

CHAPTER 7

ILLUSTRATIONS

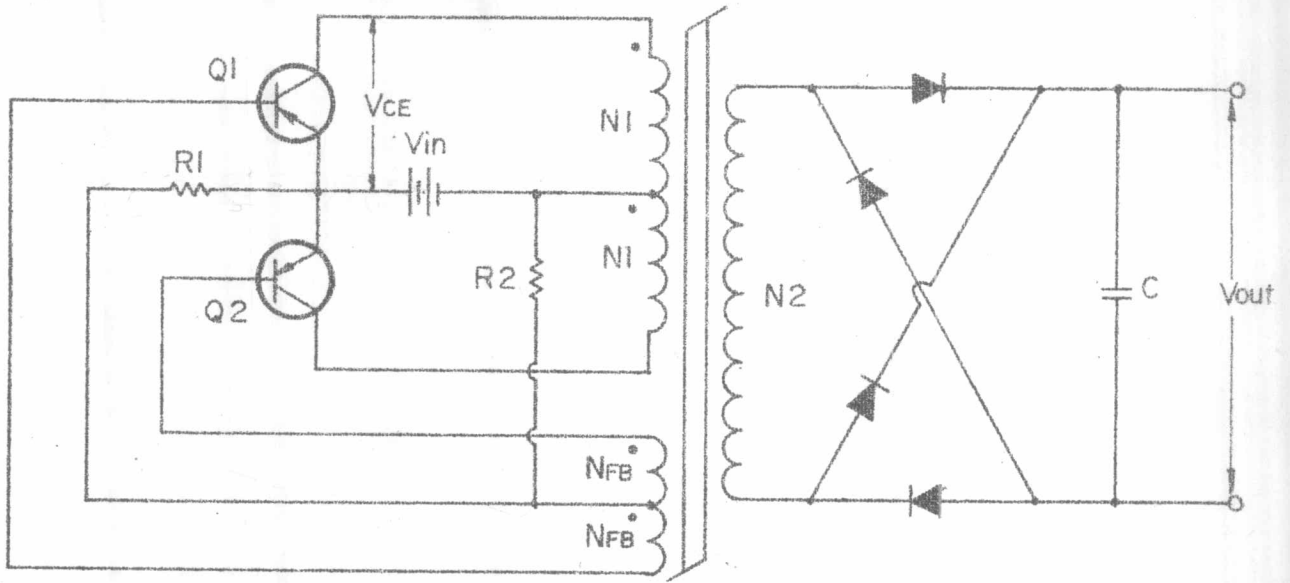


Fig. 1 Self - oscillating converter.

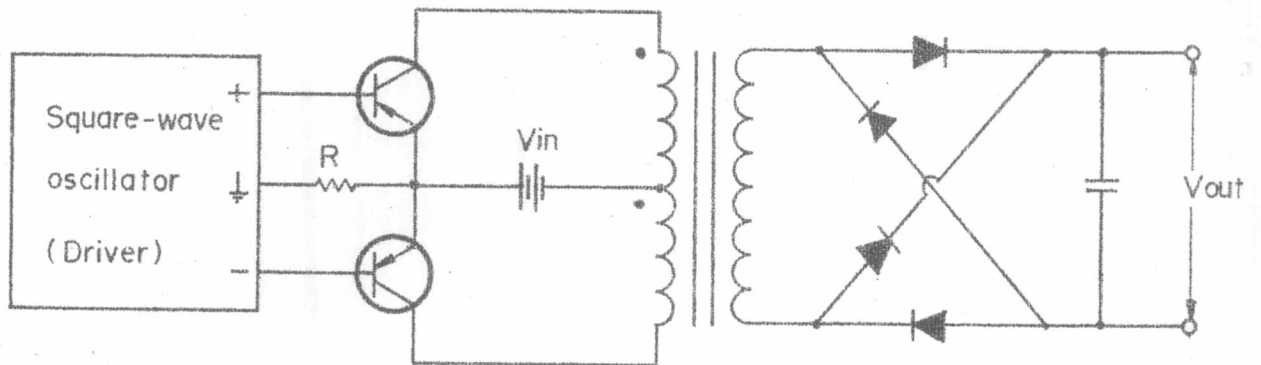


Fig. 2 Driven converter.

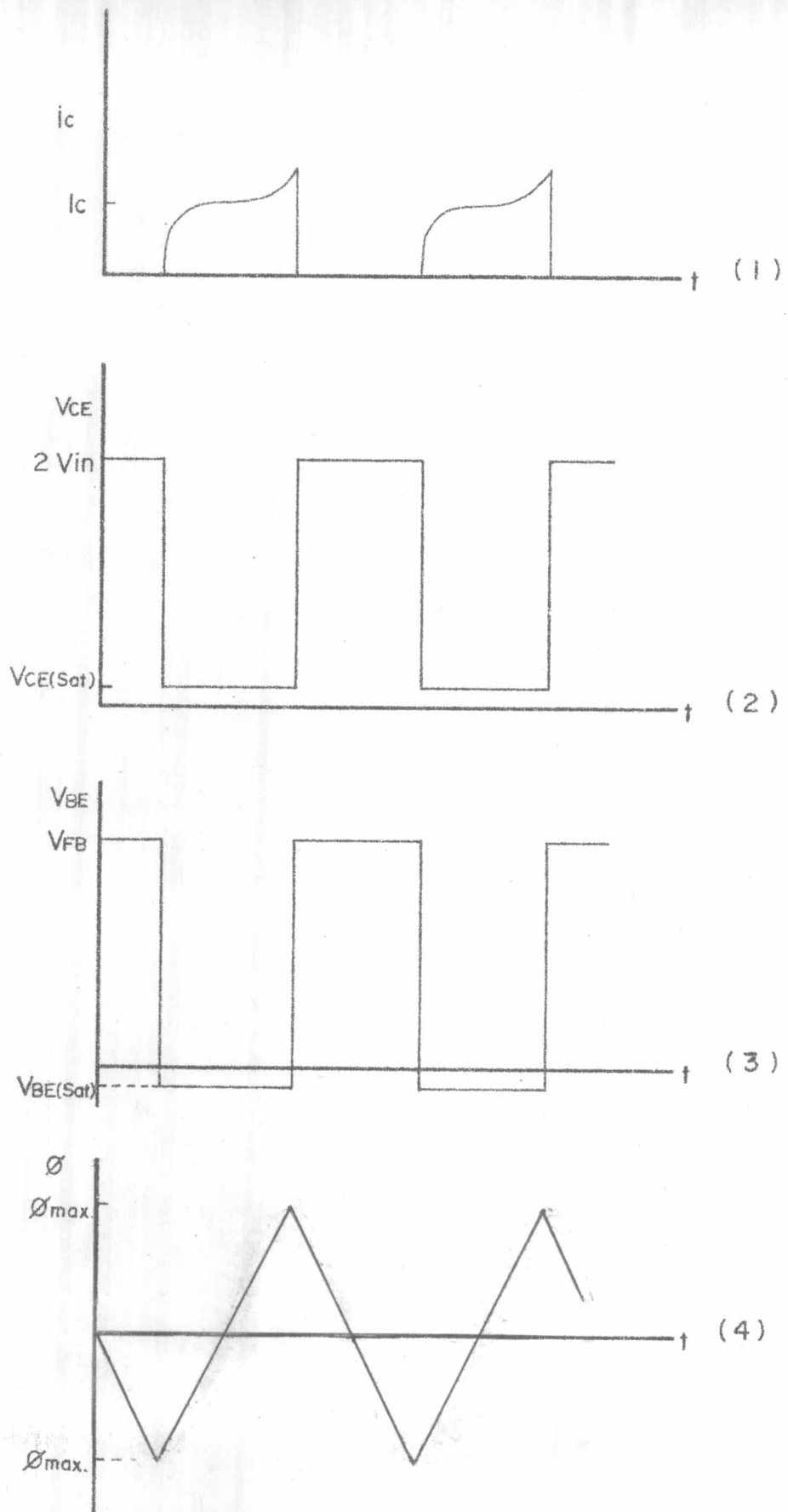
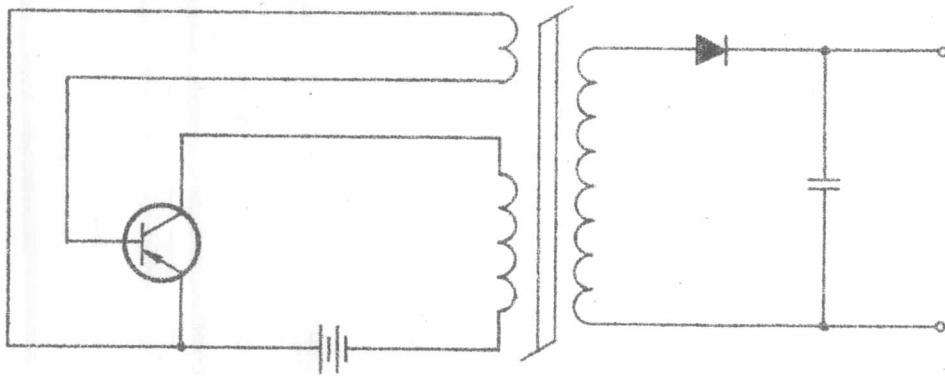
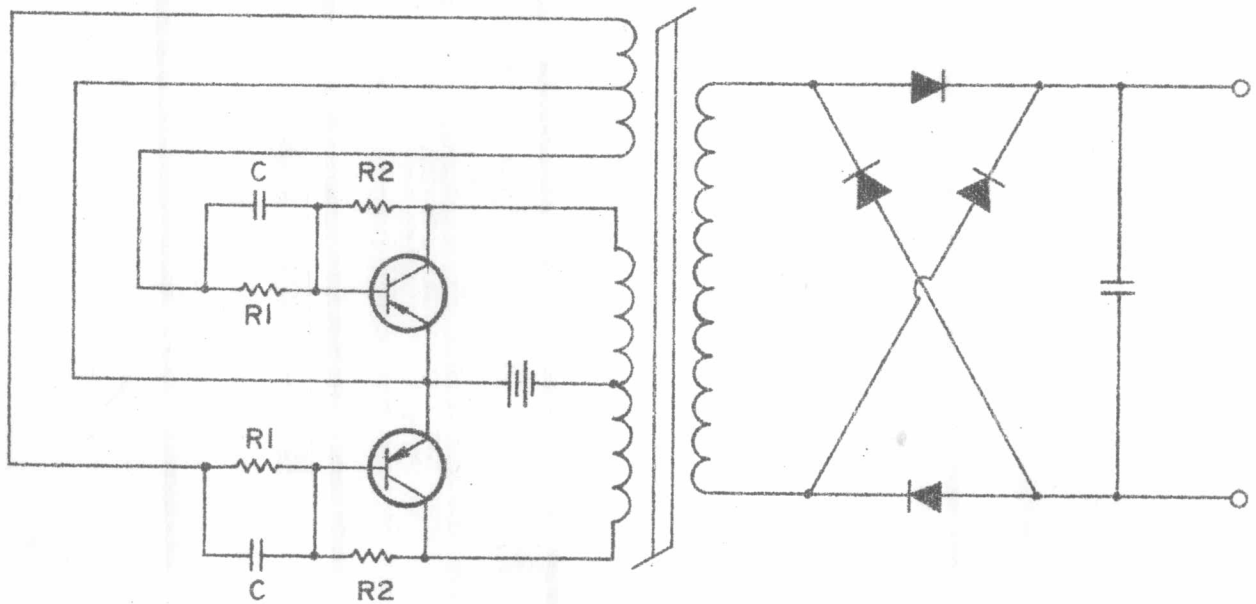


