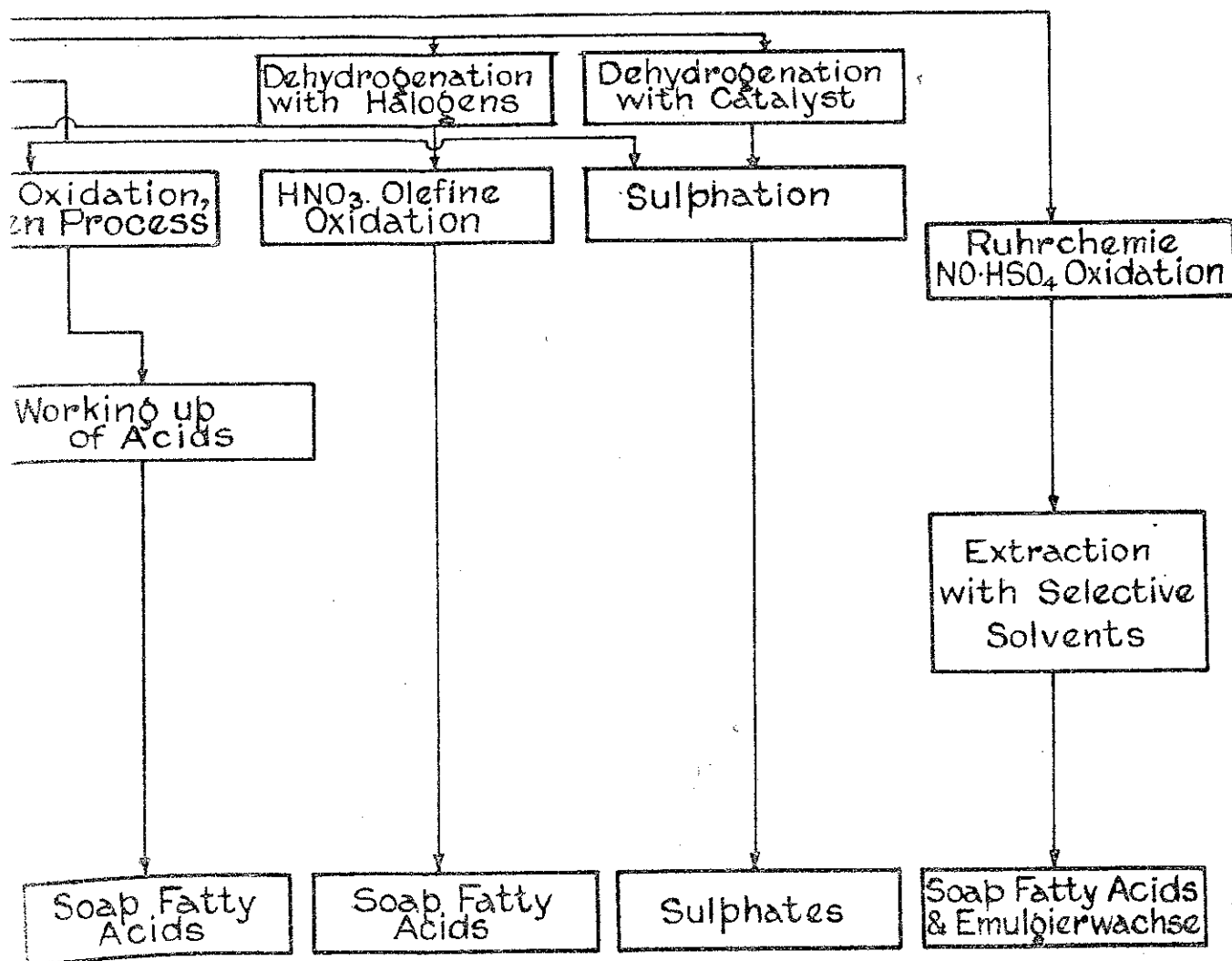


FIG. 9 SCHEME



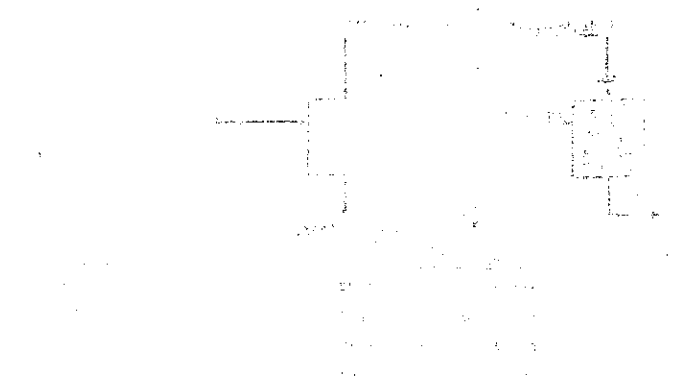
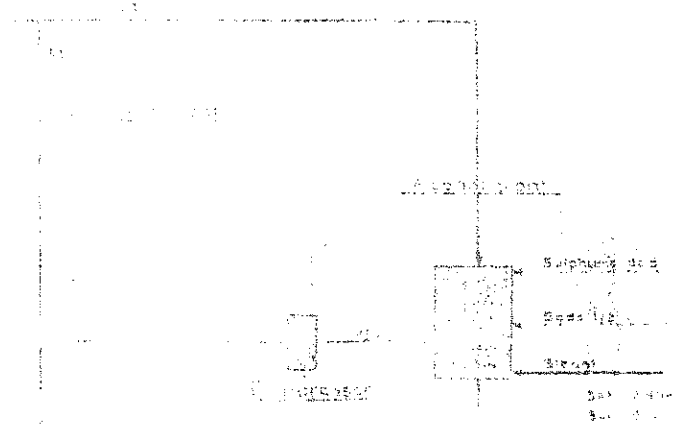
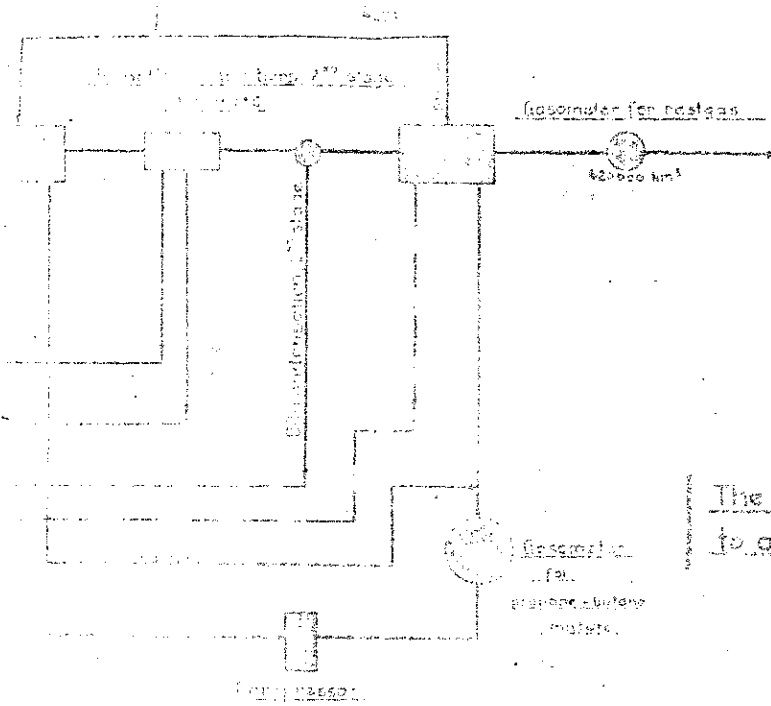
Originally meant for lubricating oil preparation can be diverted to

HEME FOR MAXIMUM PRODUCTION OF SOAPS AND



to OXO synthesis if desired

## D WASHING AGENTS



Coking	152 000
Waste-heat-boiler	46 800
Fine purification	45 000
Fractionation	41 200
Oil-cracking-plant	17 000
Kerosene-plant	500
Paraffin-distillation	9 000
	420 000 Nm³

The production figures refer always to one day (24 hours)

List of products:

- Drinking gas
- High-kerosene
- Light-kerosene
- Petrol
- Heavy-kerosene
- Light-kerosene
- Light-diesel fuel
- Mixed diesel fuel
- Lighting-oil
- Heavy-kerosene
- Soft-paraffin
- Hard-paraffin
- Ether
- Isopropyl-alcohol
- Fusel-oil
- sec-Butyl-alcohol
- Ethanol
- Aluminium-alkoholates
- Aluminium-hydroxides
- Aluminium-oxides
- Various aluminium compounds
- Erythritol
- Fatty acids
- Hydrocyanic acid
- Synthetic oil
- Hydroformyl
- Tar
- Motor oil for Otto and Diesel engines
- Aviation fuel
- Gasoline

