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**Title:** Spezialmodell S2. Rechengerät für  
Flügelvermessung mit automatischer Ablesbarkeit  
der Meßuhren

**Author(s):** Konrad Zuse

**Date:** 1944(?)

**Published by:** Konrad Zuse Internet Archive

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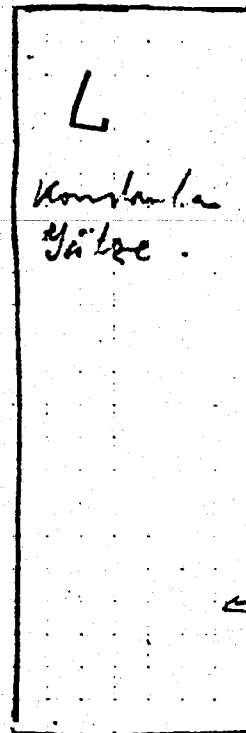
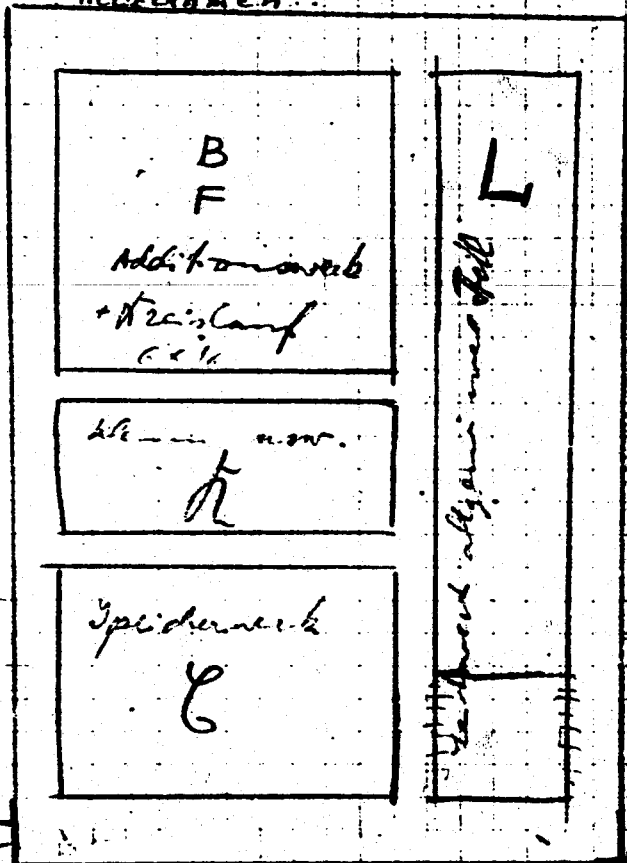
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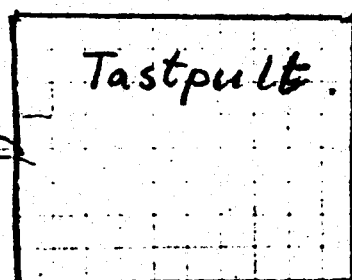
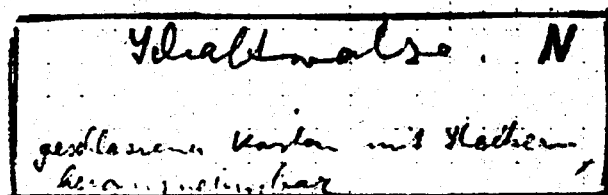
# Gesamtanordnung.

002/004  
S<sub>2</sub> 0498 1

Holzzerbmen...



← Klappbar



K.e

Aufgabe

Seite

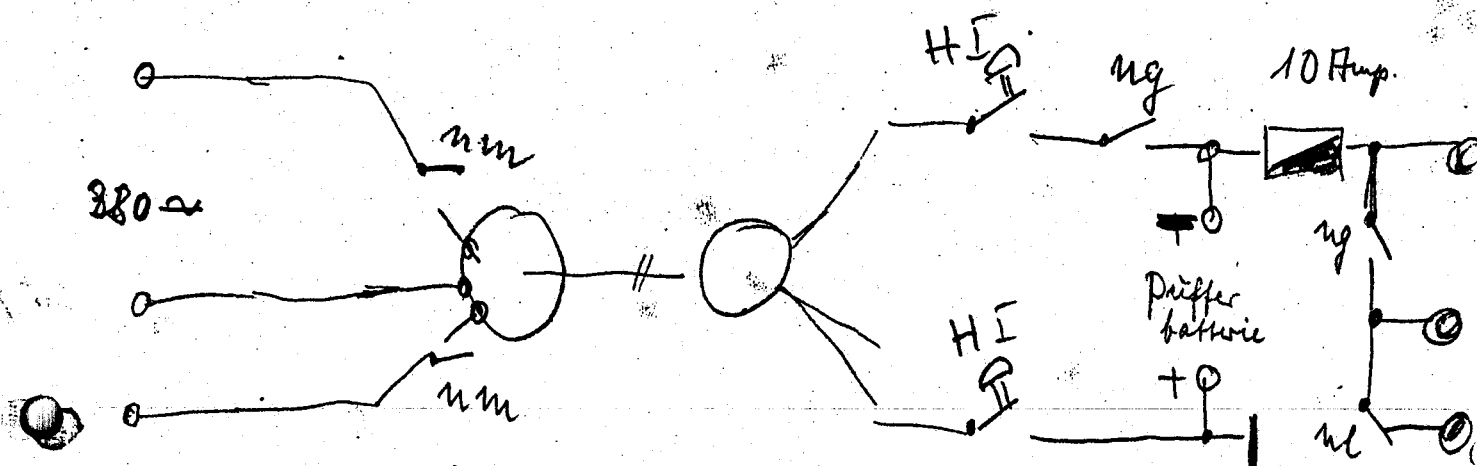
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B	02	Additionswerk
C	03	Speicherwerk
D	04	Rücküberschaltung
E	05	
F	06	Verteiler d. Zahlenkreisläufe
G	07	FL = Rechnung
H	08	H-L = Rechnung
I	09	
J	10	A = Rechnung
K	11	Gehtwerk; allgemeines Teil
L	12	
M	13	Spannungsversorgung, Schaltwerke usw.
N	14	
O	15	
P	16	
Q	17	
R	18	Resultatansetzung
S	19	Berechnung von $d_1$ und $d_2$
T	20	Taktsteuer
U	21	Übersehen
V	22	
W	23	
X	24	
Y	25	
Z	26	Zifferneinstellung

Anderson

N

10712.

$\sqrt{2}$   
24.12.



Men : mm 1a/3

ausfalls : H II, III

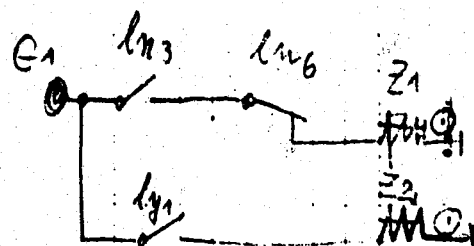
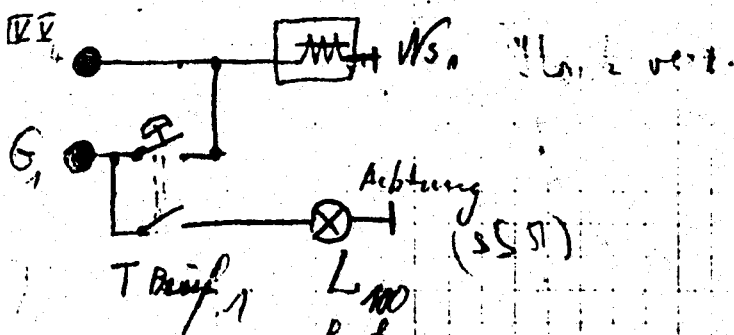
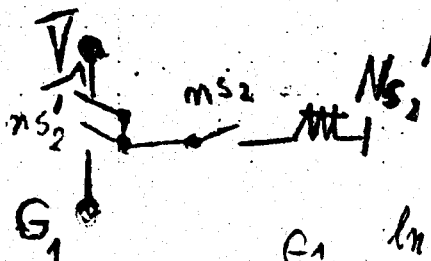
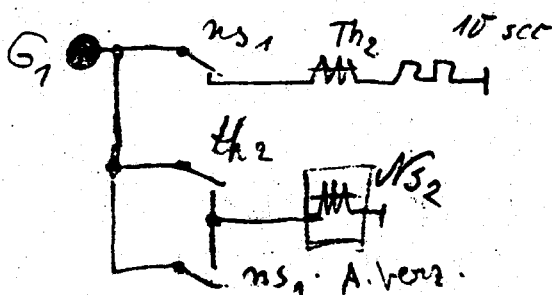
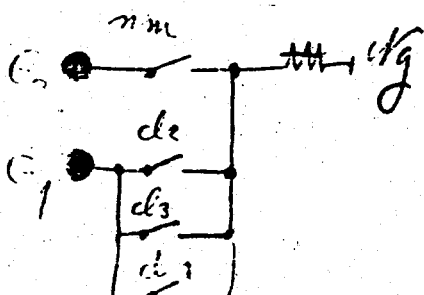
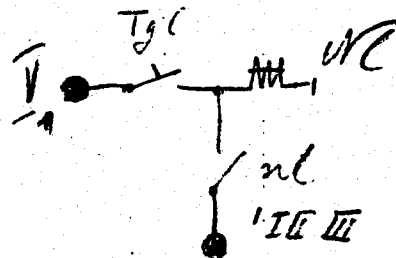
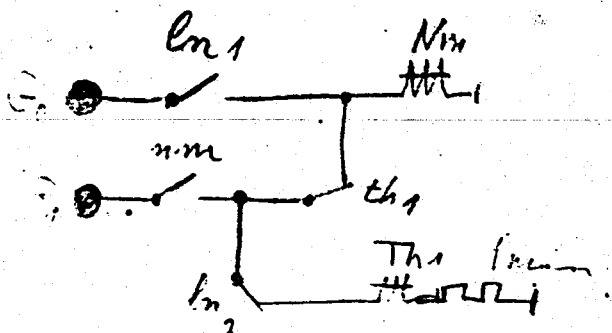
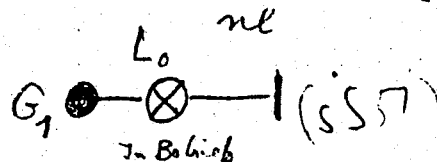
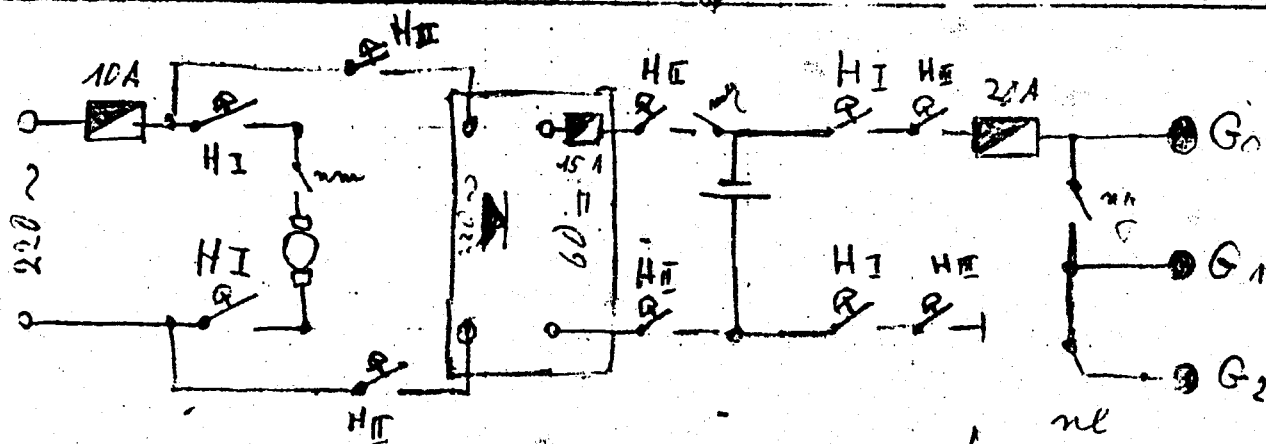
h.

N.

Ylempiöngelmä

S<sub>2</sub>

3 (31)



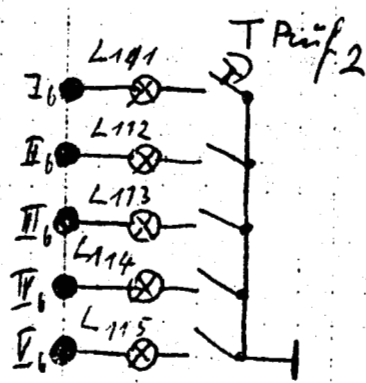
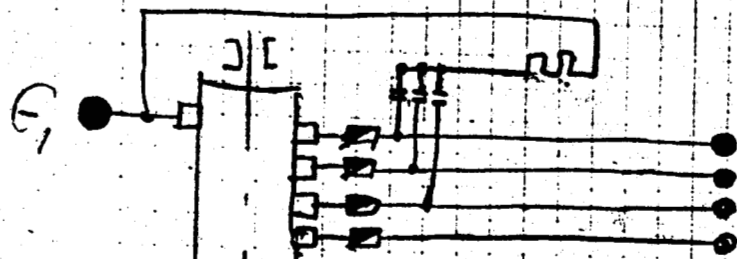
W

Schaltwalse

S<sub>2</sub>

4

(31)



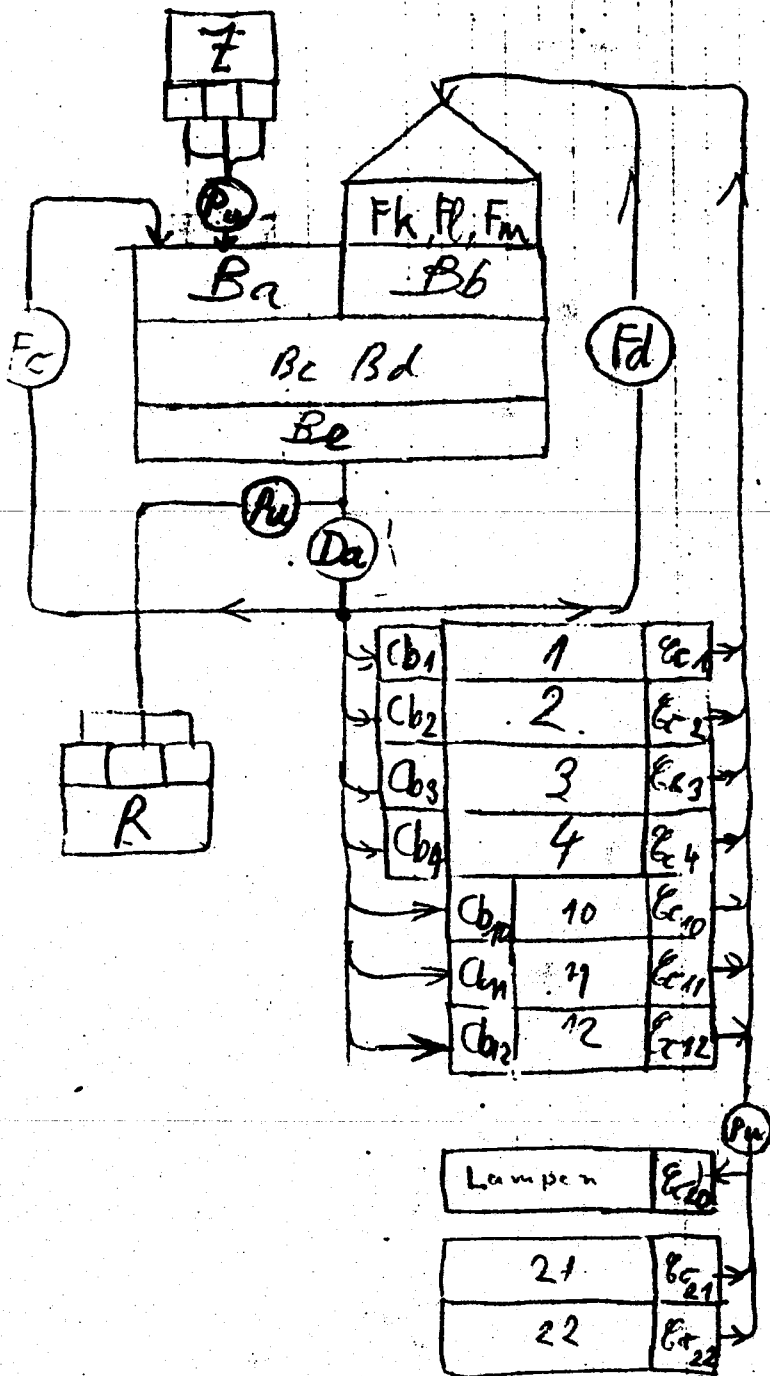
I<sub>1</sub>  
II<sub>1</sub>  
II<sub>2</sub>  
II<sub>3</sub>  
III<sub>1</sub>  
III<sub>2</sub>  
III<sub>3</sub>

keine Kondensatoren  
aus der Baugruppe

711

# Zahlenkreisläufe

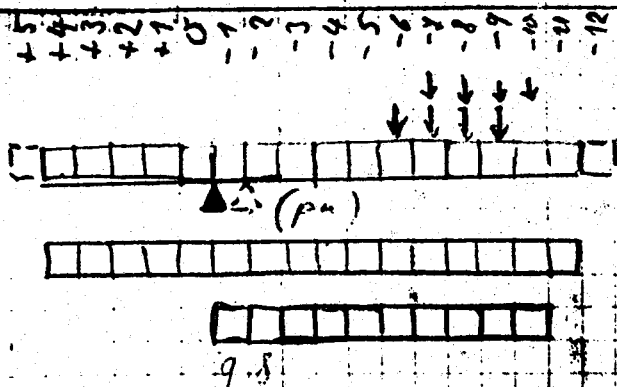
$S_2$  5 (1)