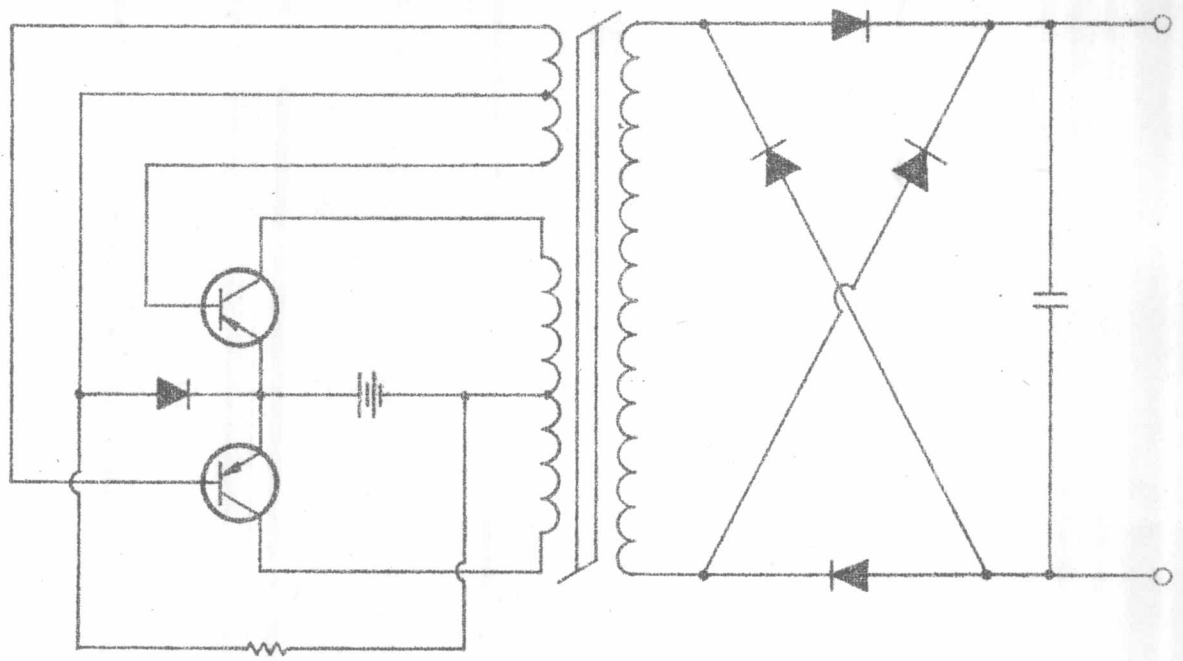
Fig. 3 Waveforms of self-oscillating converter.



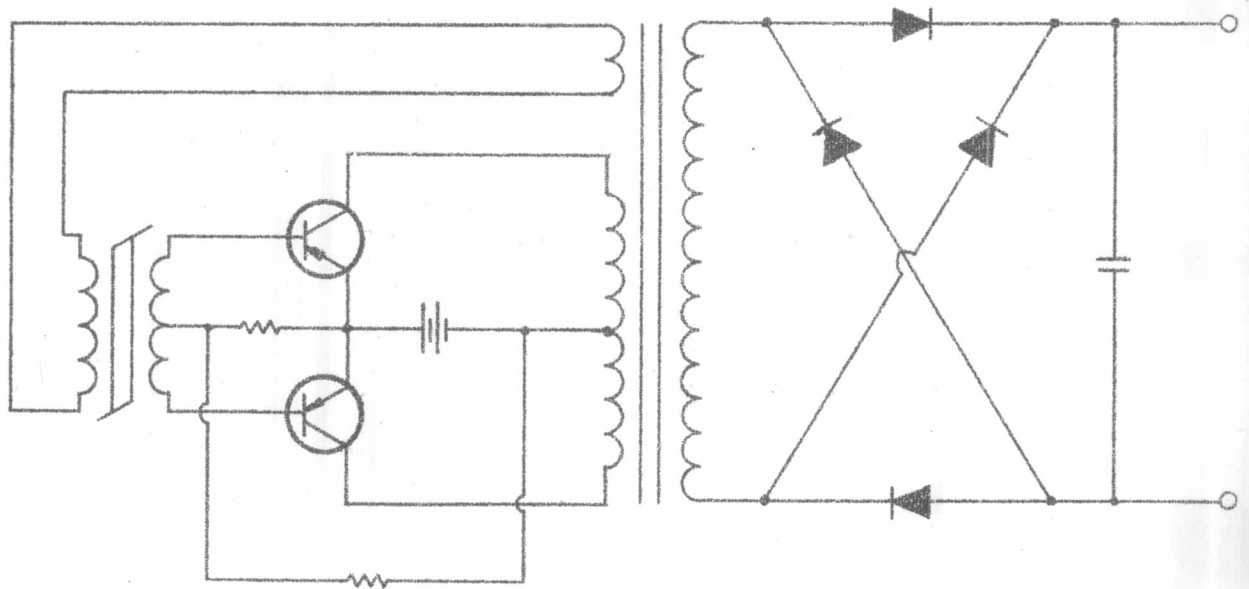
(1) One transistor converter



(2) Converter with speed-up and individual starting circuit



(3) Diode self-oscillating circuit



(4) Two transformer converter

Fig.4 Some other self-oscillating converter circuits.