Explanation of List

Fixed consumption

Fixed costs (including depreciation) per 125 tons	
Electricity	15000
Water	40000
Gas	45000
Depreciation	11000
Salaries	42000
Material	5000
Profit	10000
<b>Total</b>	<b>167000</b>

The production fixed cost always  
is 167000 (125 tons)

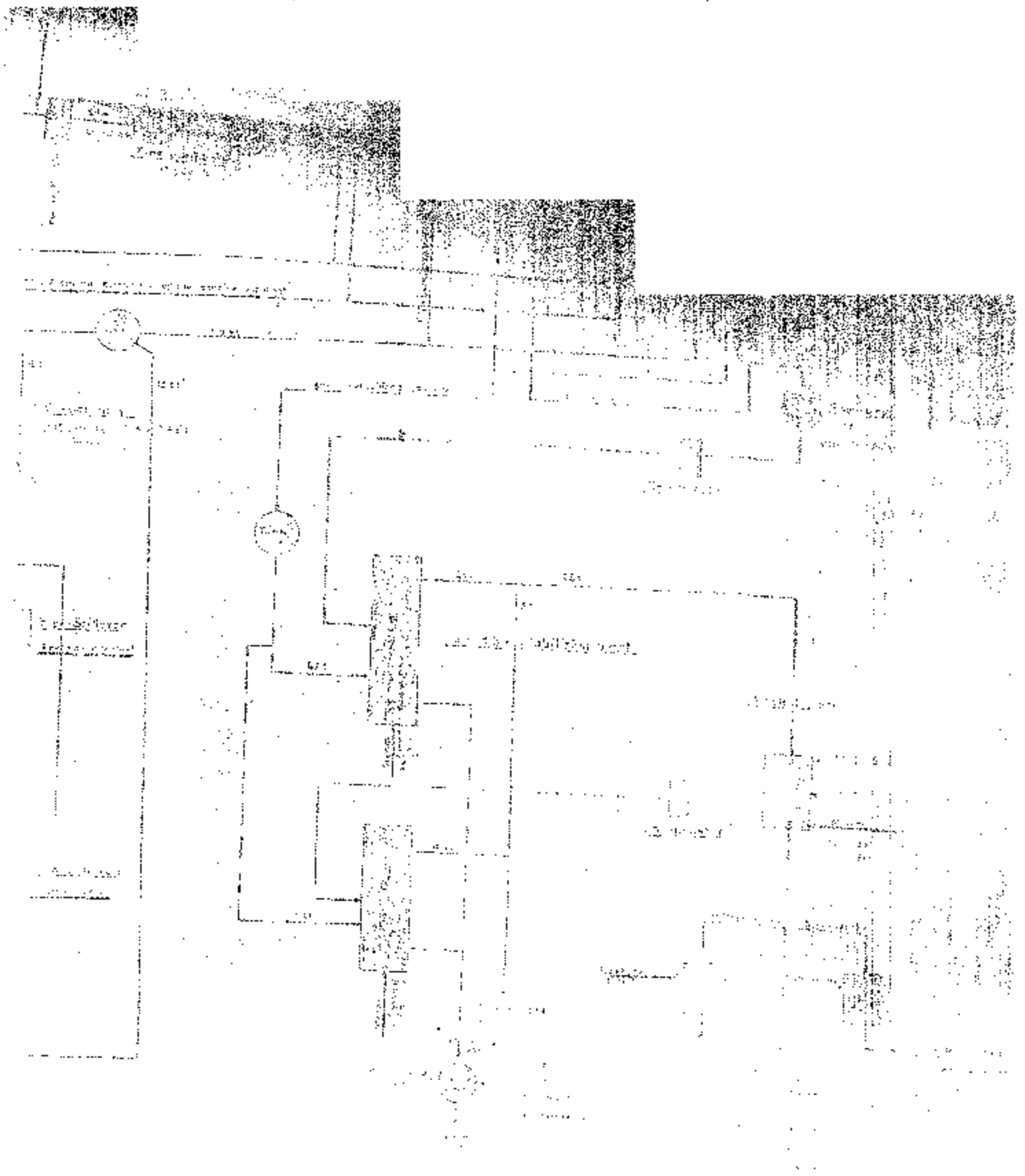
List of products:

- 1. Steam
- 2. Steam
- 3. Steam
- 4. Steam
- 5. Steam
- 6. Steam
- 7. Steam
- 8. Steam
- 9. Steam
- 10. Steam
- 11. Steam
- 12. Steam
- 13. Steam
- 14. Steam
- 15. Steam
- 16. Steam
- 17. Steam
- 18. Steam
- 19. Steam
- 20. Steam