HL  $\left. \begin{matrix} F_{l1}, d_e \\ F_{l2}, d_n \end{matrix} \right\} \begin{matrix} E_{c1} \\ E_{c2} \\ E_{c3} \end{matrix} \left. \begin{matrix} 1 \rightarrow 2 \\ 2 \rightarrow 3 \\ 3 \rightarrow 1 \end{matrix} \right\}$

10  $\rightarrow$  11  
11  $\rightarrow$  12  
12  $\rightarrow$  10

$\sigma_1$   
 $\sigma_2$



$B_a B_b$

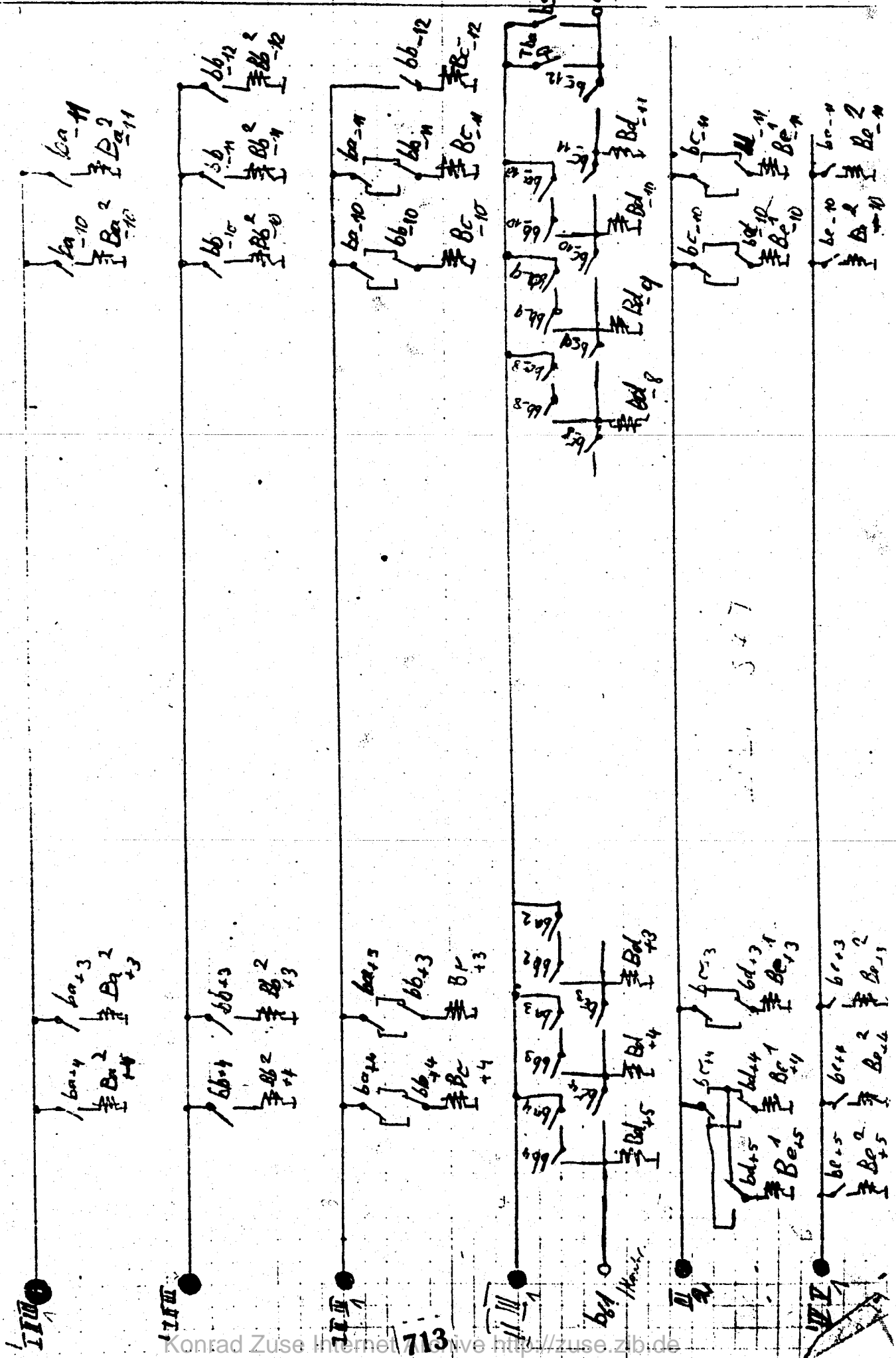
$E_{c1} \div x$   $E_{c2}, E_{c3}$   
 $E_{c4}, E_{c5}, E_{c6}$

Additional work

S<sub>2</sub>

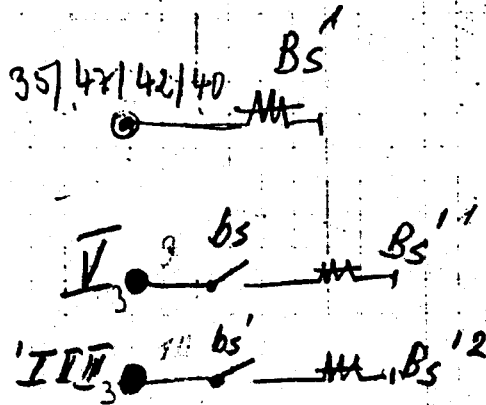
6

(3)

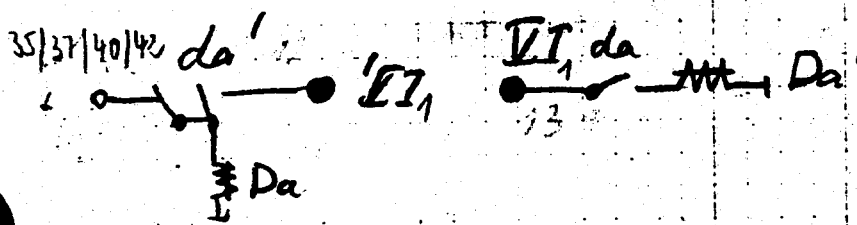
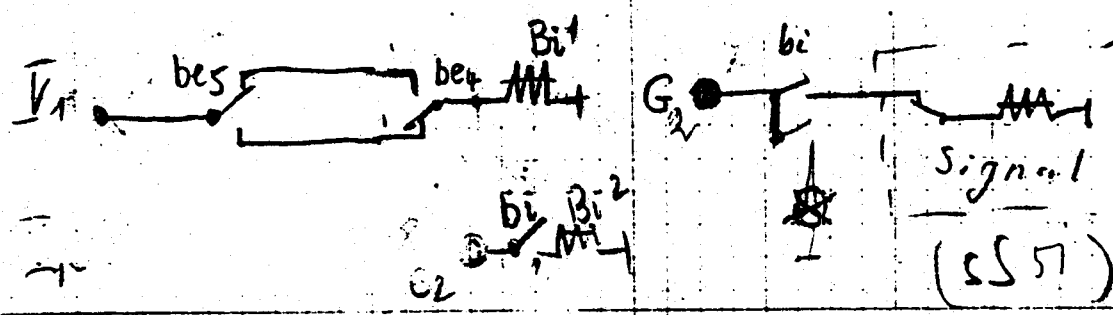