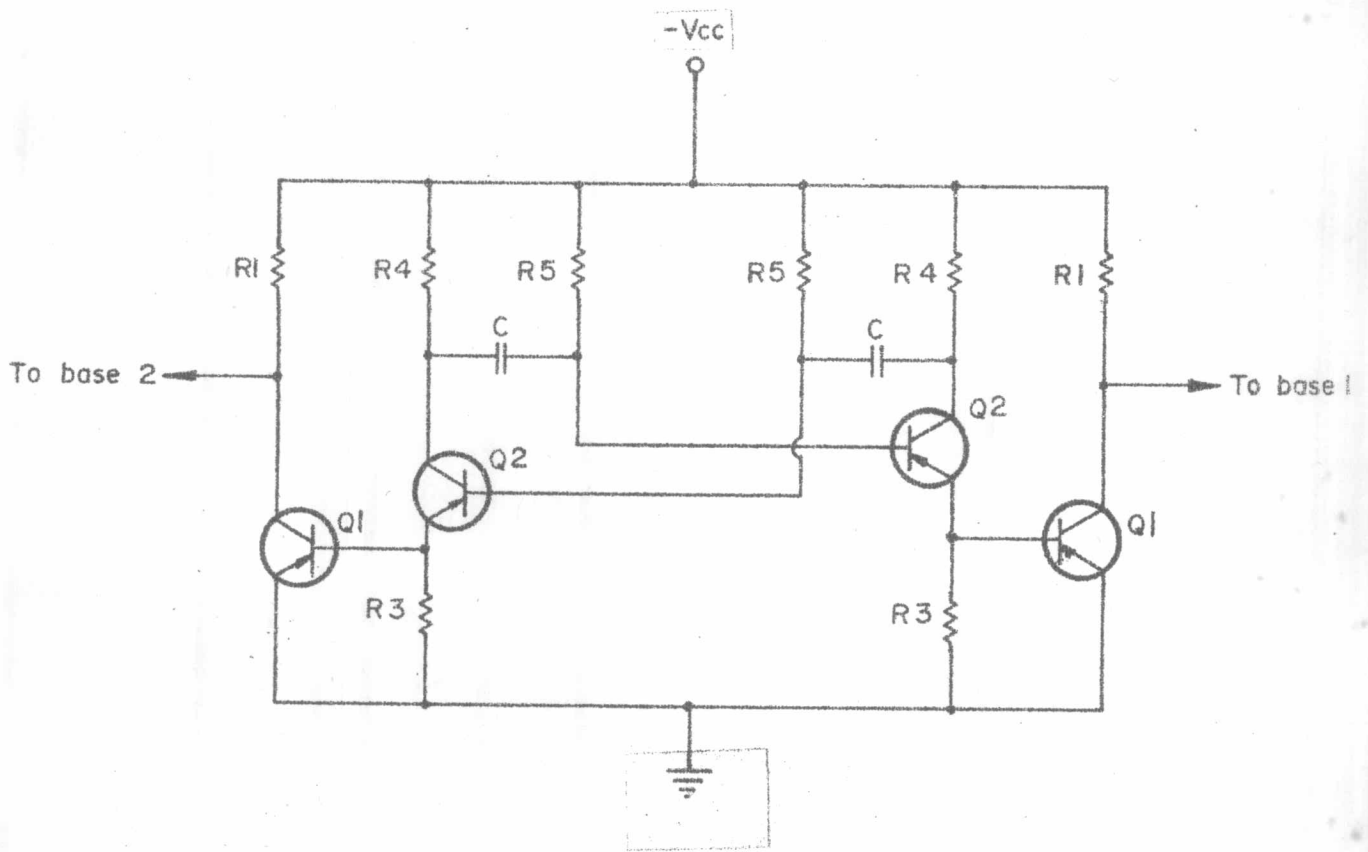


Fig.5 Driver circuit for driven converter.

Q1, Q2 = 2N 2905A

R1 = 120 Ω

R3 = 220 Ω

R4 = 2.4K

R5 = 56K

C = 6600 pF

0V

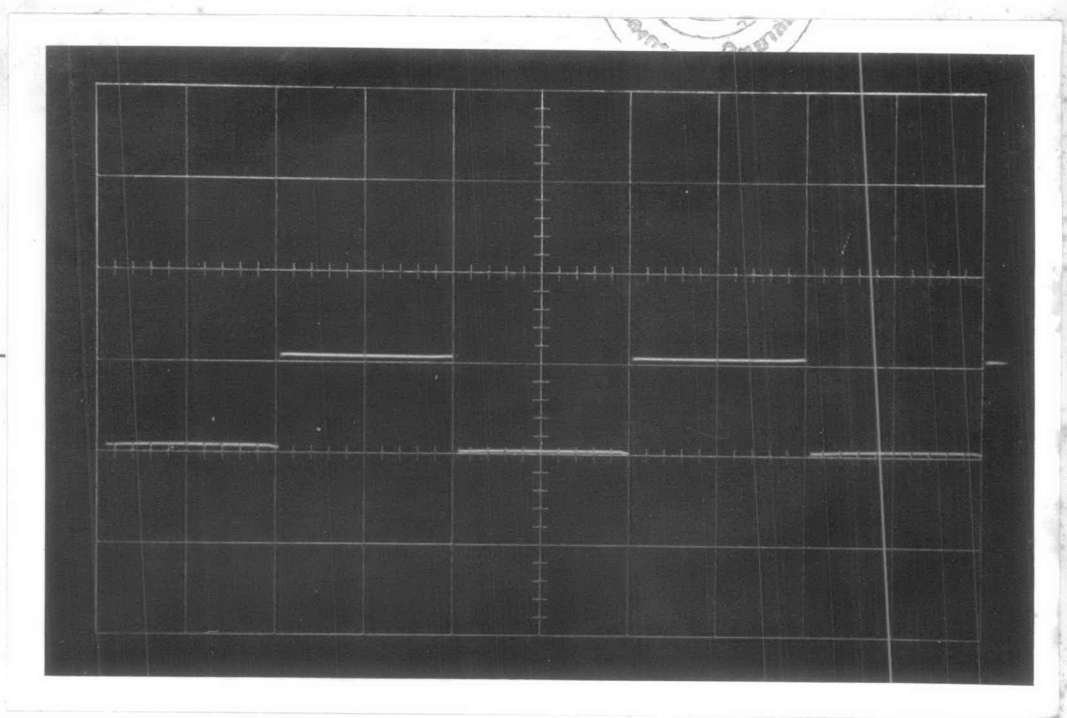


Fig. 6-A Base to emitter voltage. Scale 10V/div., 100ps/div.

0V

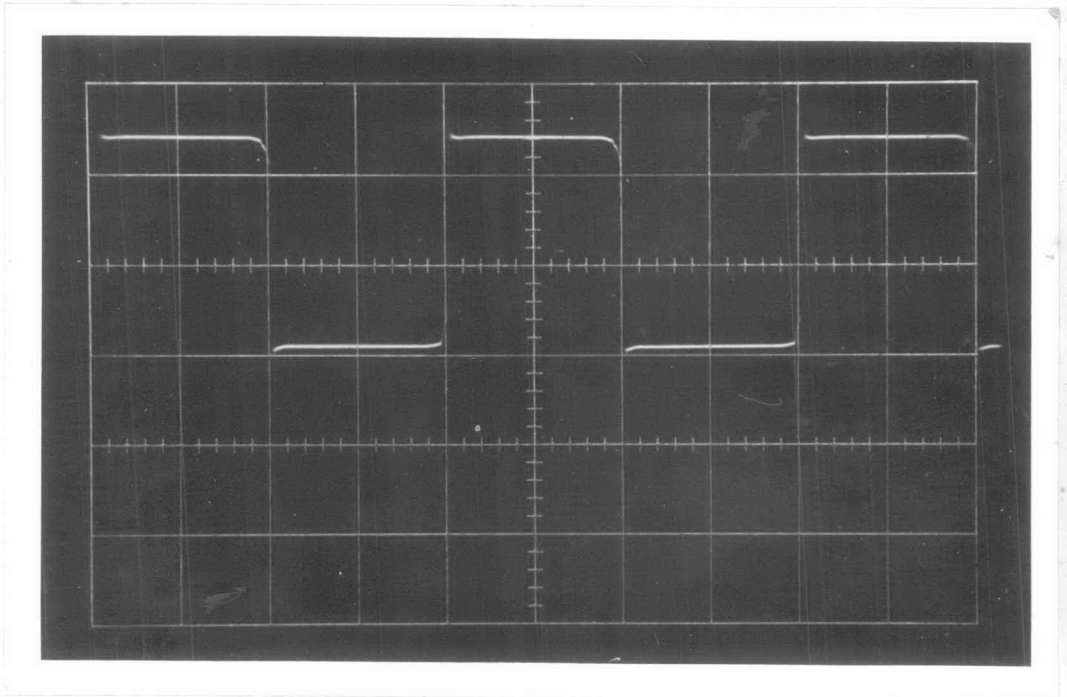


Fig. 6-B Collector to emitter voltage, Scale 20V/div., 100ps/div.

0V

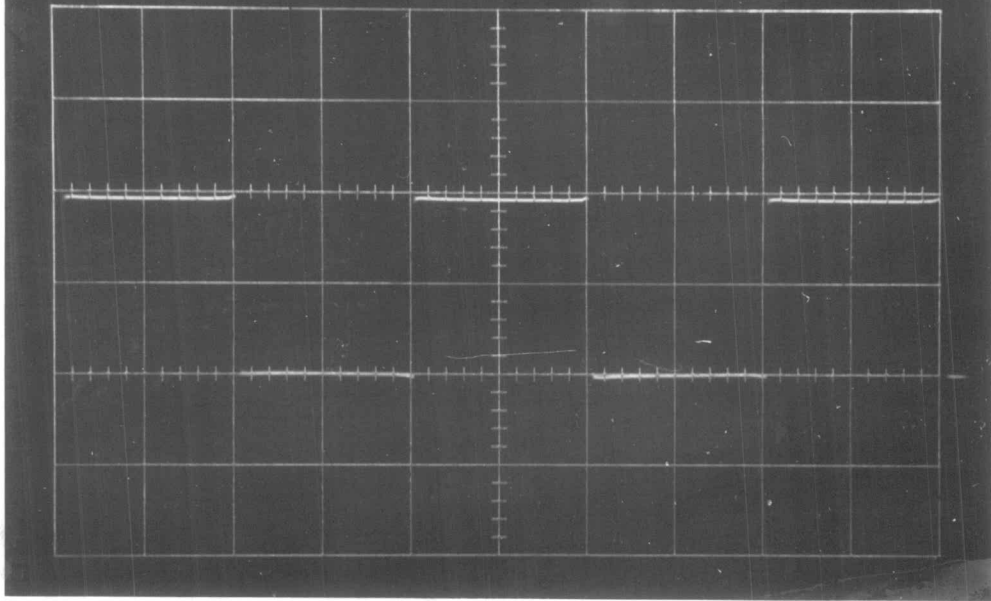


Fig. 6-C Feedback voltage. Scale 5V/div., 100 μ s/div.