- 21. Steam
- 22. Steam
- 23. Steam
- 24. Steam
- 25. Steam
- 26. Steam
- 27. Steam
- 28. Steam
- 29. Steam
- 30. Steam
- 31. Steam
- 32. Steam
- 33. Steam
- 34. Steam
- 35. Steam
- 36. Steam
- 37. Steam
- 38. Steam
- 39. Steam
- 40. Steam

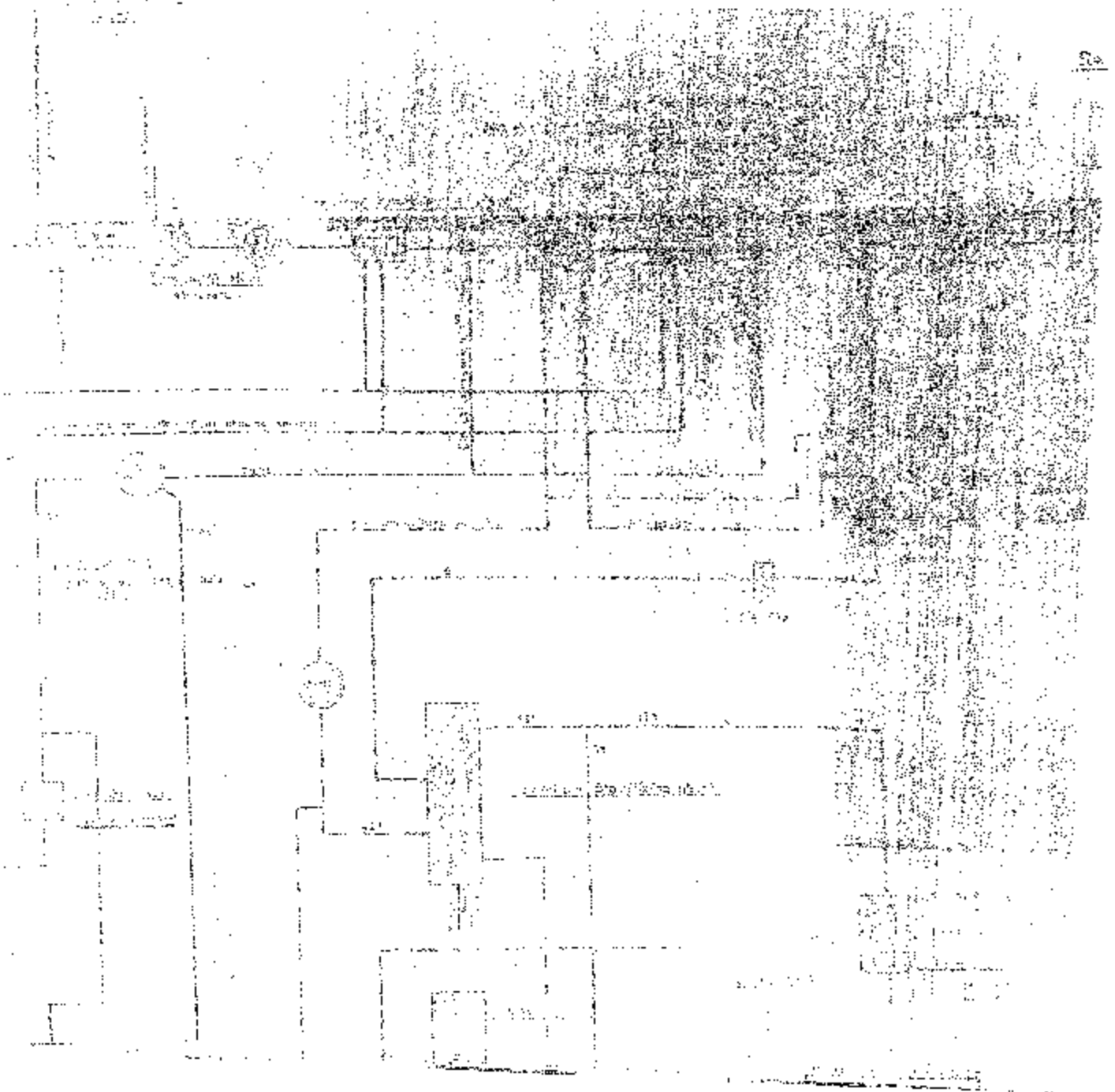






# Production scheme

of the chemical works  
of „Rheinpreußen“



Proc

of  
to