Substitutionskennzeichnung

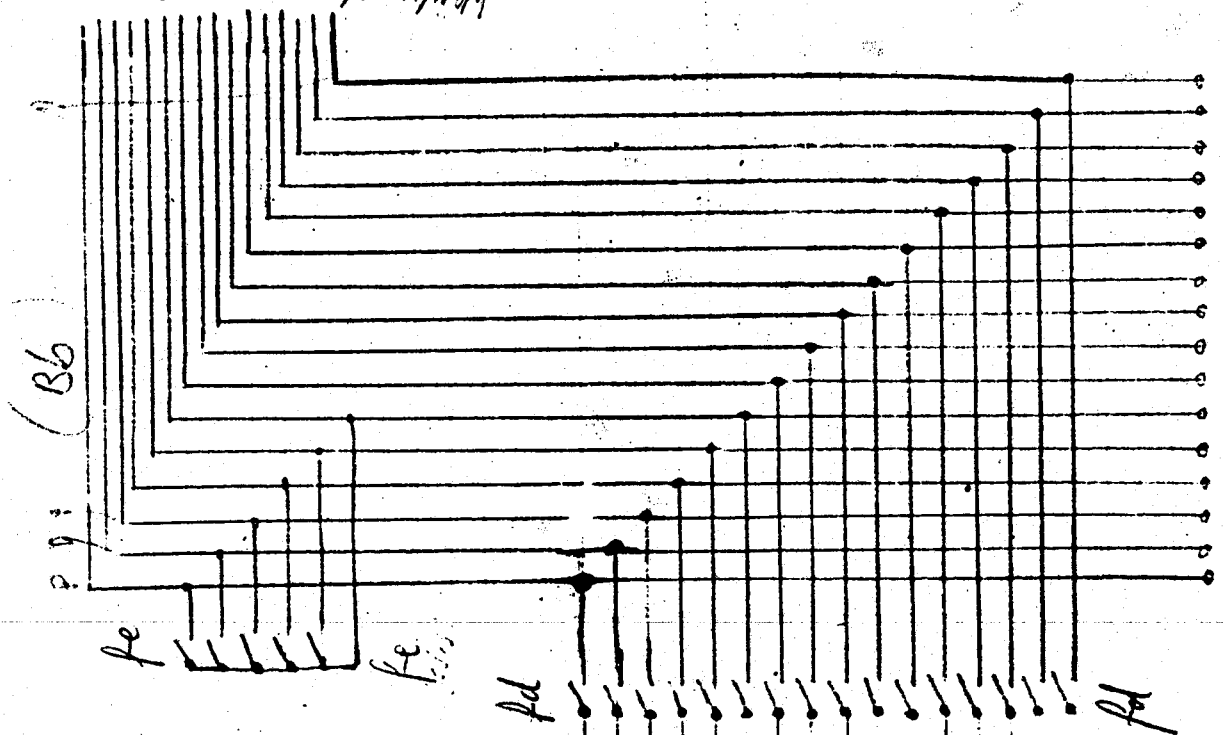


Thellomb. Beschreibung

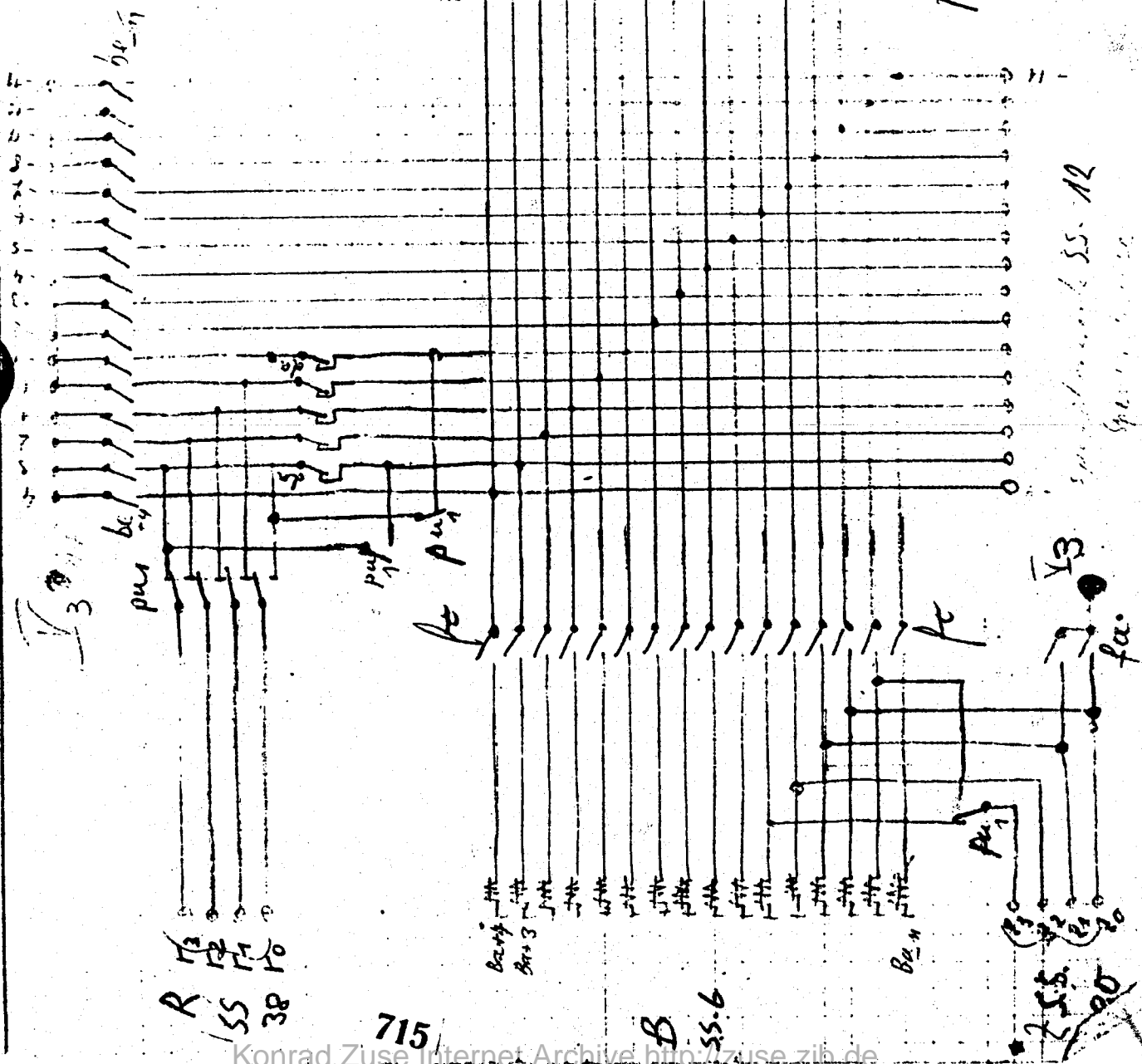


$|S_2| = 8$

Specimens 55. 14  
Misselwhite



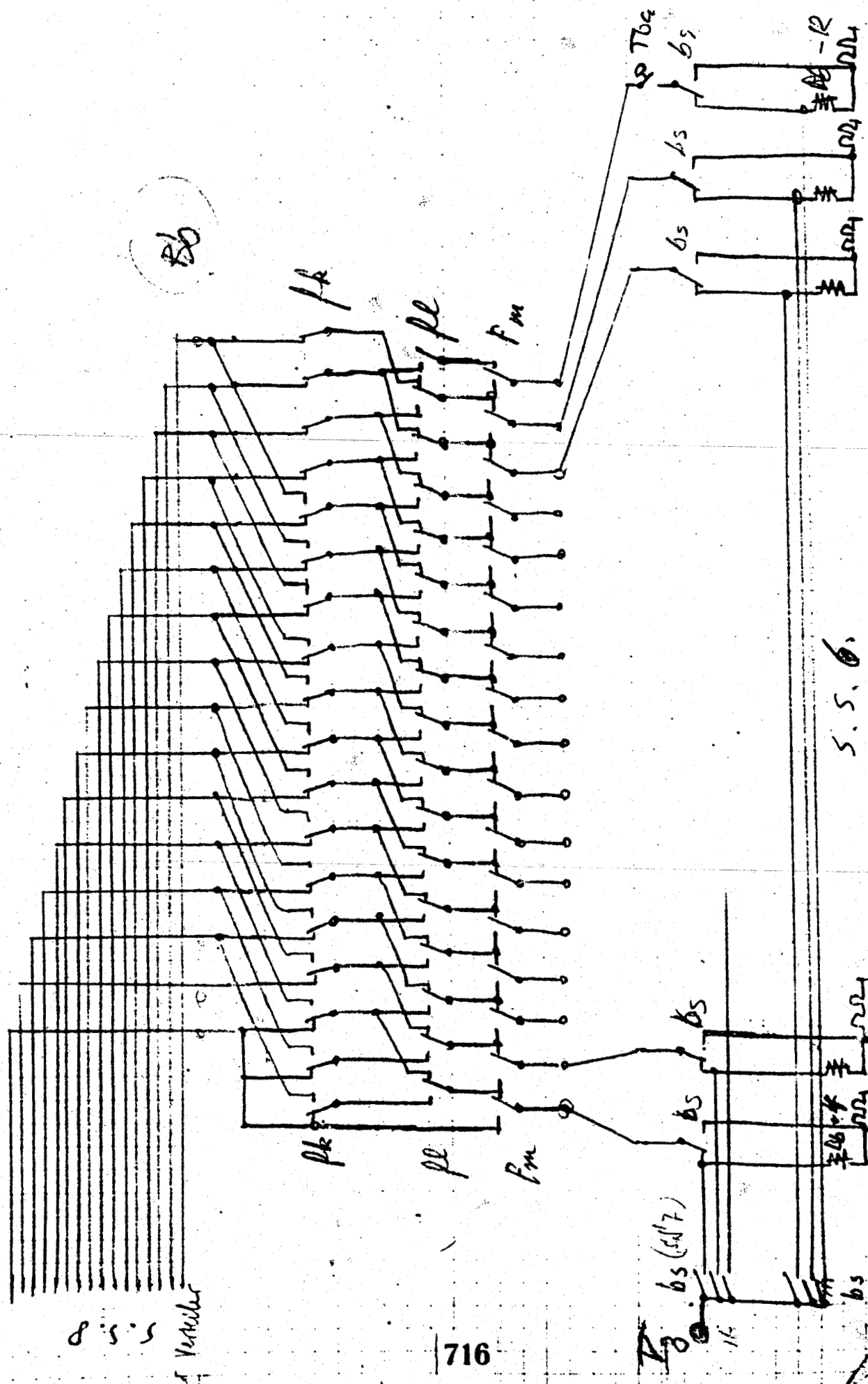
55-12

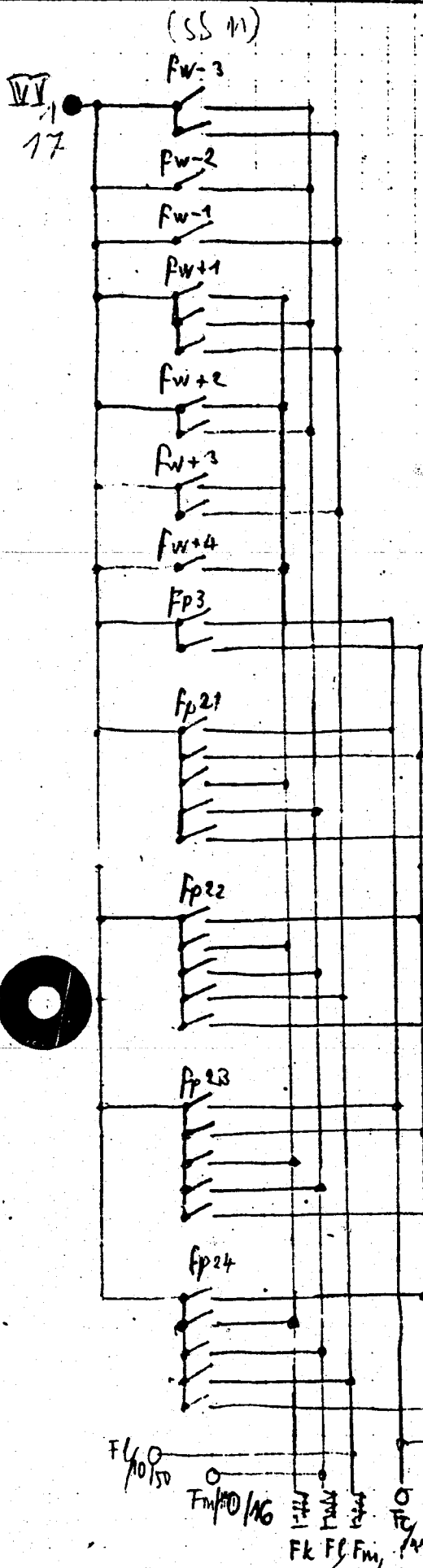


~~FILED~~  
R 55 38

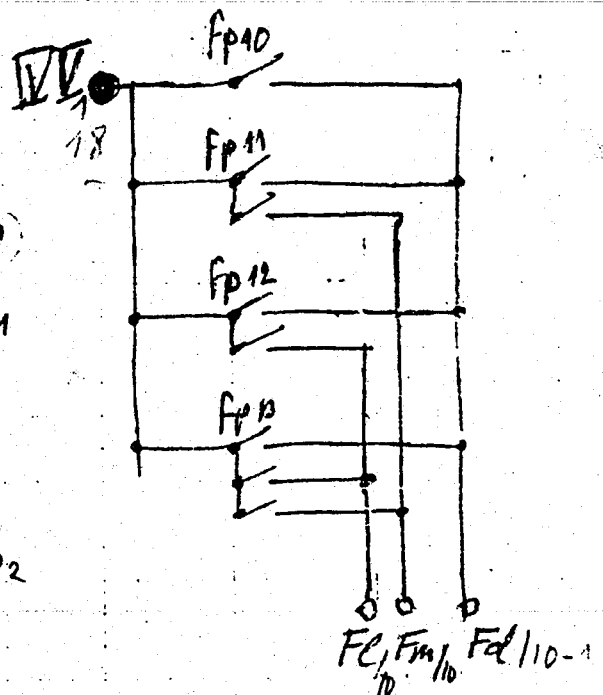
715

855





		Fk	Fc	Fm
Fw -3			X	X
Fw -2			X	
Fw -1				X
Fw 0				
Fw +1		X	X	X
Fw +2		X	X	
Fw +3		X		X
Fw +4		X		
Fp 10	0			
Fp 11	-1			X
Fp 12	-2		X	
Fp 13	-3		X	X



R

Verheerter  
Gemeinschaft

S<sub>2</sub>

AA

(I, II, IV, V)

IV U

49 0 — FP10  
AAA

40/42/35/37

0 — Fro  
AAA

49 0 — AAA<sup>M</sup>

40/42/35/37

0 — Fr<sup>-1</sup>  
AAA

49 0 — AAA<sup>12</sup>

40/42/35/37

0 — Fr<sup>-2</sup>  
AAA

49 140 0 — Fr<sup>13</sup>  
AAA

40/42/35/37

0 — Fr<sup>14</sup>  
AAA

35/37/42 0 — AAA<sup>3</sup>

10/40/42/35/47

0 — Fr<sup>15</sup>  
AAA

46 0 — AAA<sup>21</sup>

10/40/35/37  
1-2 47/42

0 — Fr<sup>16</sup>  
AAA

6140 0 — AAA<sup>22</sup>

46 0 — AAA<sup>23</sup>

46 0 — Fr<sup>24</sup>  
AAA

FW-3

9/37/40 0 — AAA

49/37 0 — AAA<sup>-2</sup>

49 0 — AAA<sup>-1</sup>

49/35/37/42/40 0 — AAA<sup>+1</sup>

49/35/37/42/40 0 — AAA<sup>+2</sup>

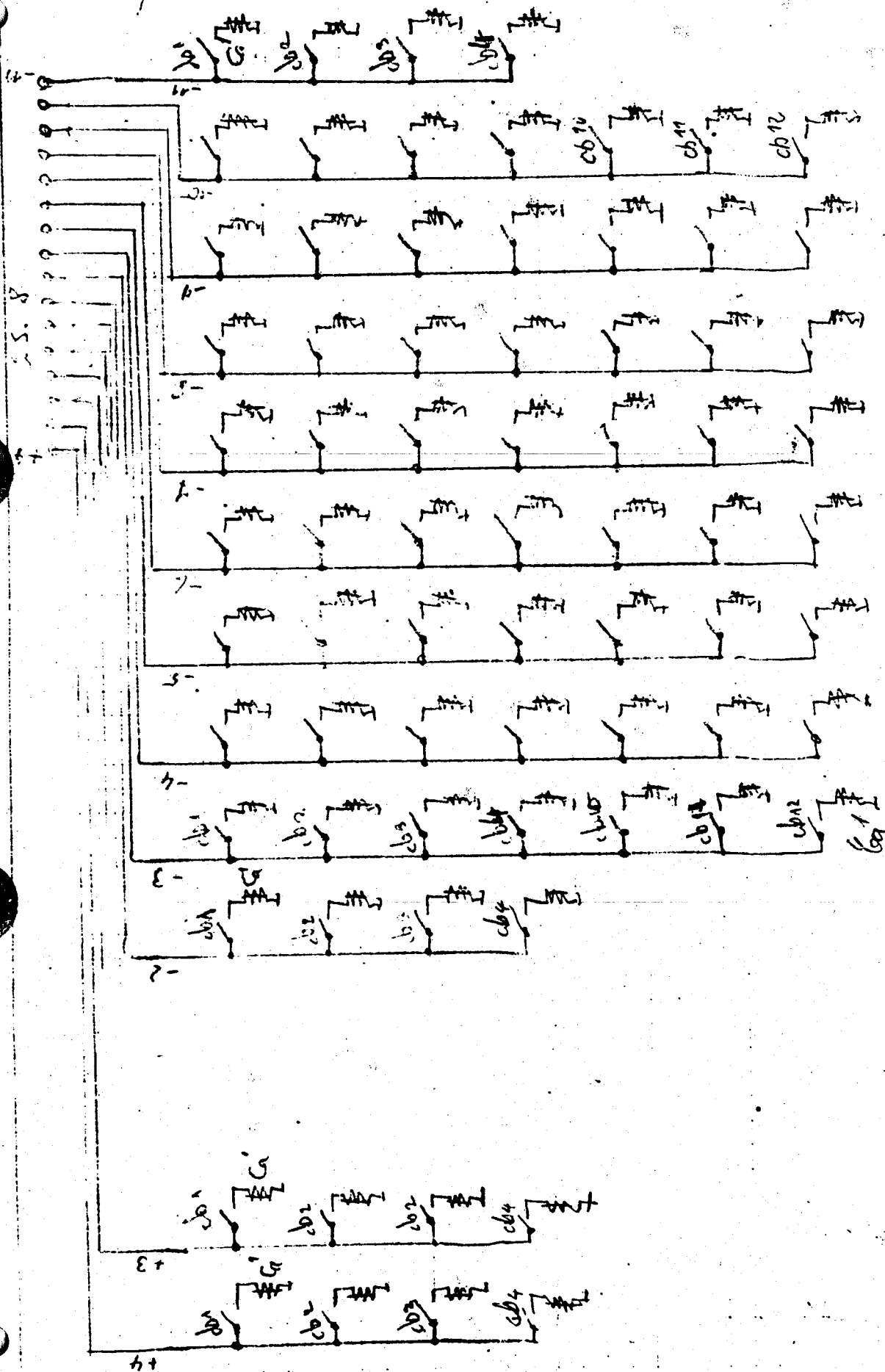
49 0 — AAA<sup>+3</sup>

49 0 — AAA<sup>+4</sup>

Speicherwerk  
Speicherkreise

S<sub>2</sub>

12/6



719

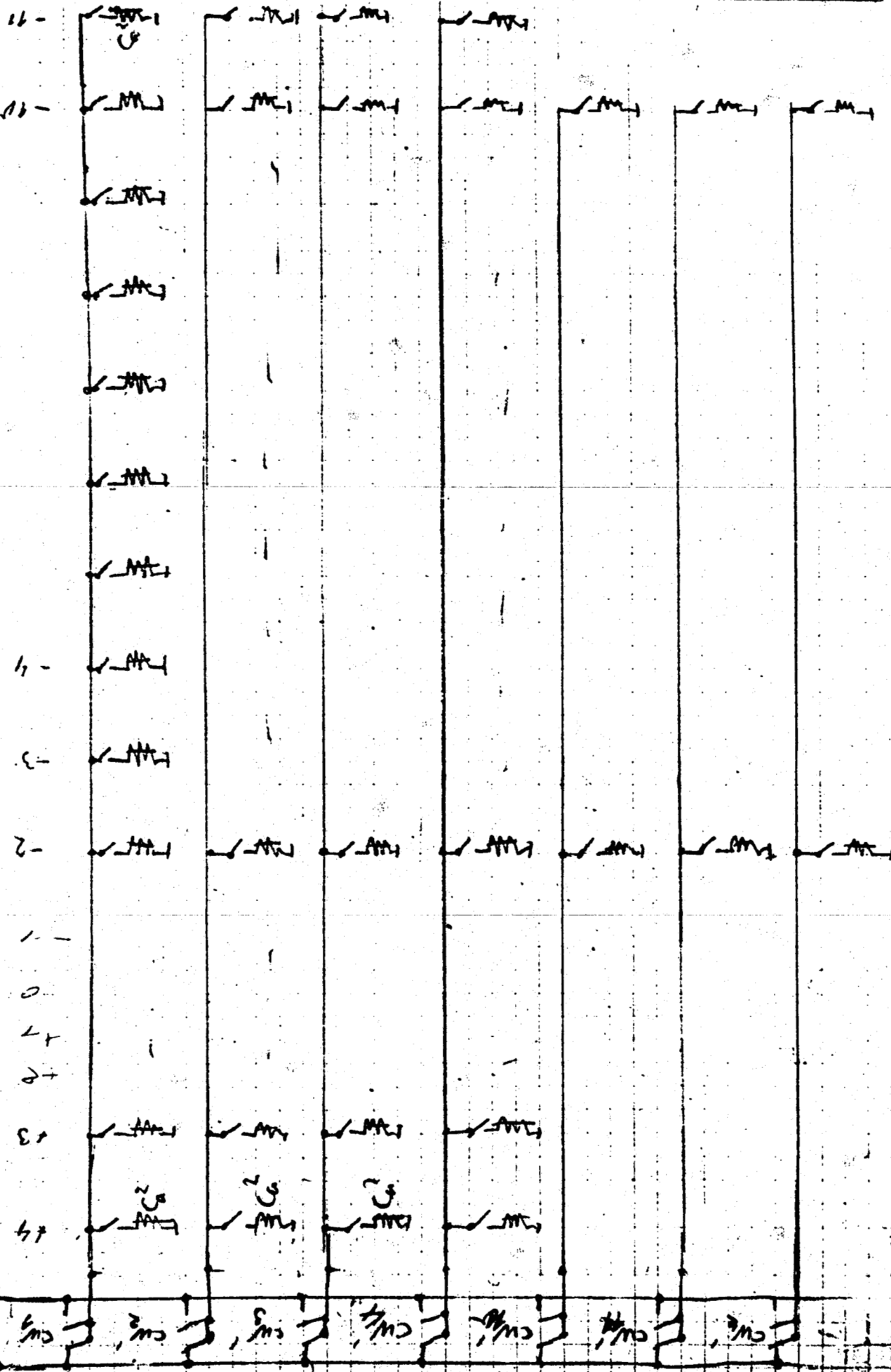
6

Hallekreise

S<sub>2</sub>

13

6



68017  
 68117  
 68117  
 68117

S 4





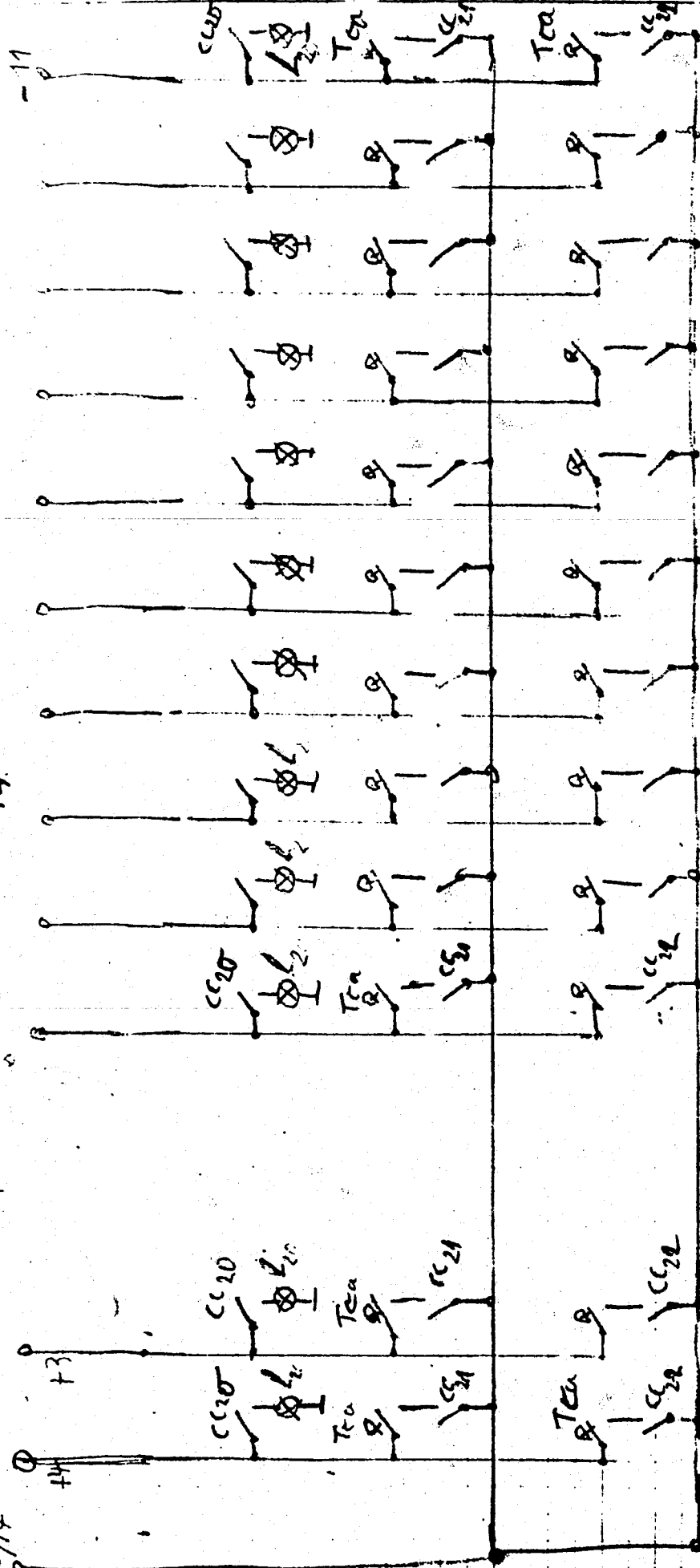
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S<sub>2</sub>