0A

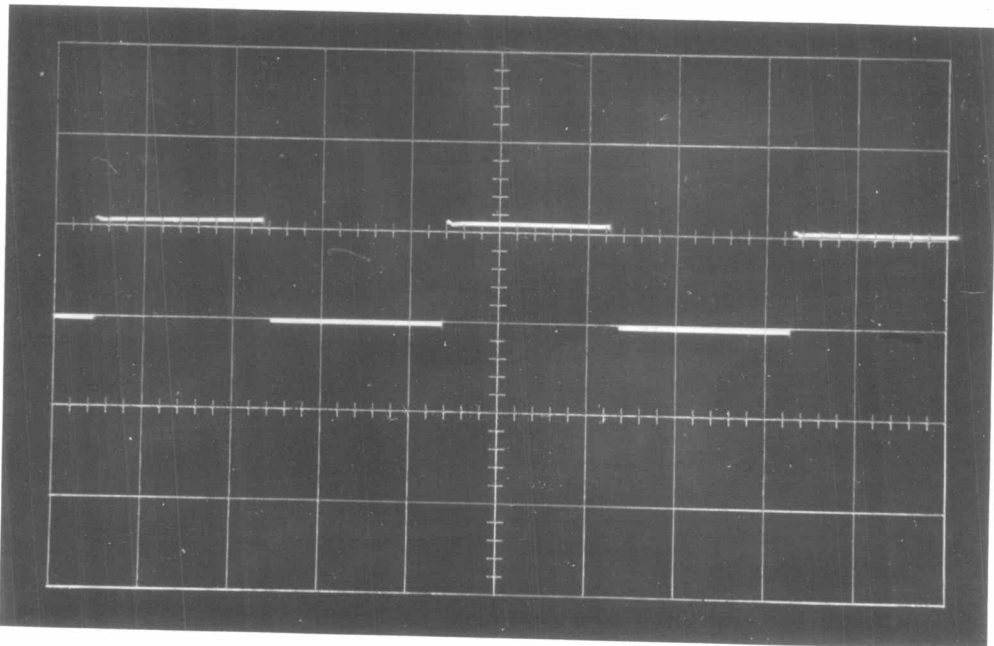


Fig. 6-D Base current. Scale 0.05A/div., 100 μ s/div.

I16656751

0A

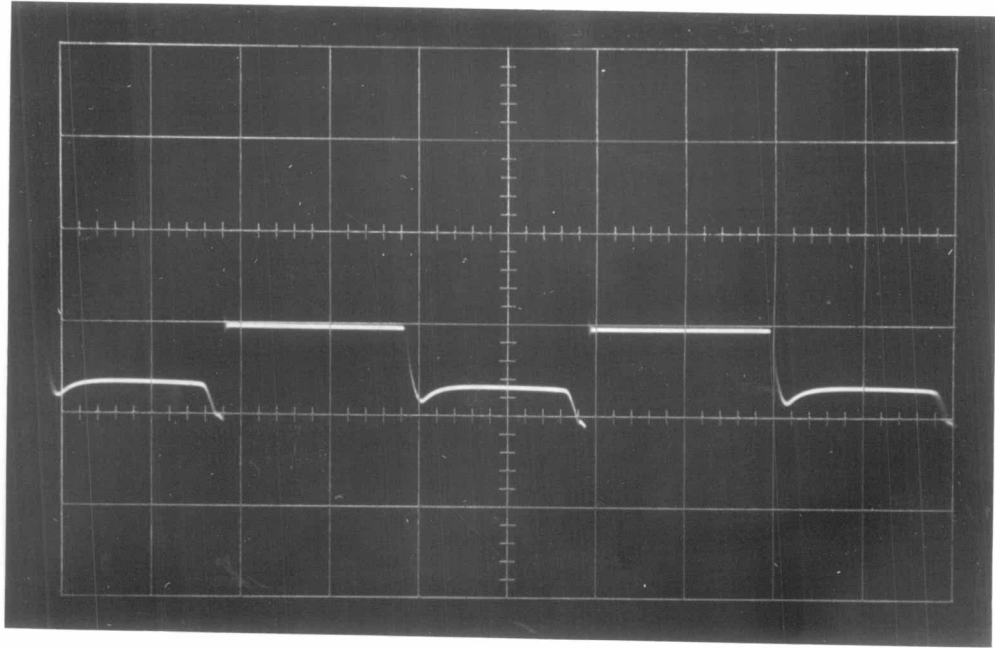


Fig. 6-E Collector current. Scale 1A/div., 100us/div.

0A

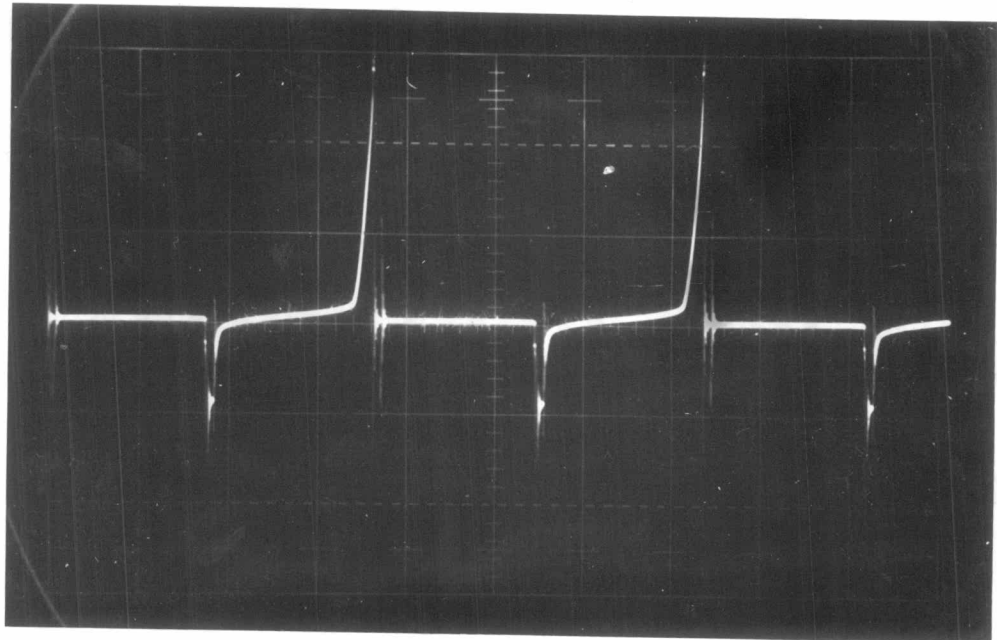


Fig. 6-F Collector current at no load. Scale 0.5A/div., 100us/div.

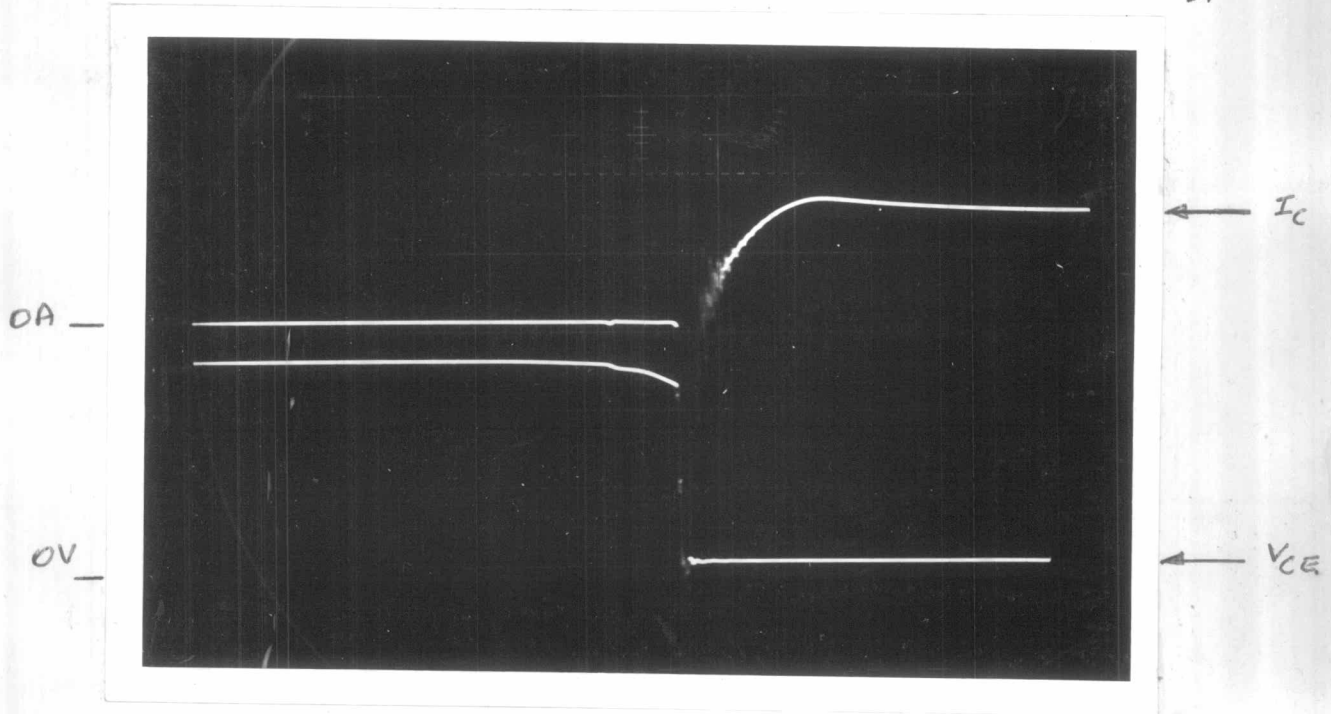


Fig 6-G I_C and V_{CE} during switching ON. Scale 0.5A/div., 20V/div., 10ns/div.

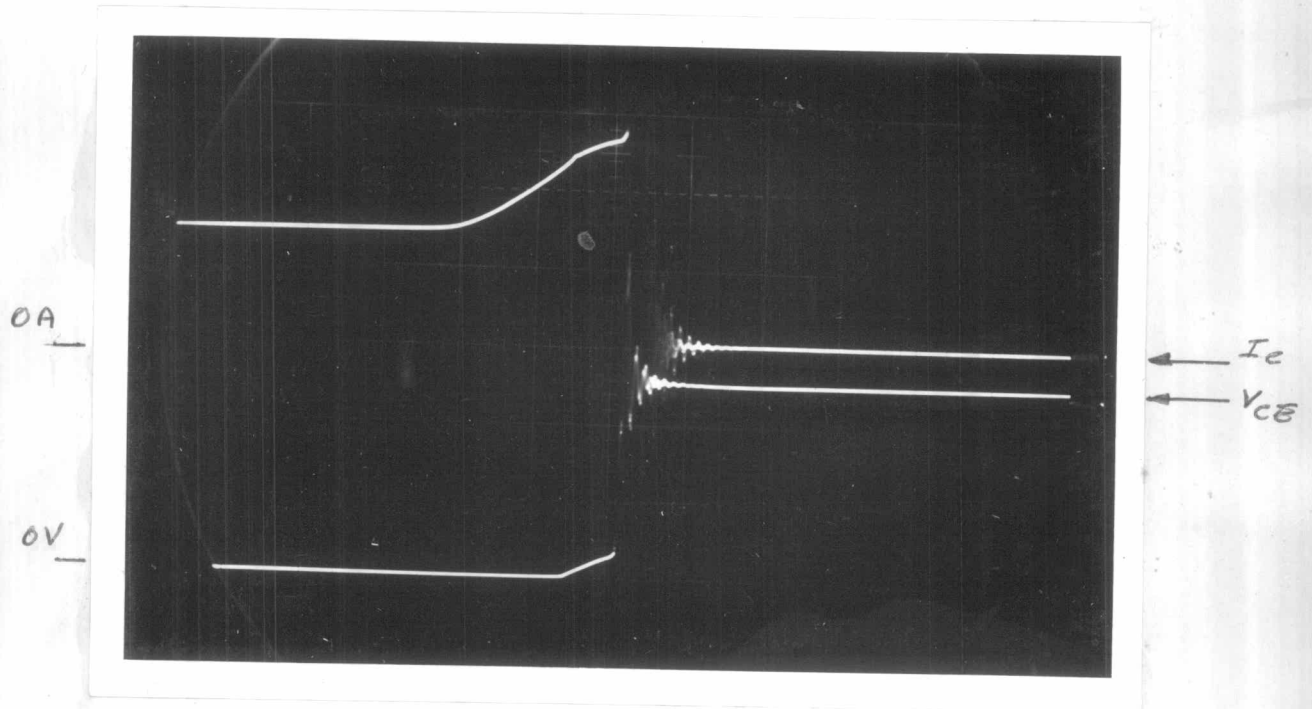


Fig. 6-H I_C and V_{CE} during switching OFF. Scale 0.5A/div., 20V/div., 10ns/div.

0V

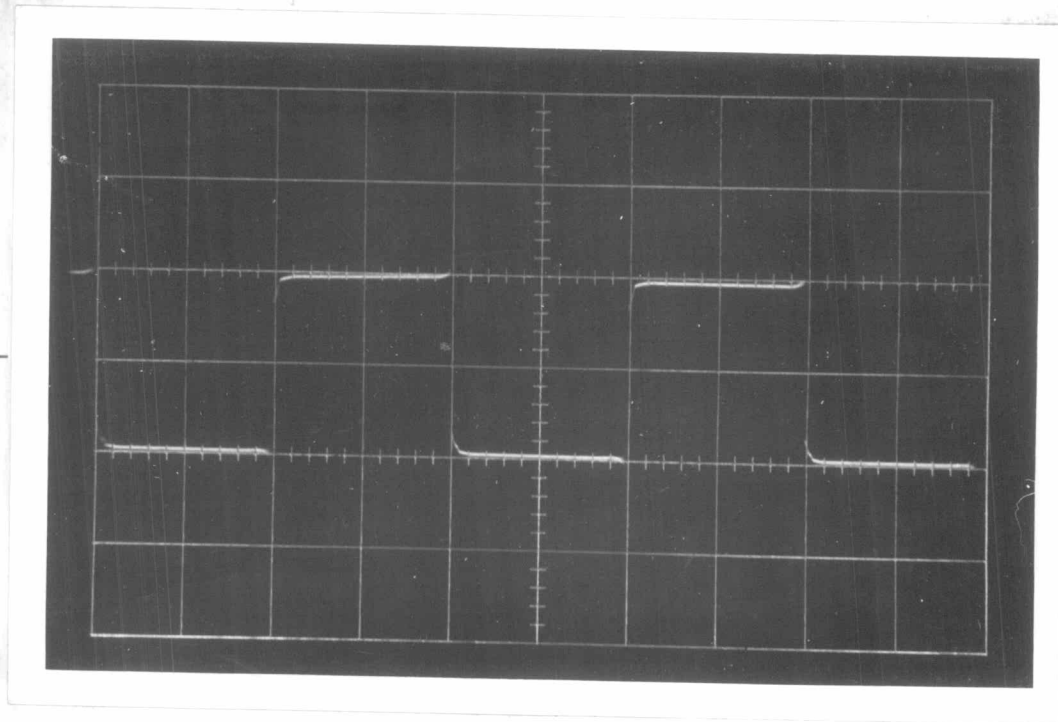


Fig. 6-I Transformer primary voltage. Scale 50V/div., 100us/div.

0V

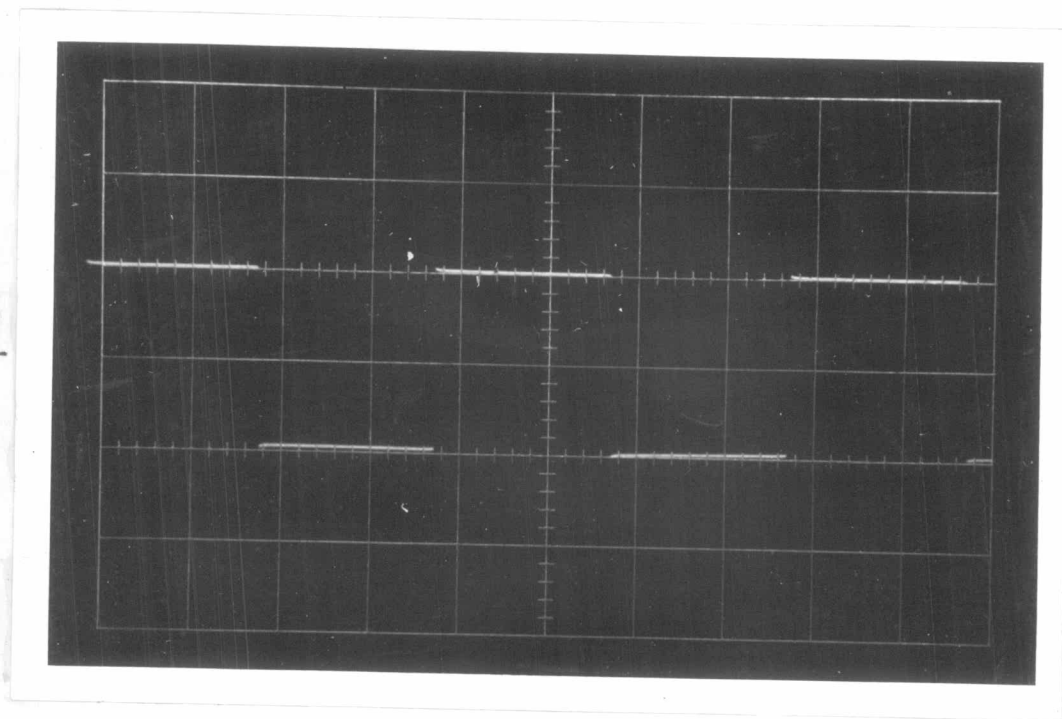


Fig. 6-J Transformer secondary voltage. Scale 100V/div., 100us/div.

Fig. 6 Waveforms of the 15W, 25-100V, self-oscillating converter.

0A

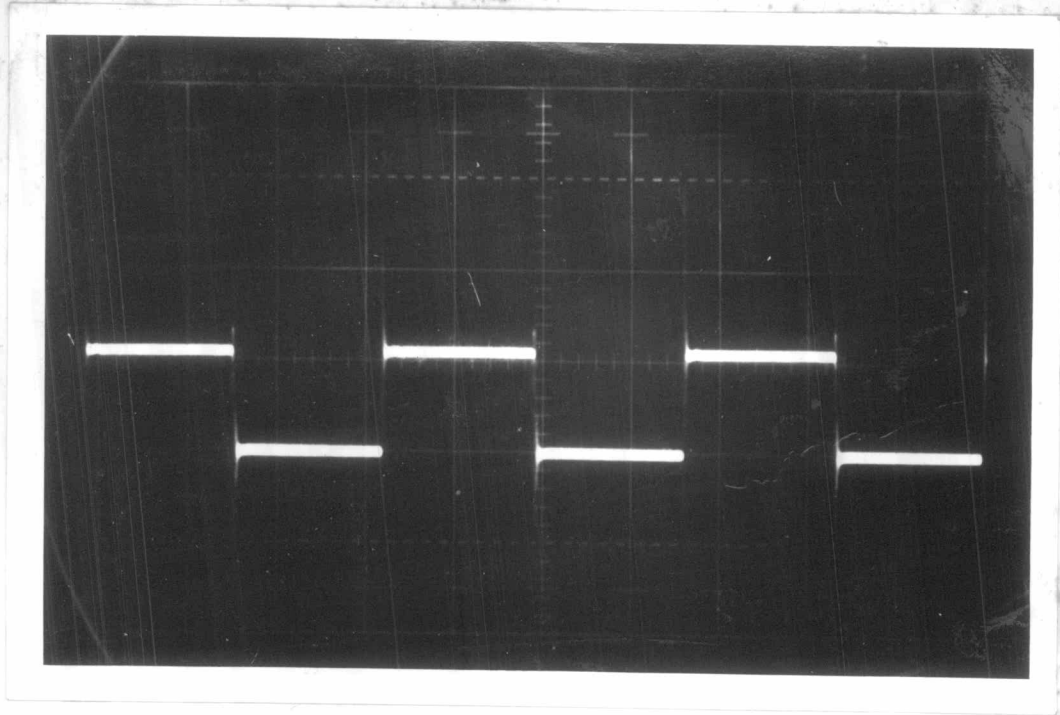


Fig. 7-A Base current. Scale 0.05A/div., 100ns/div.