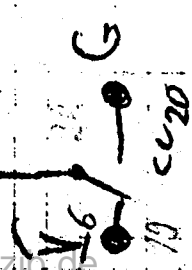
15

55 14

540/14



K. Sp.



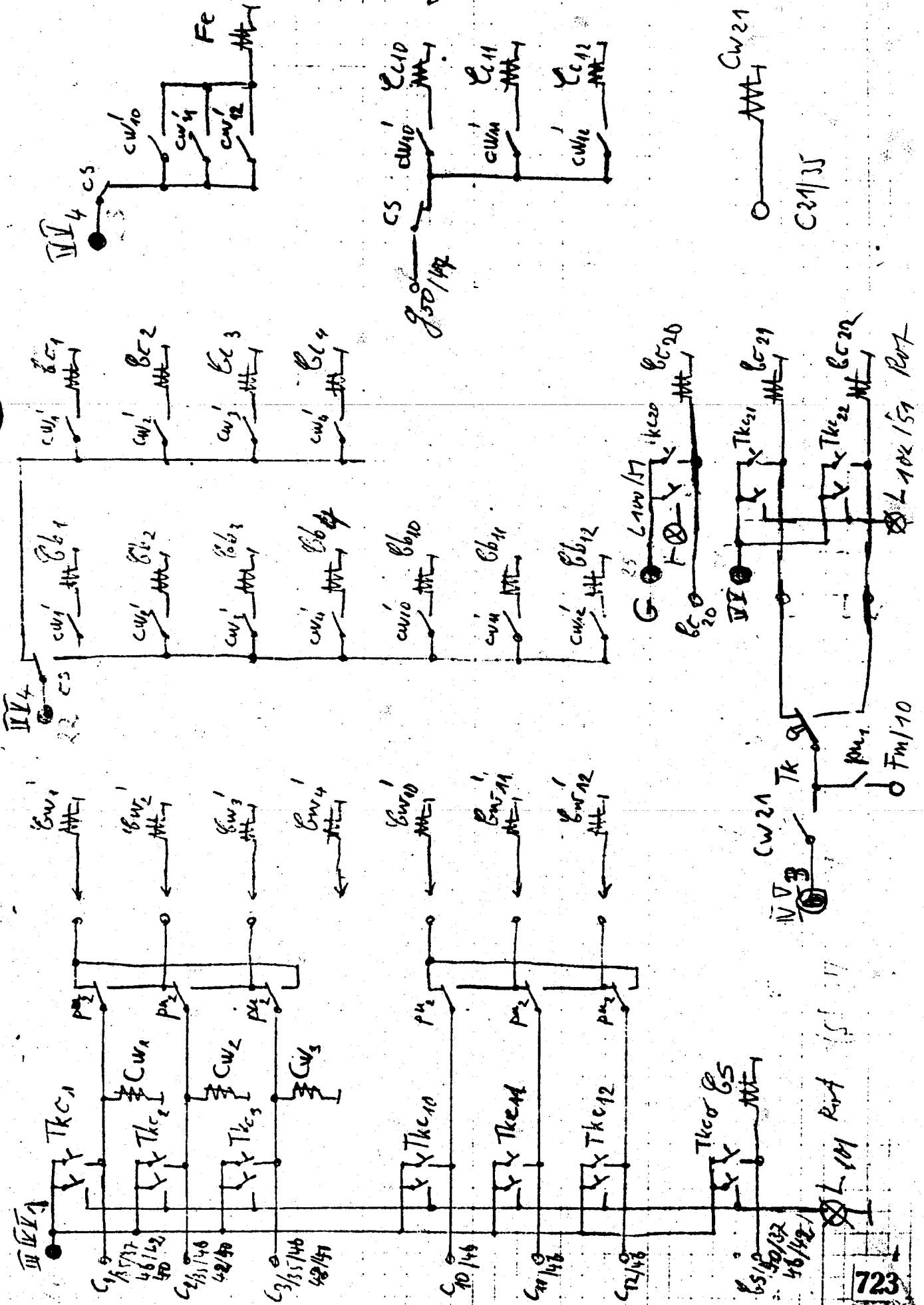
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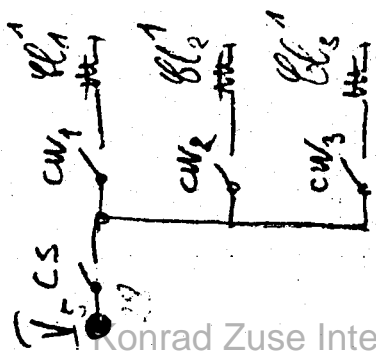
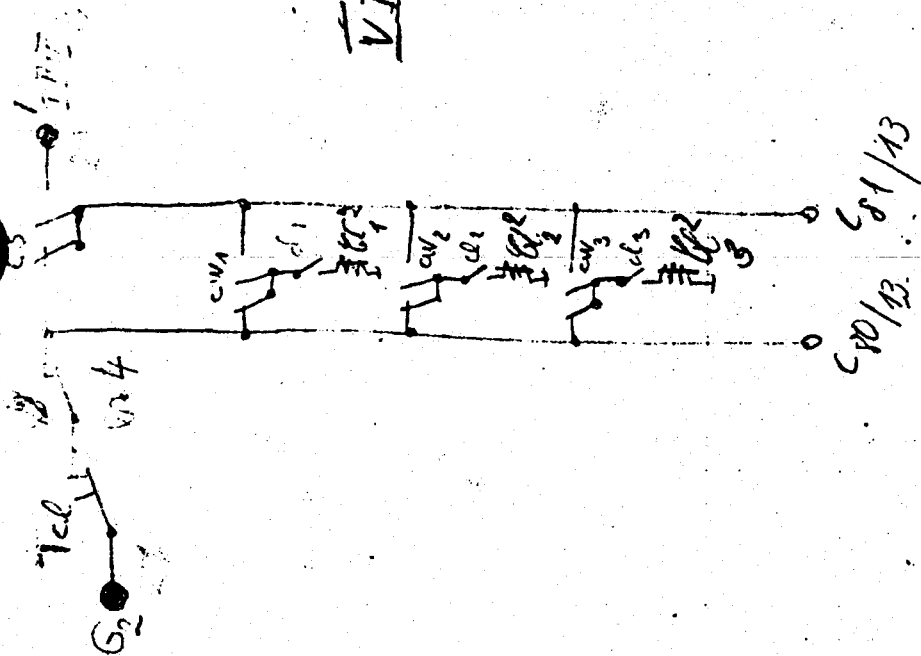
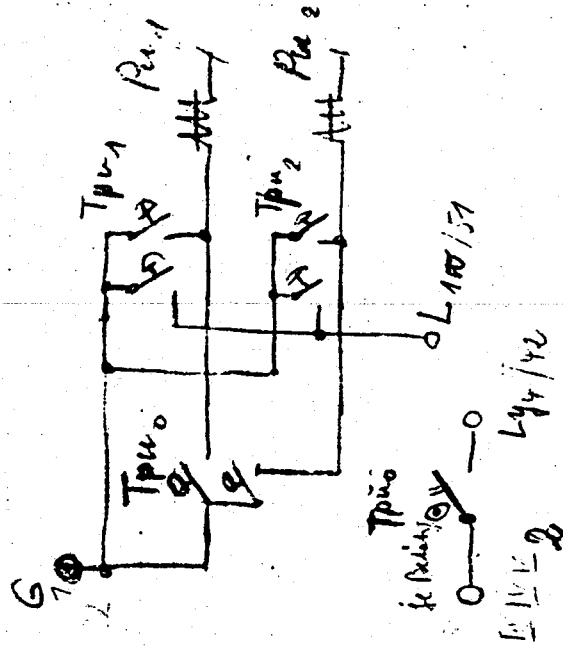
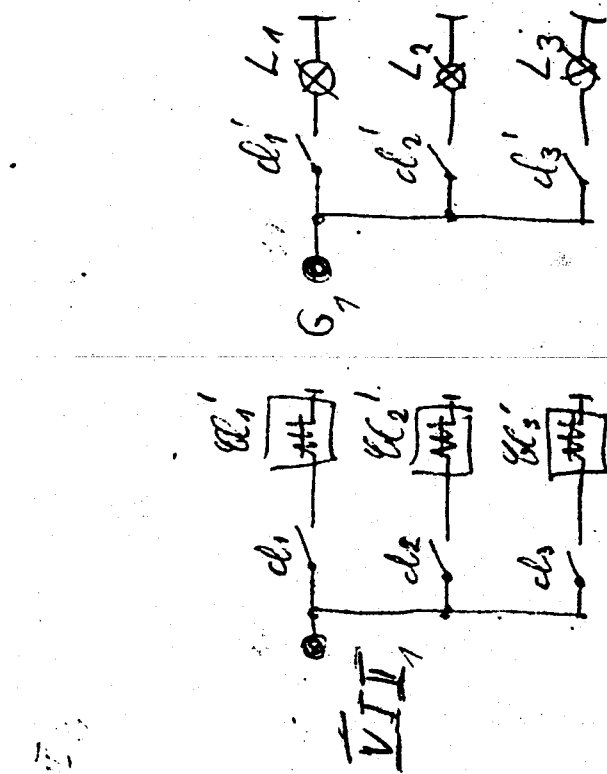
6. Speicherwerk  
Klemmung