0A

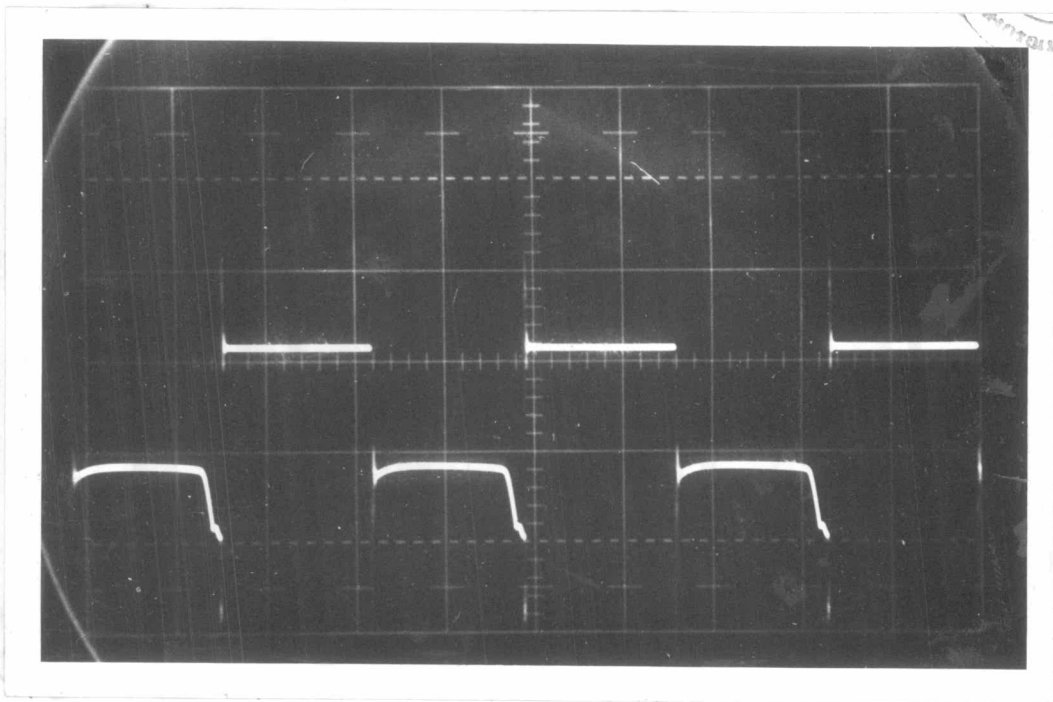


Fig. 7-B Collector current. Scale 0.5A/div., 100ns/div.

0V

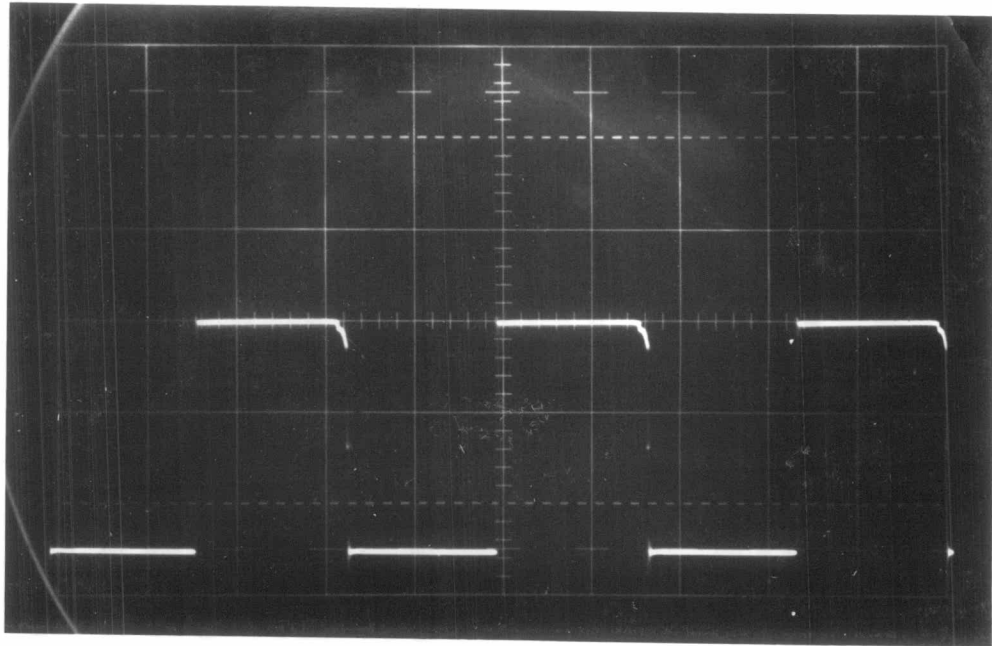


Fig. 7-C Collector to emitter voltage. Scale 20V/div., 100 μ s/div.

0V

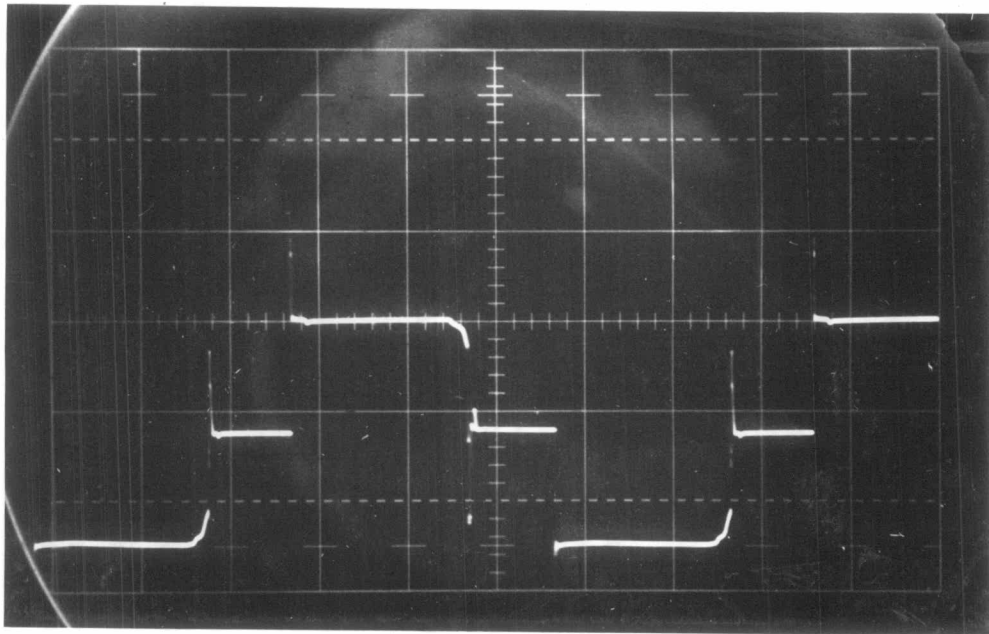


Fig. 7-D V_{CE} when the driver's frequency is less than 3.3 kHz.

Scale 20V/div., 100 μ s/div.

0A

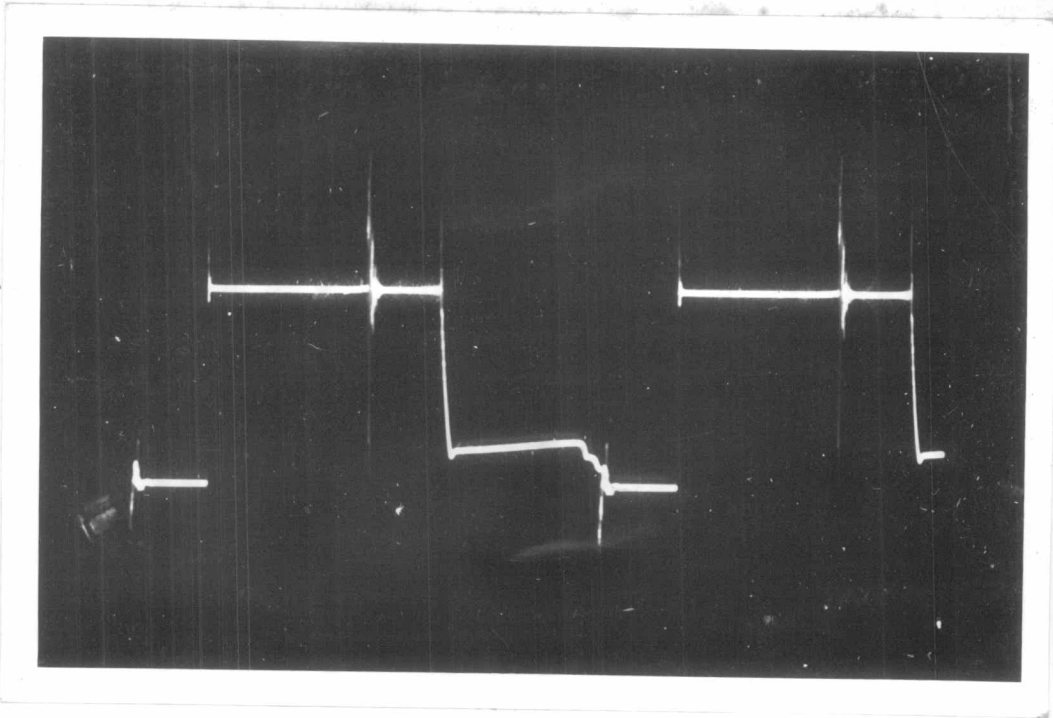


Fig. 7-E I_C when the driver frequency is less than 3.3 kHz.