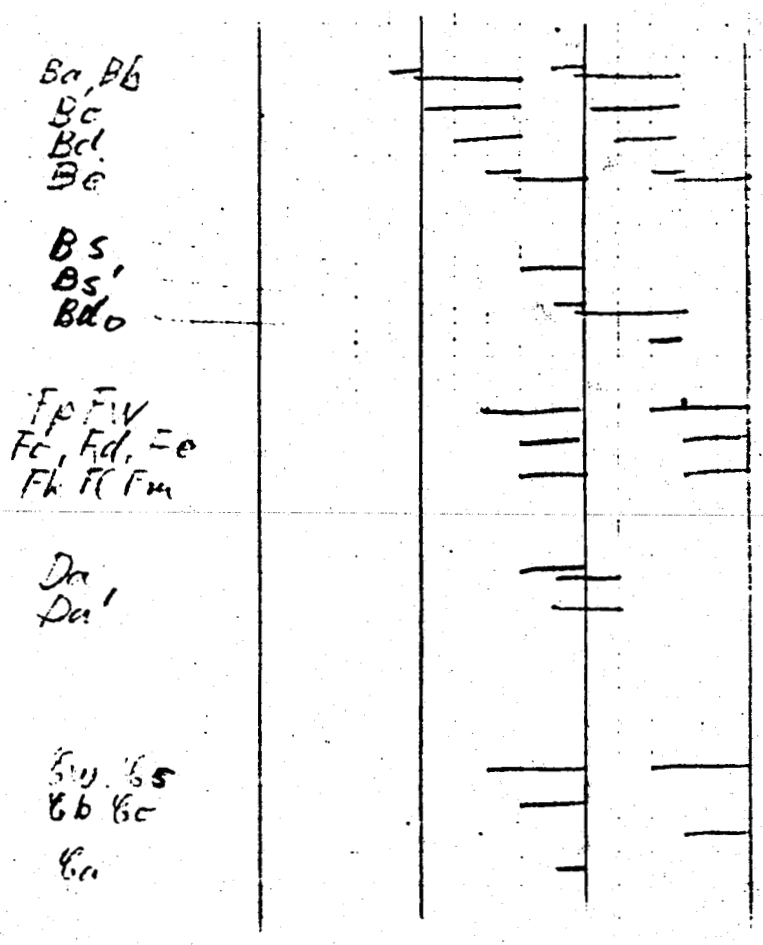
S<sub>2</sub>

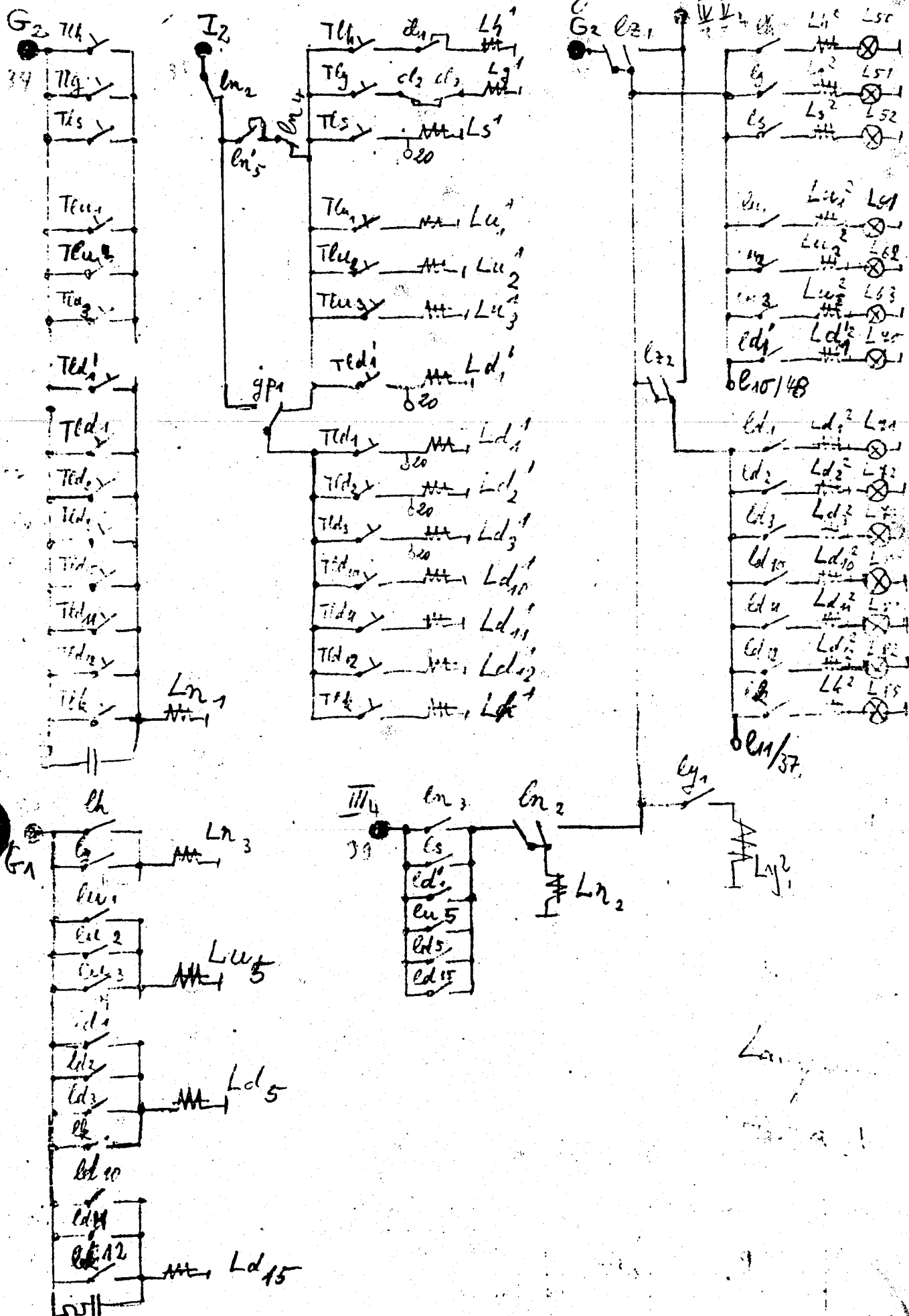
16

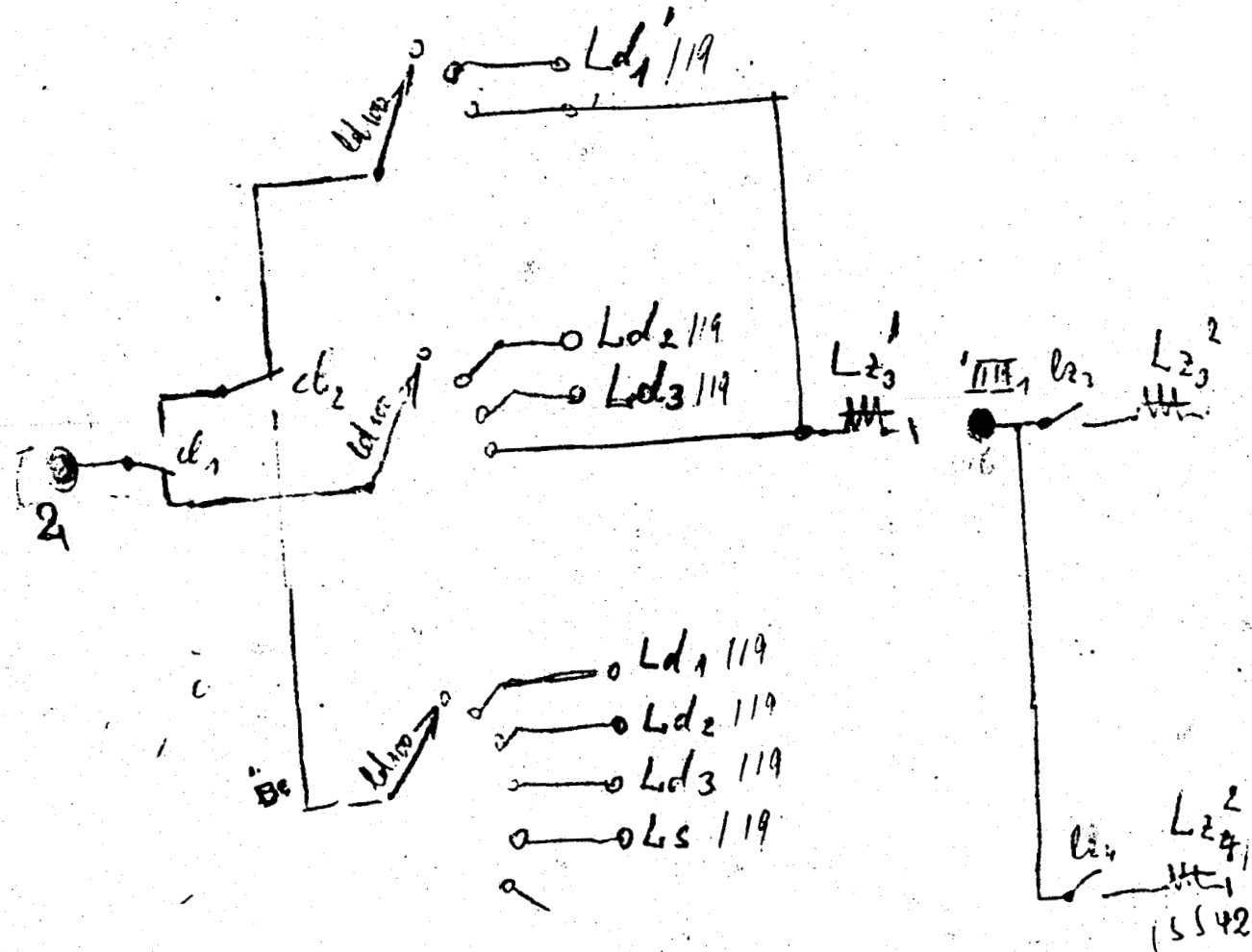
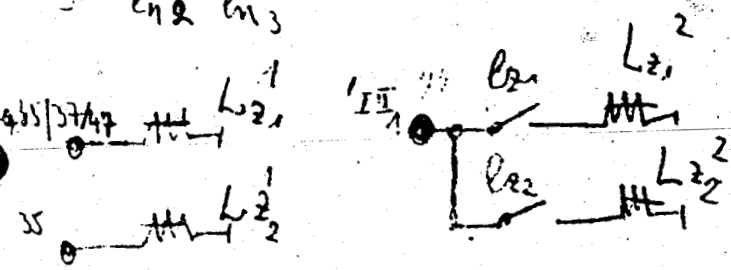
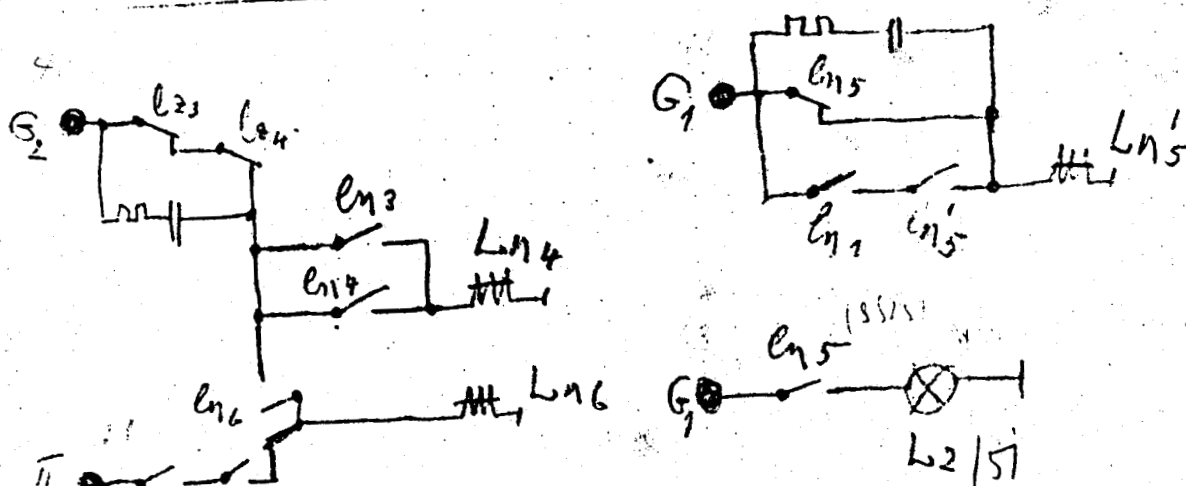
(6,4)











La Luer 12.

Operationskommandierung.

S<sub>2</sub>

21

Tdd1  
Lm1  
Ld1  
Ld5  
Lm2  
Dd  
Dd  
Lm5  
Lm5  
Lm1

Tdd1  
Lm1  
Lm5  
Lm5  
Lm5

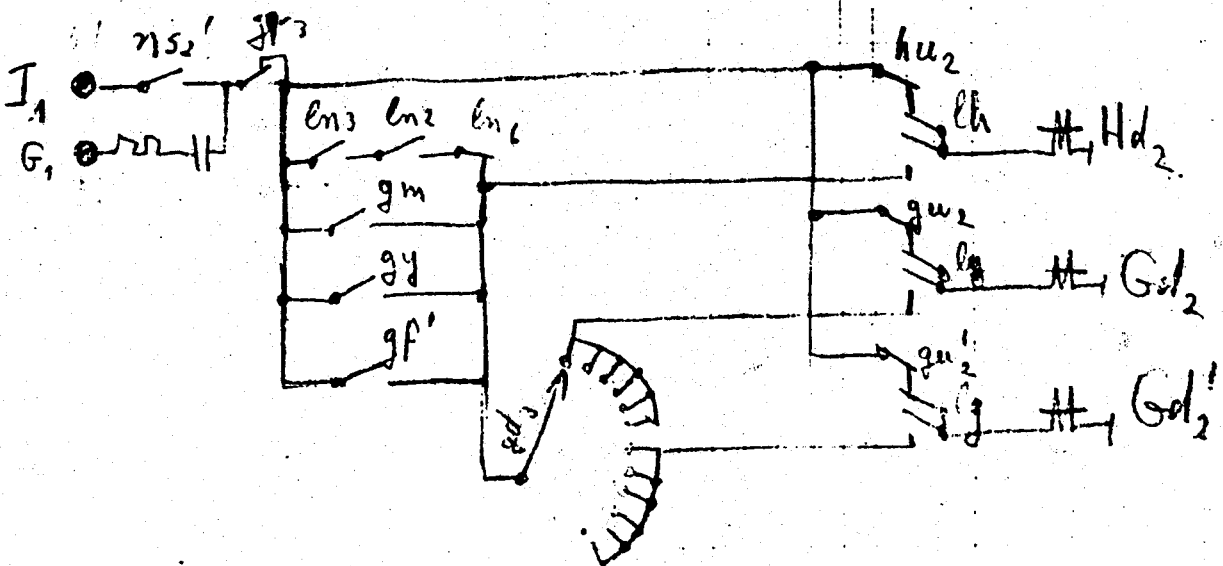
Tdd1  
Lm1  
Lm3  
Lm2  
Lm4  
Hd1  
Hm  
Lm5  
Lm5  
Lm1  
Lm100  
Lm1  
Lm5  
Hd  
Lm  
Lm3  
Lm6  
Hd1

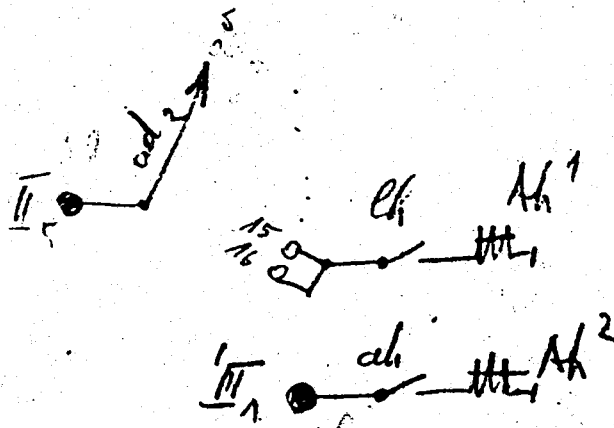
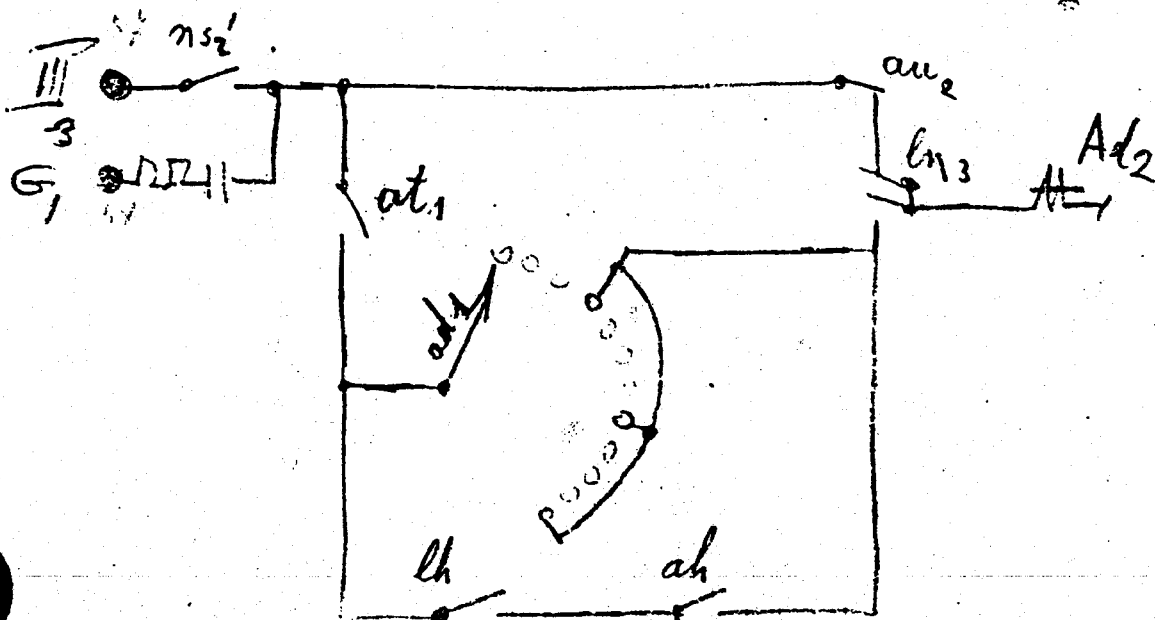
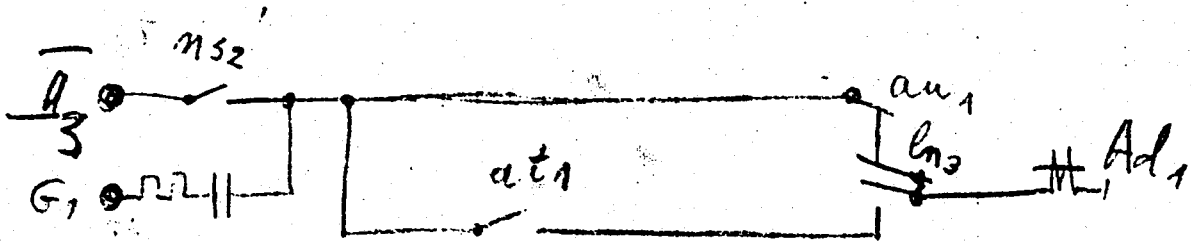
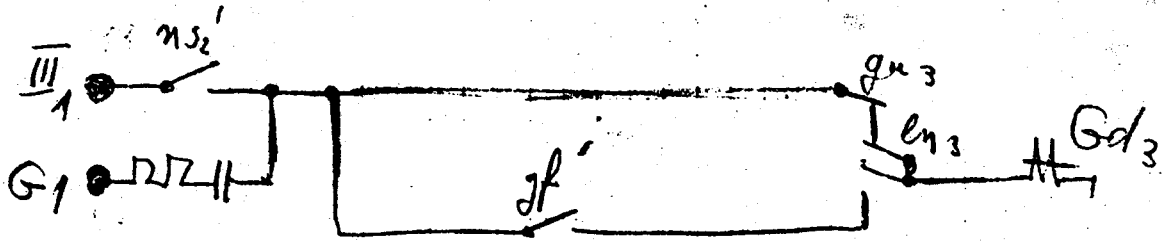
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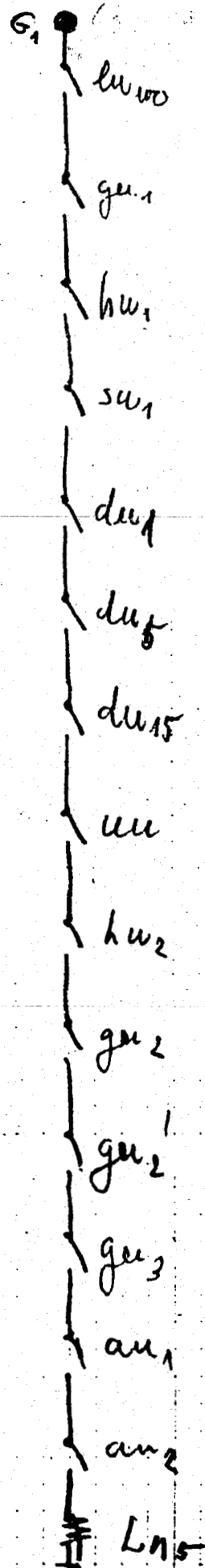
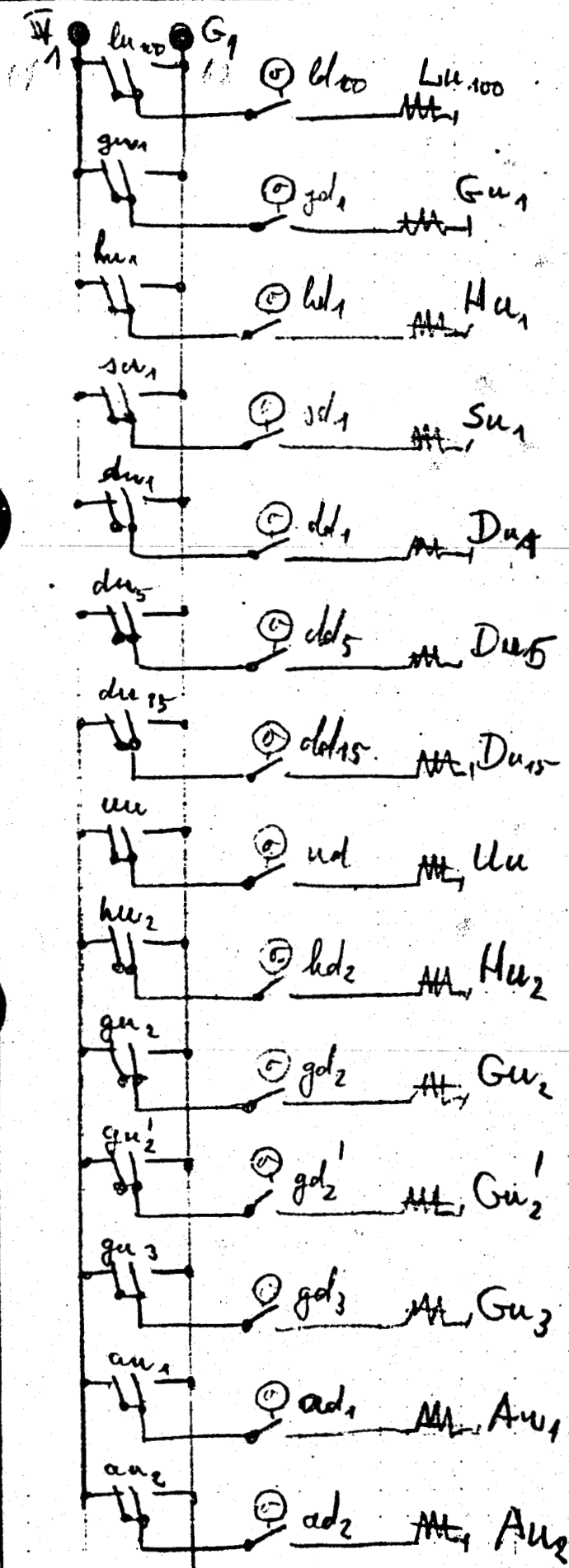
H	Abh. v. L-Rotation	TLh	Lh	$L_{n3}[L_{n3}]$	Hd1	Hd2	Gd3	Hu1
G	FP-Rotation	TEg	Lg		Gd1	Gd2	Gd4	
S	Ed. v. d. r. d. a.	TEs	LS		Sd	See		
Ud	1	TEu1	Lu1	Lu5	Ud			
	2	TEu2	Lu2					
	3	TEu3	Lu3					
Dd	1	TEd1	Ld1	Ln2	Dd			
	1	TEd1	Ld1					
	2	TEd2	Ld2					
	3	TEd3	Ld3					
	5	TEd5	Ld5					
	10	TEd10	Ld10					
	11	TEd11	Ld11					
Dd	12	TEd12	Ld12	Ln2	Dd			
	15	TEd15	Ld15					