Scale 0.5A/div., 100 μ s/div.

Fig. 7 Waveforms of 15W, 25-100V, driven converter.

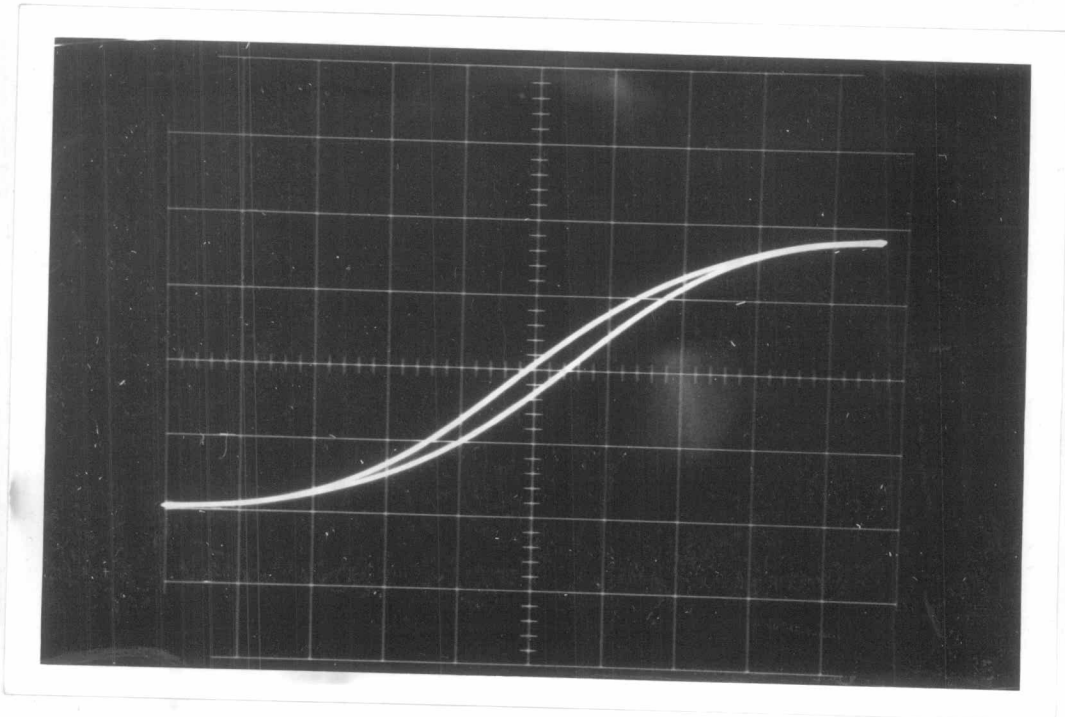


Fig. 8 B-H curve of TDK h5B ferrite core. Scale: vert.=50mV/div., (1940 gauss/
hor.=500mV/div. (3.33 oersted/div.))

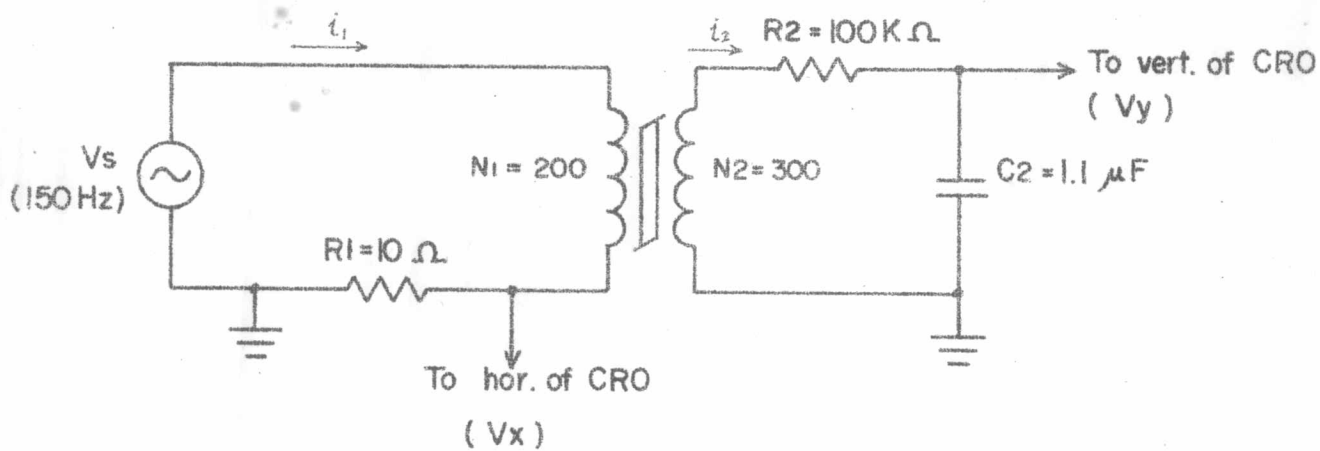


Fig. 9 Circuit for determining B-H curve



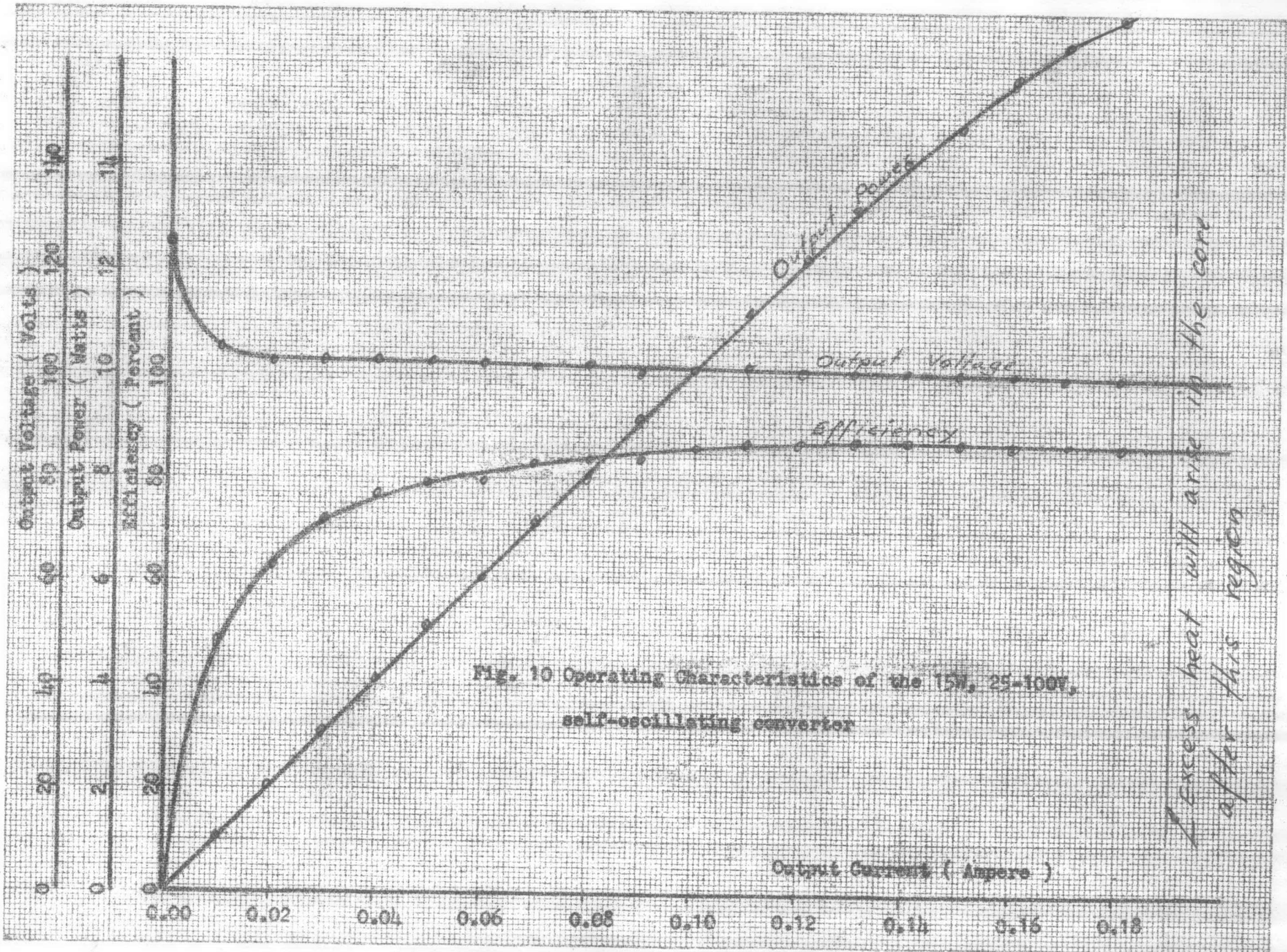


Fig. 10 Operating Characteristics of the 15%, 25-100V, self-oscillating converter