- $L_{n1}$  Eine Taste ist gedrückt  
 $L_{n2}$  Eine Operation läuft  
 $L_{n3}$   $L_h$  v.  $L_g$   
 $L_{n4}$   $L_h$  v.  $L_g$  — Fortsetzung  
 $L_{n5}$  Alle Wähler in Grundstellung.  
 $L_{n5'}$   $\sim L_{n5}$   
 $L_{z1}$  Operationen sind Normal.  
 $L_{z2}$  " " Konstante Steuerung.  
 $L_{z3}$  Abbruchkette mit Götting  
 $L_{z4}$  " " ohne " "  
 $L_{d100}$  Drehzahlkonstante  
 $L_{d100}$  Unterl. Rel. &  $L_{d100}$



[illegible]

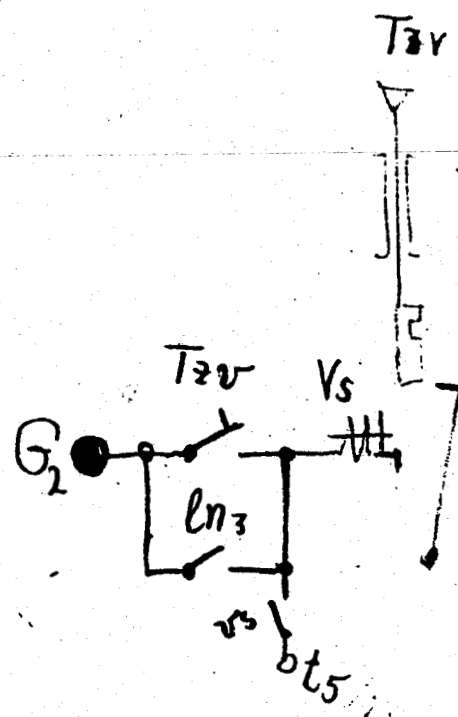
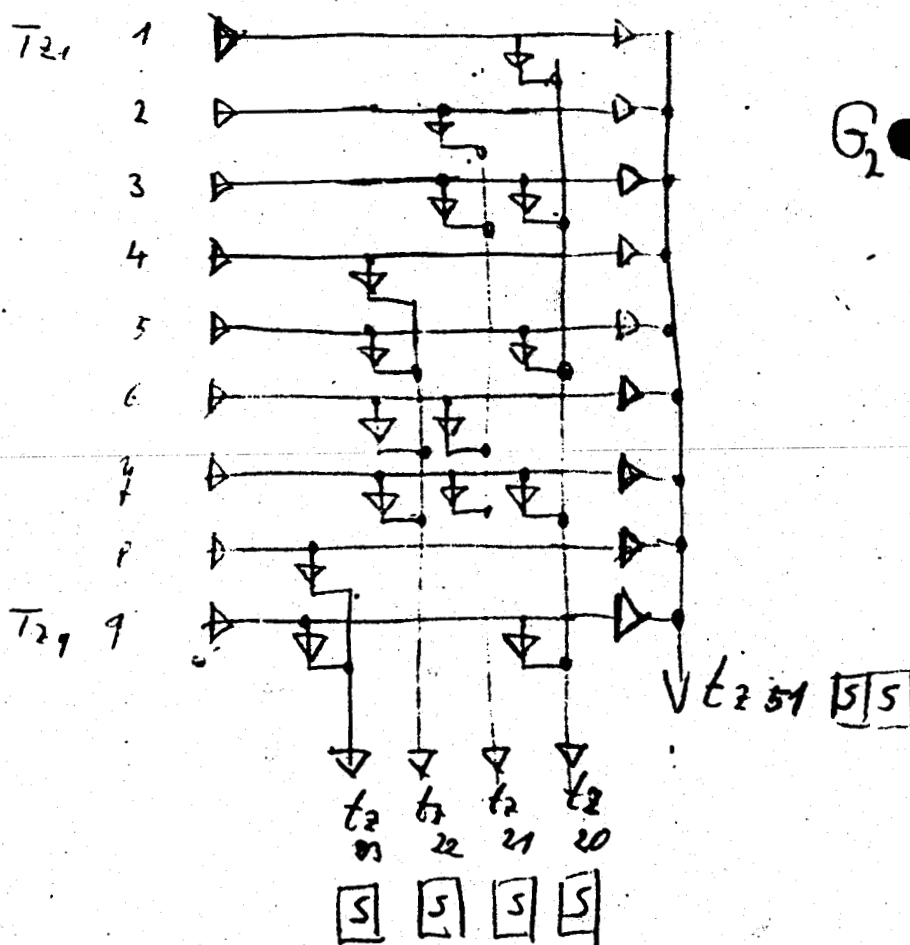


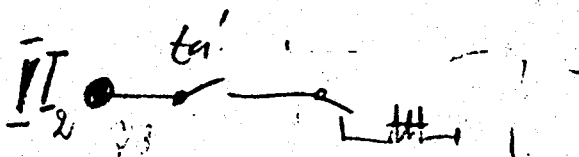
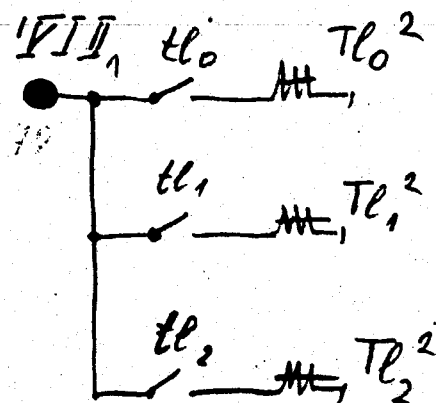
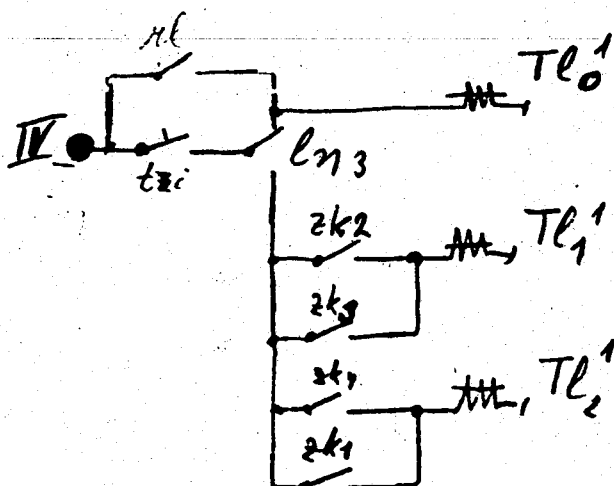
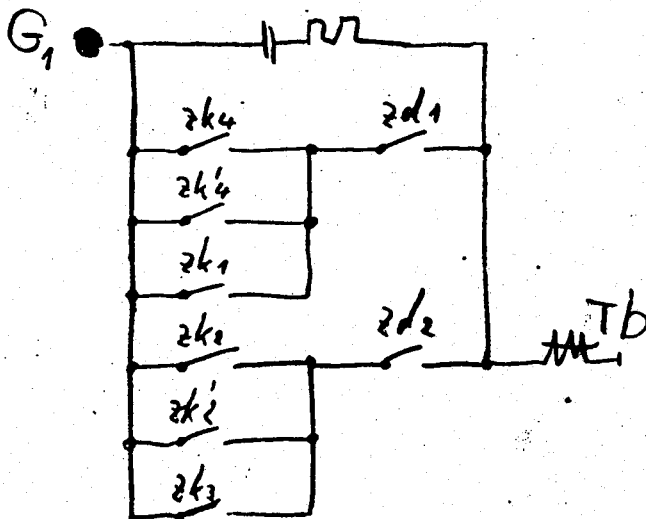
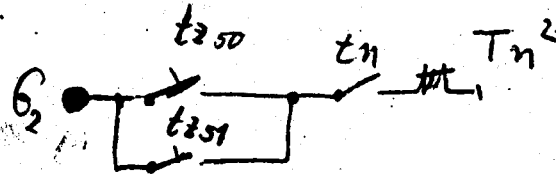
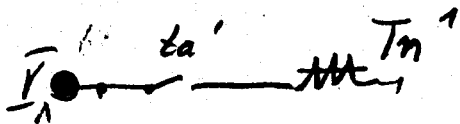
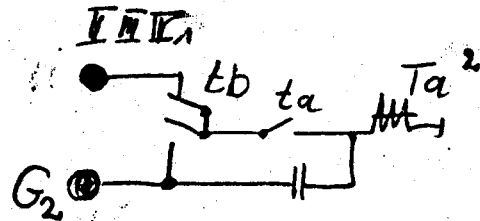
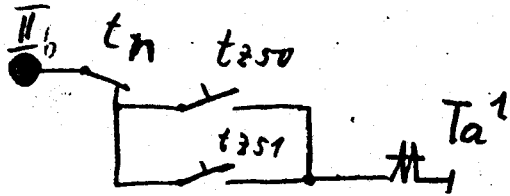


-	7	8	9	0
$T_{2V}$	$T_{21}$	$T_{28}$	$T_{29}$	$T_{2i}$
	4	5	6	
	$T_{24}$	$T_{25}$	$T_{26}$	
0	1	2	3	$T_{2j}$
$T_{20}$	$T_{21}$	$T_{22}$	$T_{23}$	