Excess heat will arise in the core after this region

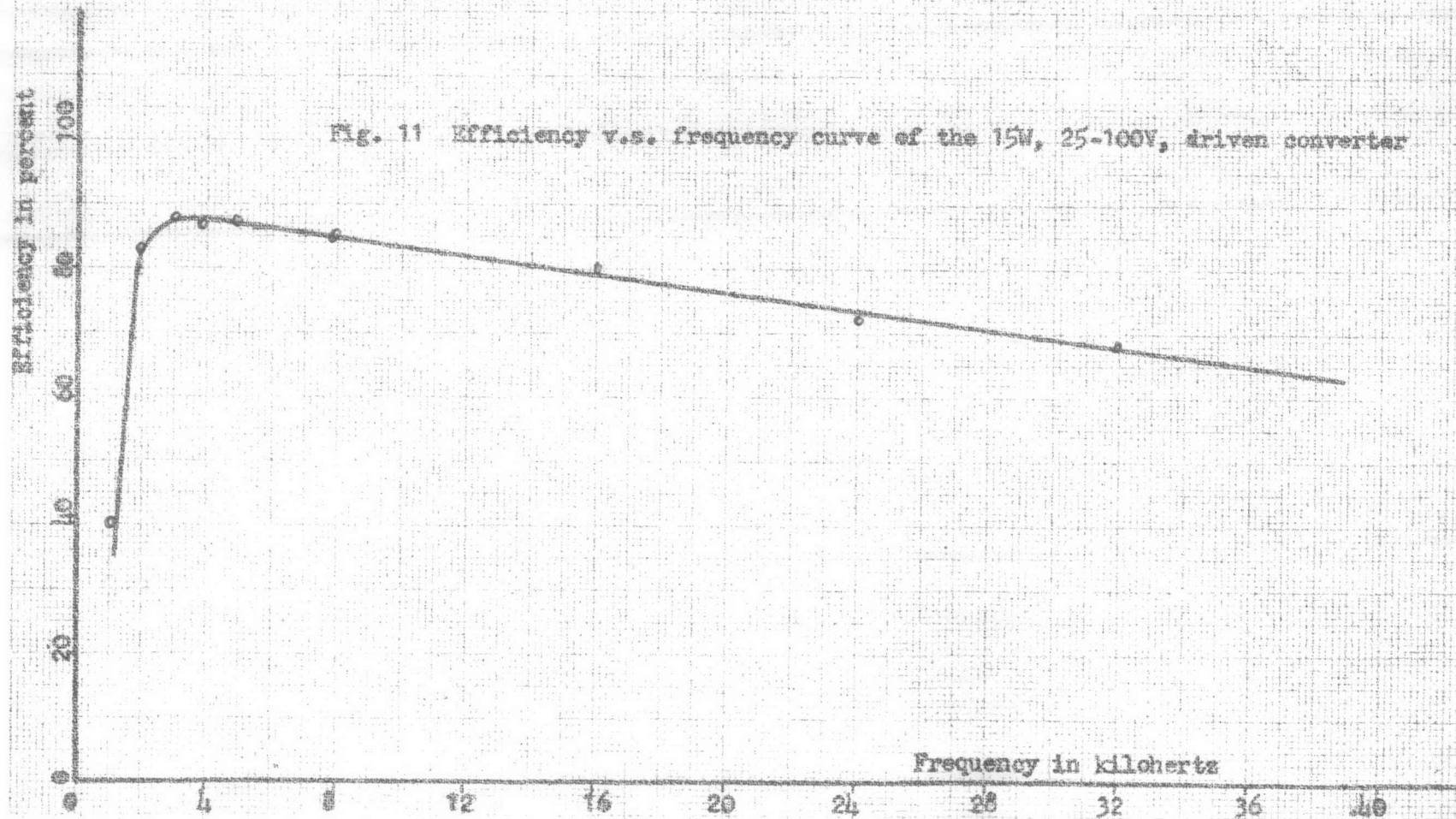


Fig. 11 Efficiency v.s. frequency curve of the 15W, 25-100V, driven converter

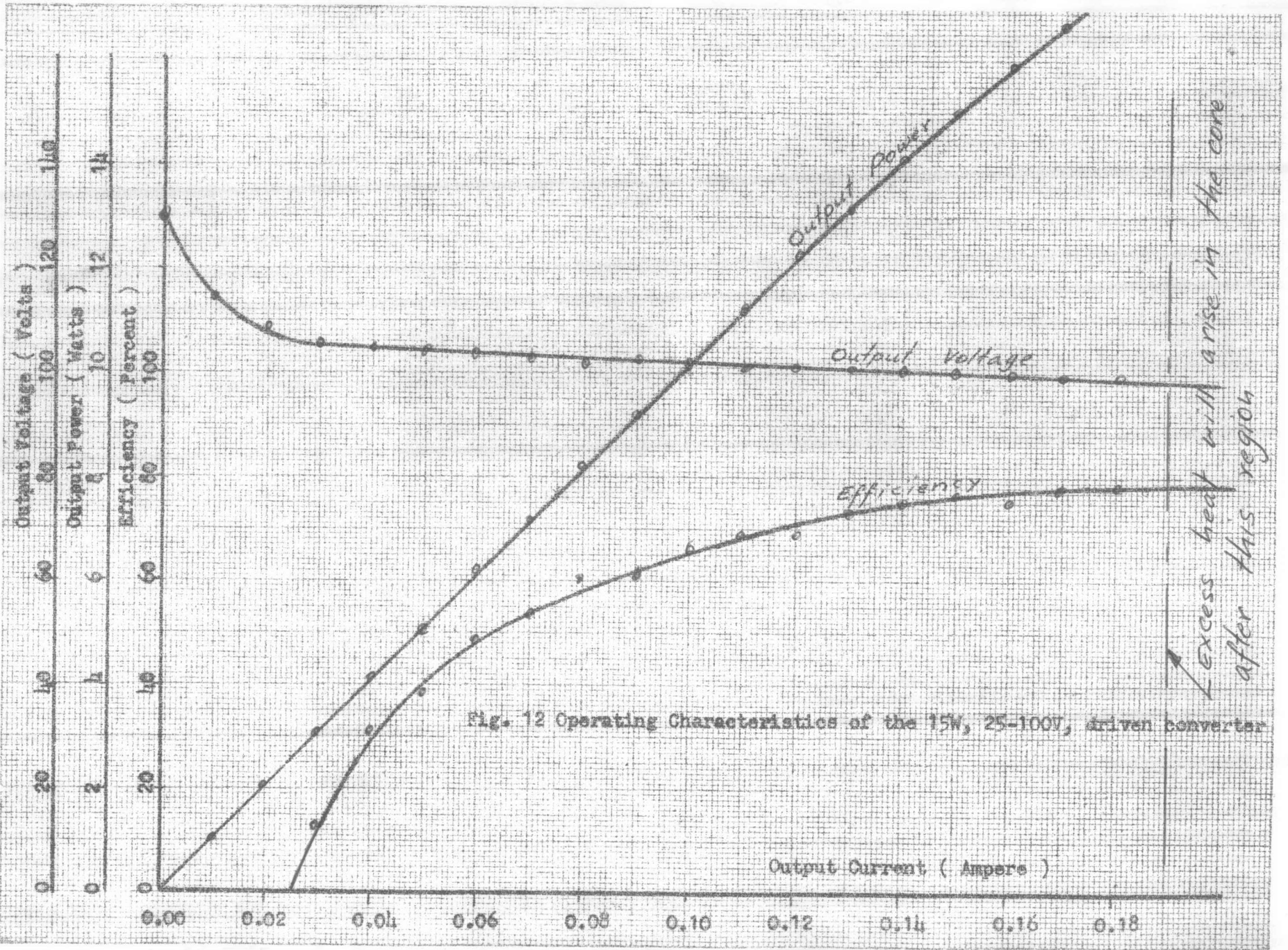


Fig. 12 Operating Characteristics of the 15W, 25-100V, driven converter

FEEDBACK VOLTAGE TABLE

V_{in}	$V_{BE(sat)}$	0.2	0.3	0.4	0.5	0.6	0.7	0.8
2		0.84	1.08	1.31	1.53	1.74	1.95	2.16
4		1.09	1.40	1.67	1.92	2.17	2.40	2.62
6		1.29	1.64	1.95	2.24	2.50	2.76	3.01
8		1.46	1.85	2.19	2.50	2.80	3.07	3.34
10		1.61	2.03	2.40	2.74	3.05	3.35	3.64
12		1.75	2.20	2.59	2.95	3.29	3.60	3.90
14		1.87	2.35	2.76	3.15	3.50	3.83	4.15
16		1.99	2.49	2.93	3.33	3.70	4.05	4.38
18		2.10	2.62	3.08	3.50	3.89	4.25	4.60
20		2.20	2.75	3.23	3.66	4.06	4.44	4.80
30		2.65	3.30	3.86	3.37	4.84	5.28	5.70
40		3.03	3.76	4.40	4.97	5.50	5.99	6.46
50		3.36	4.17	4.87	5.50	6.08	6.62	7.12
60		3.66	4.54	5.30	5.98	6.60	7.18	7.73
70		3.94	4.88	5.69	6.42	7.08	7.70	8.28
80		4.20	5.20	6.06	6.82	7.53	8.18	8.80
90		4.44	5.49	6.40	7.20	7.95	8.64	9.29
100		4.67	5.78	6.72	7.57	8.35	9.07	9.74