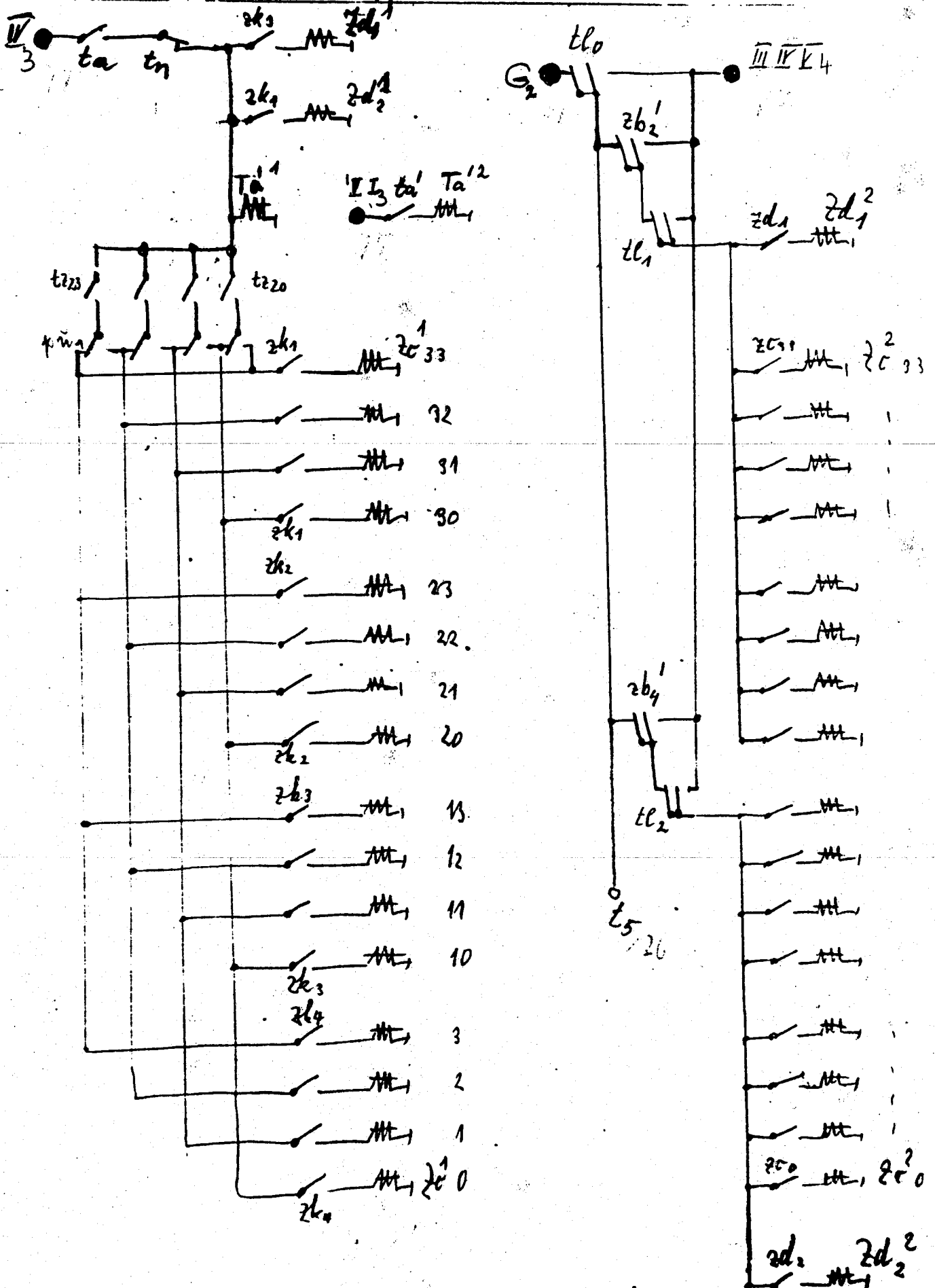
$T_{2i} \rightarrow [5]$

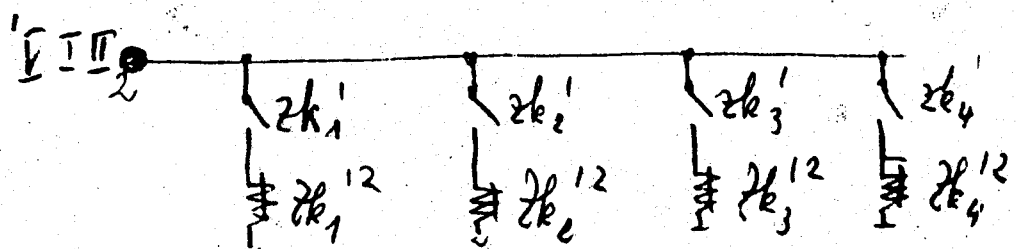
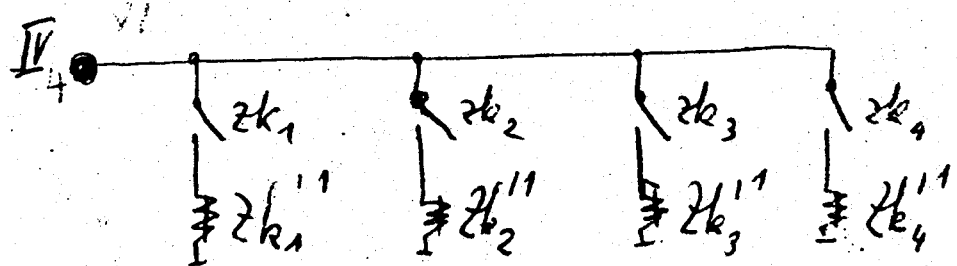
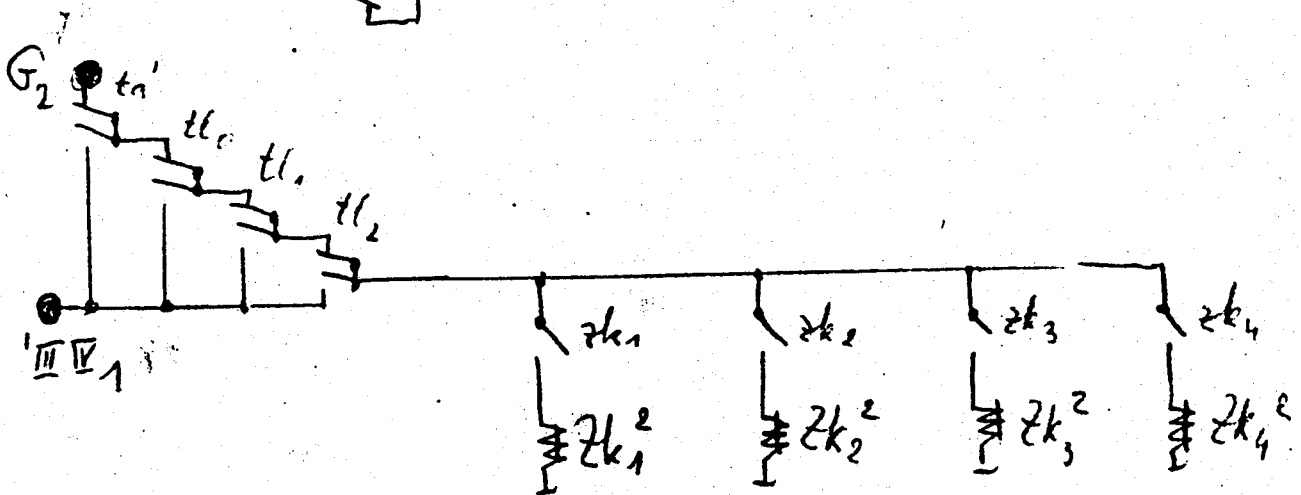
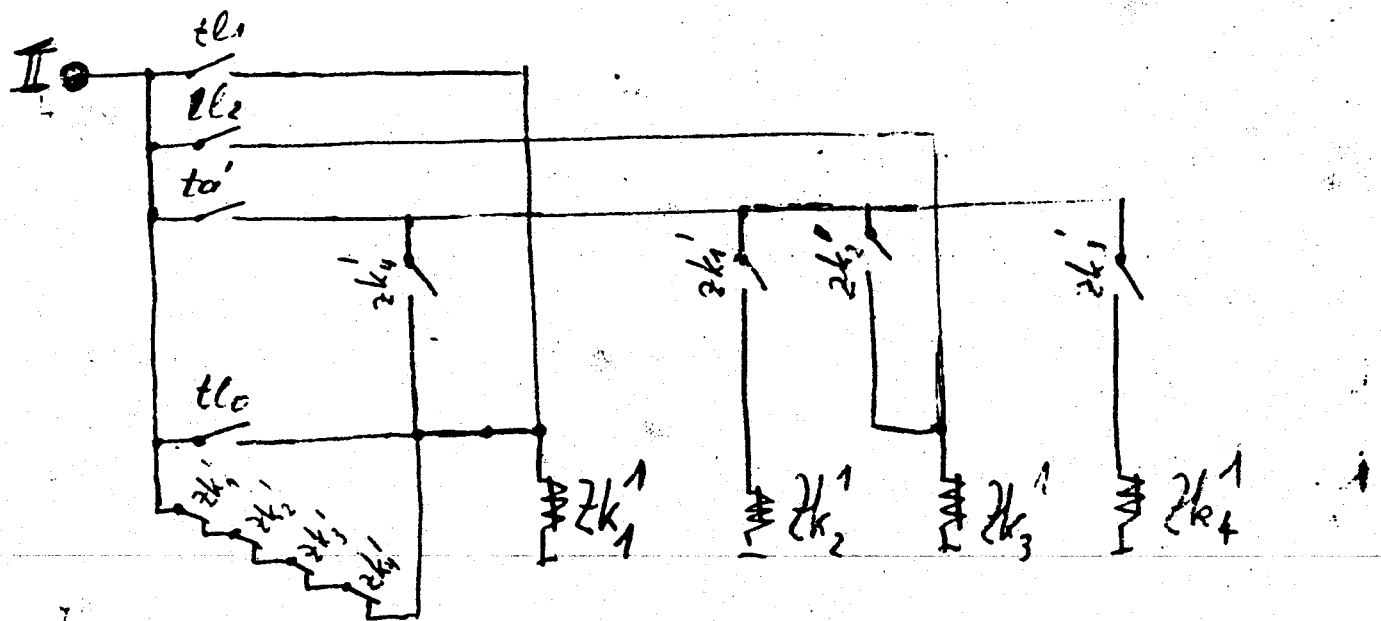
$T_{20} \rightarrow t_{250} [55]$

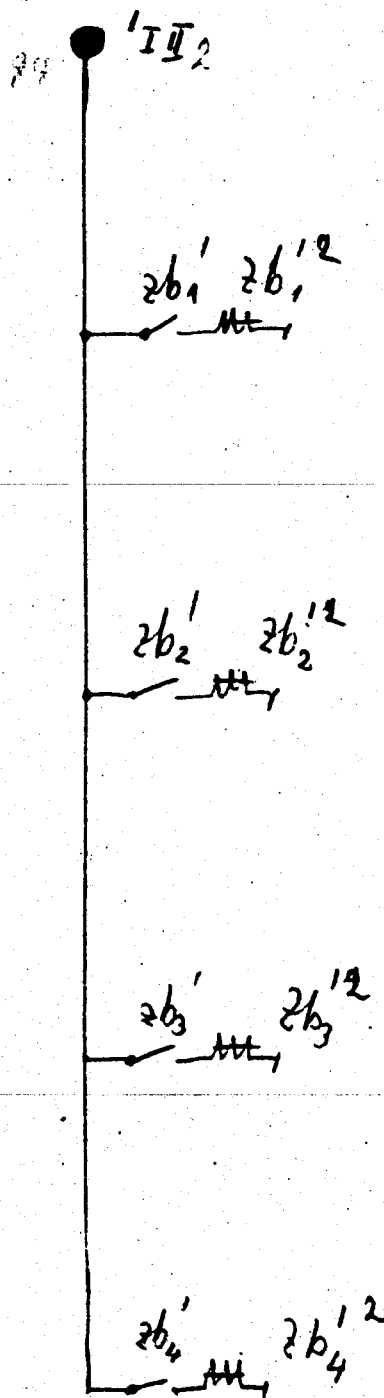
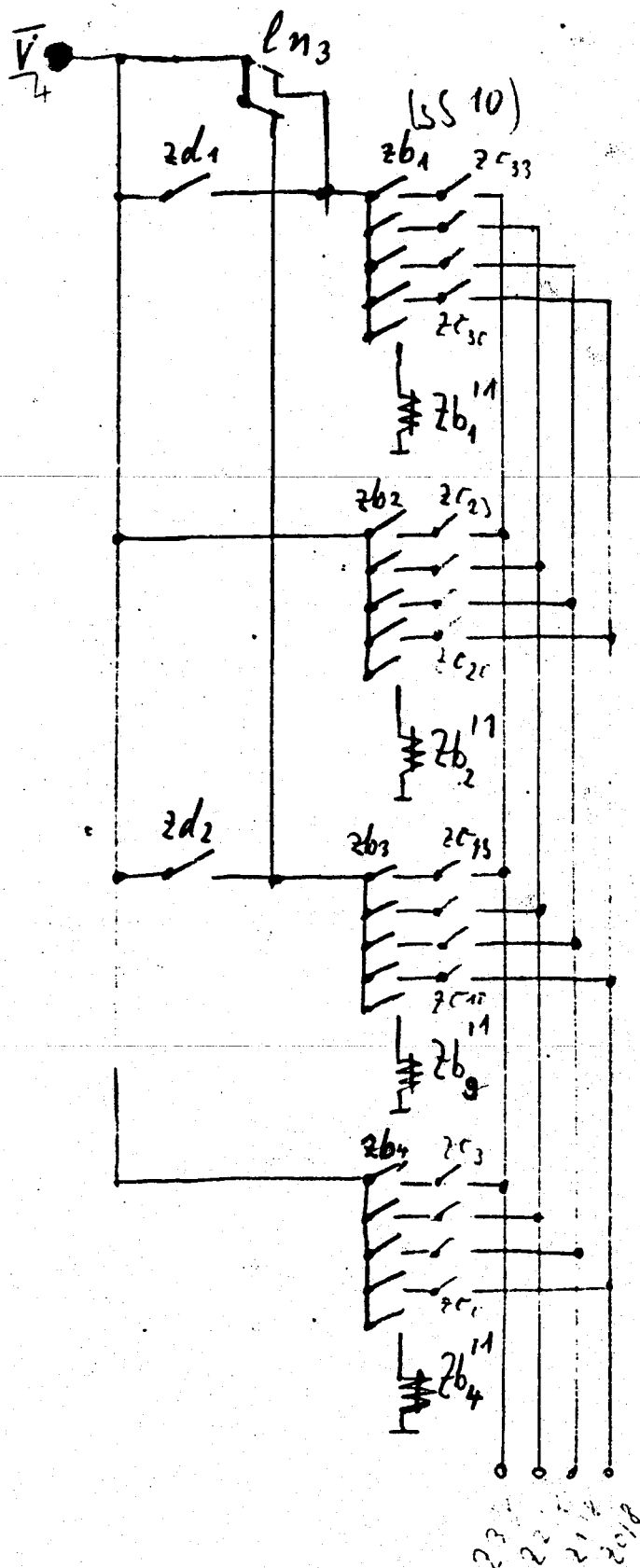




Schnarrer 157









Ta, La, Lu  
2e 1p Cam.

S<sub>2</sub>

31

1.7.11

1.7.11

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1.7.11

T<sub>21</sub>  
T<sub>22</sub>  
T<sub>23</sub>  
T<sub>24</sub>  
T<sub>25</sub>

T<sub>26</sub>  
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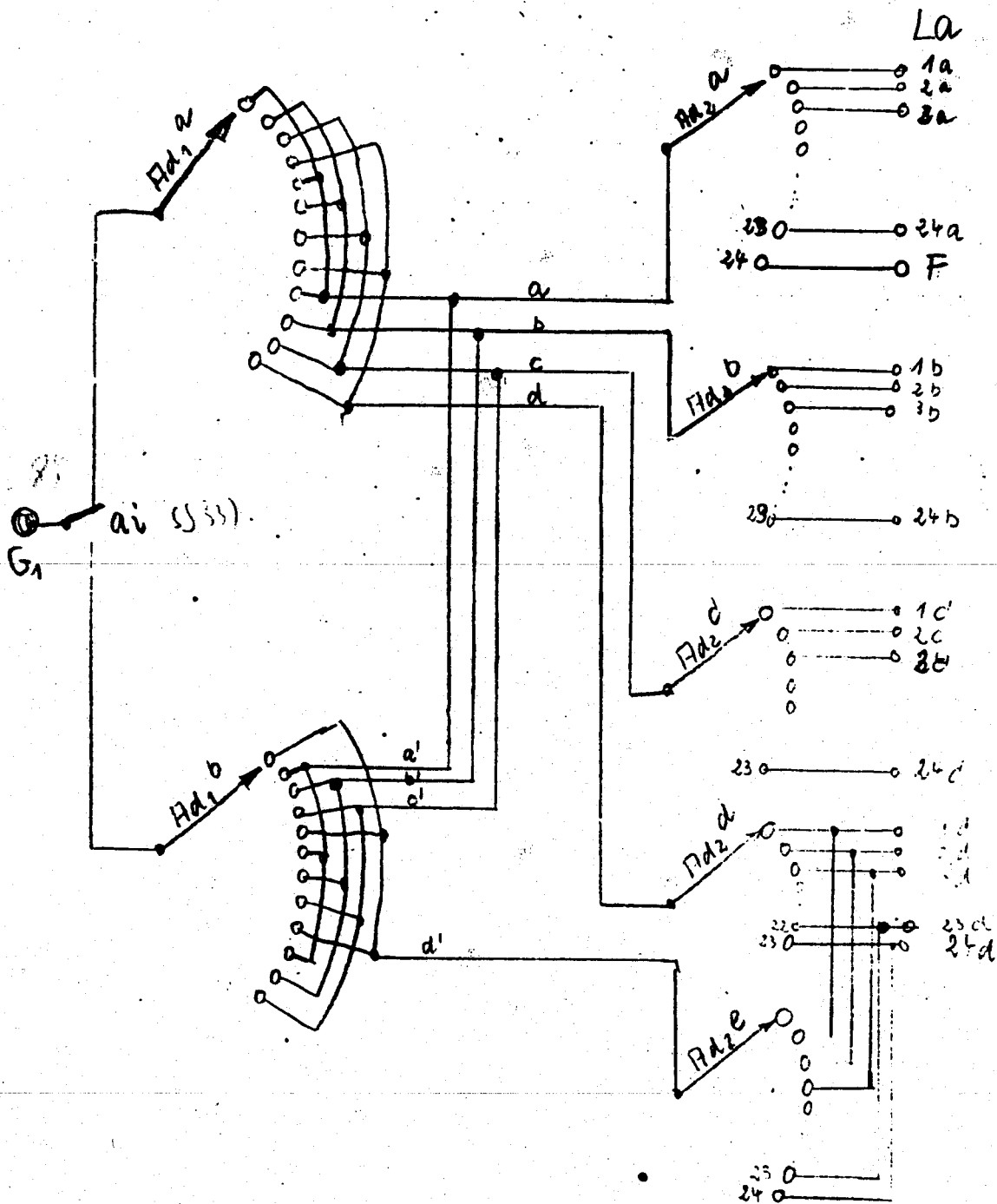
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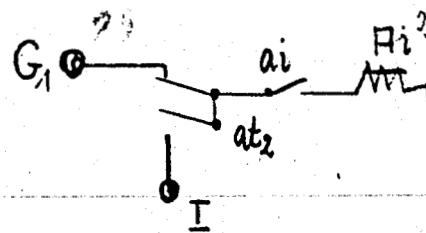
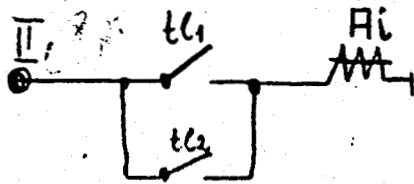
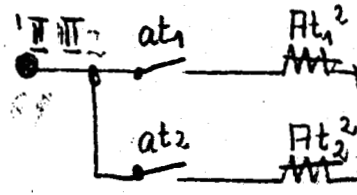
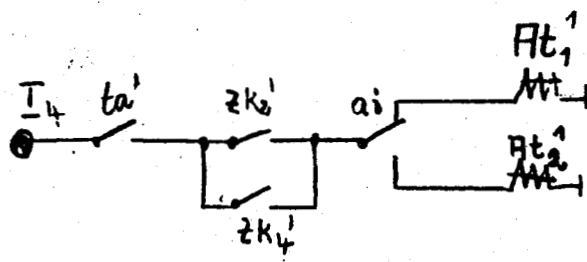
739



1	6	11	18
2	7	12	19
3	8	13	20
4	9	14	21
5	10	15	22
		16	23
		17	24

La F

a	b
c	d

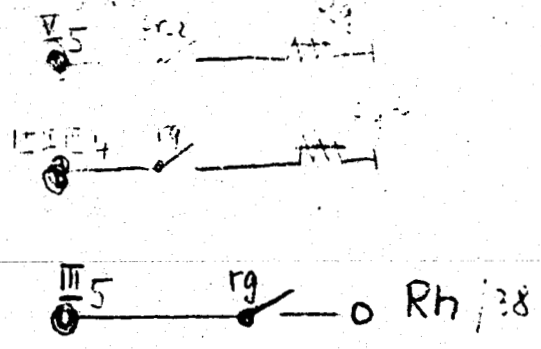
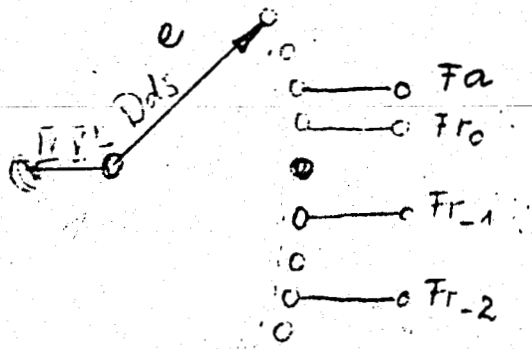
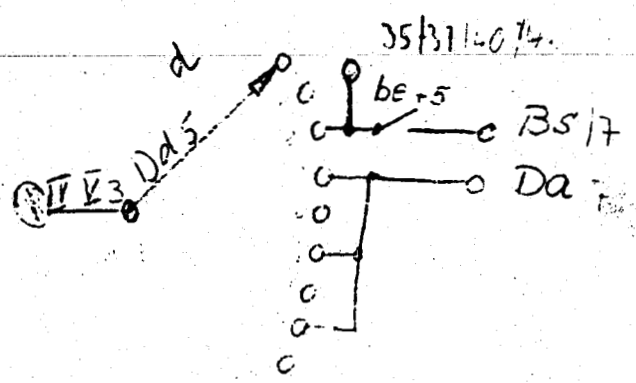
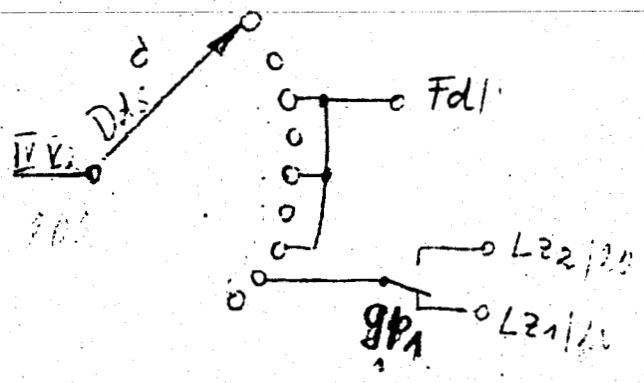
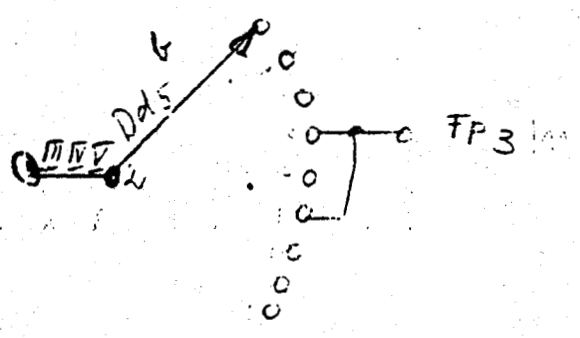
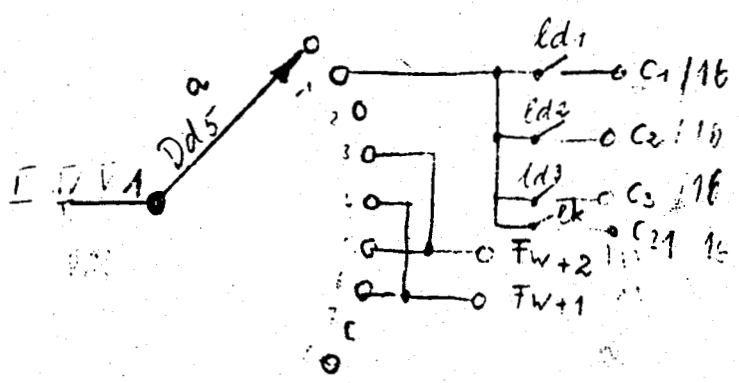


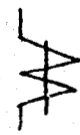
# D Markierungsschema Zeitplan

S2

Spiel	Vorgang	Ba	Bb	C	Fc	Fd	Bs	Fw	Cw	Cs	Fa	Da	Fr	Rh	Lz	Fp3
1	C2 → Bb		Ci						Cw1							1. u. 2.
2	Süppel	Komplex	Be			X	X				X					
3	1. Ziffer	Be	4x Be		X	X		Fw+2				X	Fo			X
4			2x Be			X		Fw+1								
5	2. Ziffer	Be	4x Be		X	X		Fw+2				X	Fr1			X
6			2x Be			X		Fw+1								
7	3. Ziffer											X	Fr2	X	X	

	1	2	3	4	5	6	7
Fp3							
Fc							
Fd							
Bs							
Fw			+2	+1	+2	+1	
Cw							
Cs							
Fa							
Da							
Fo							
Fr-1							
Fr-2							
Pg							
Rh							
Lz							



 Dd5 (SS 23)

# Zeitplan

B2

30

1	2	3	4	5	6	7-10	11	12
C1 → Bb	suppl. 1. Mult.	Speich. 1. Mult.	2. Mult.	3. Mult.	1.-2. Ziff.	3. Ziff.	C1 Lösen	

CW1  
CS  
DK  
BS  
Fa  
Fc  
Fd  
Fw  
Rg  
Rh  
Lz1  
Da  
Fr-2

Siehe D  
Spiel 3-6

Fw

Rg

Rh

Lz1

Da

Fr-2

Spiel

Vorgang

1

2

3

4

5

6

7

8

9

10

11

12

C1 Lösen

Be

C1

Be

Be

Be

Be

Be

Be

Be

Be

Be

Be

Be

Be

Be

C1 → Bb

Be → Bb

Be → Bb

Be → Bb

Be → Bb

Be → Bb

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Be → Bb

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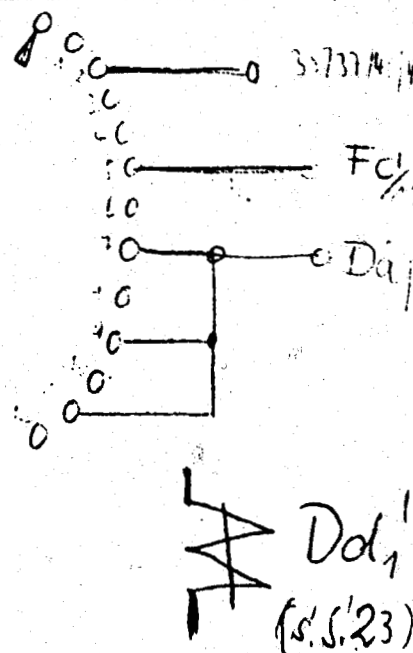
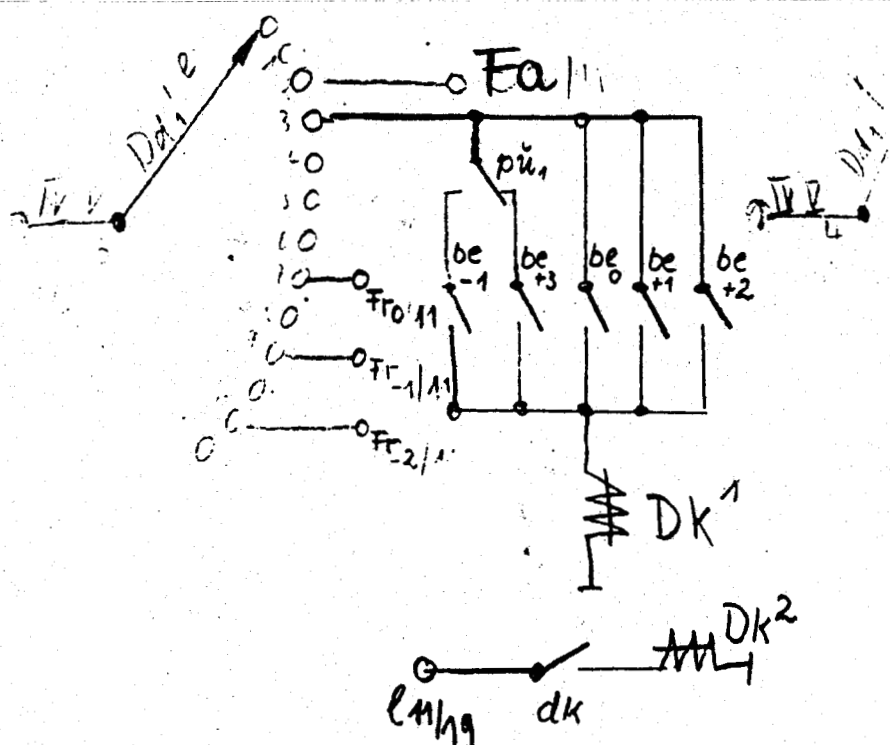
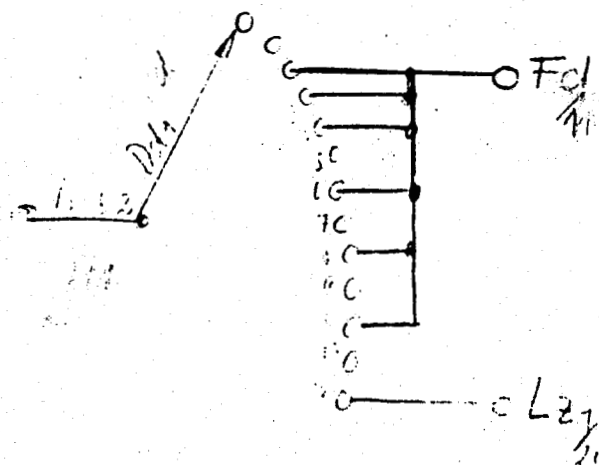
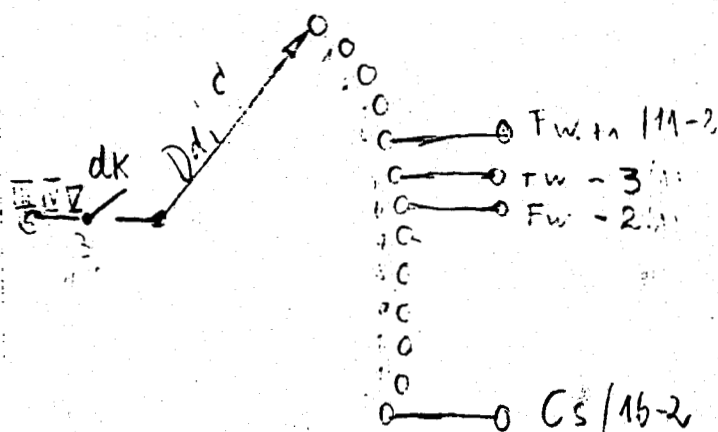
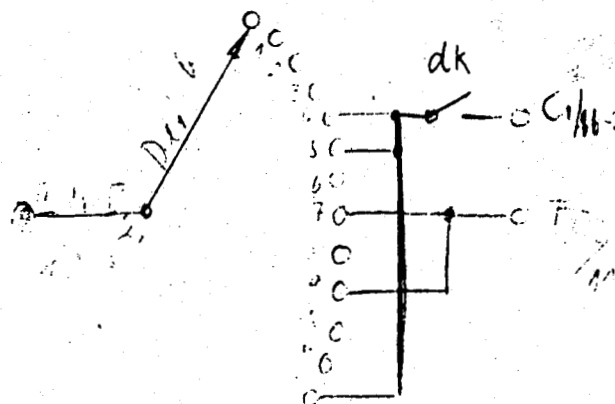
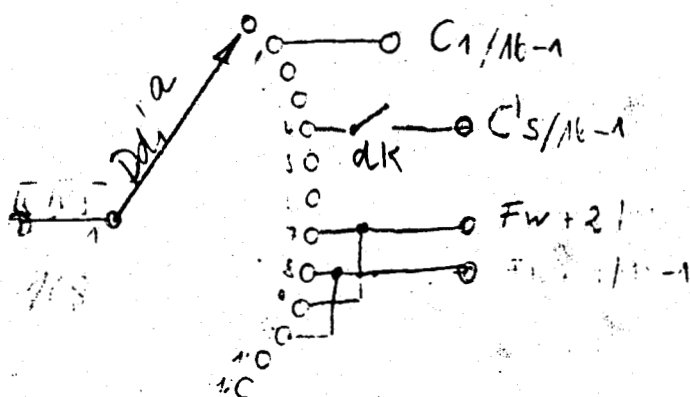
Be

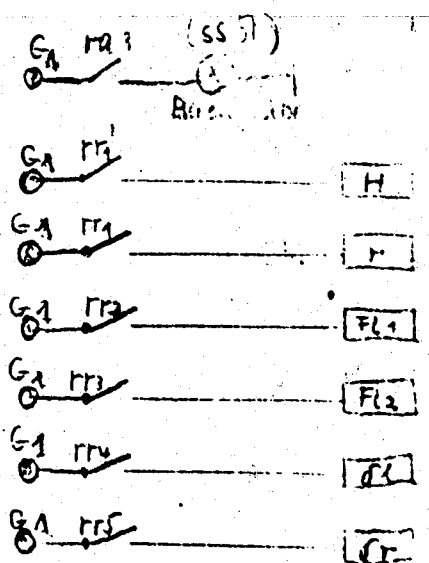
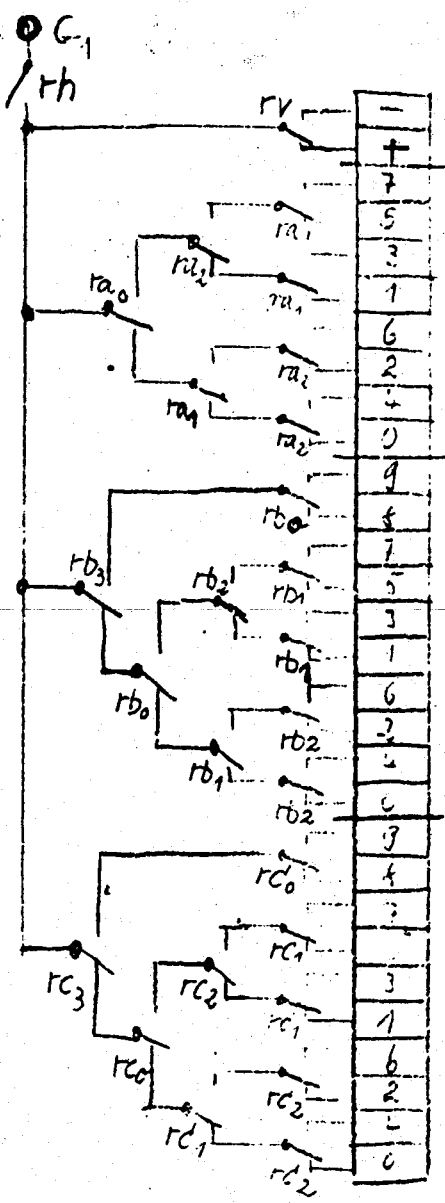
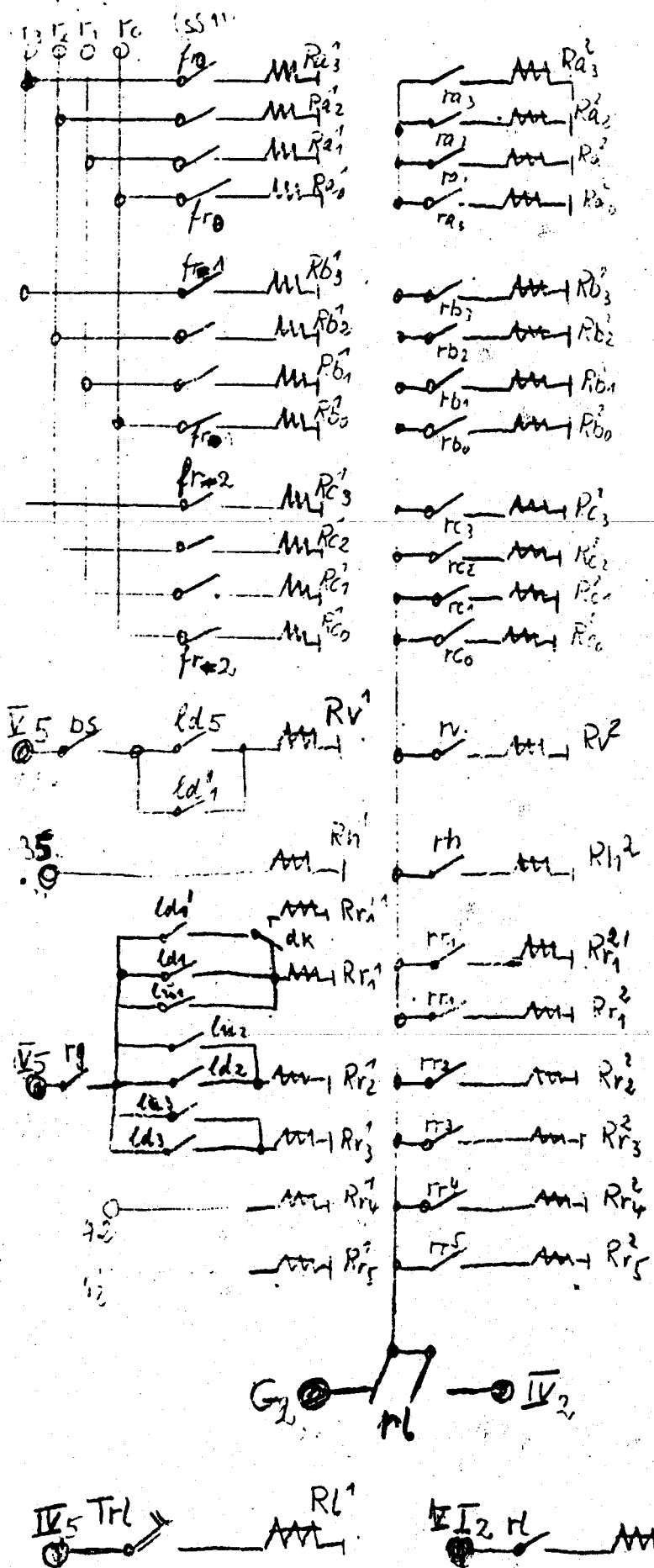
Be

Be

Be

744





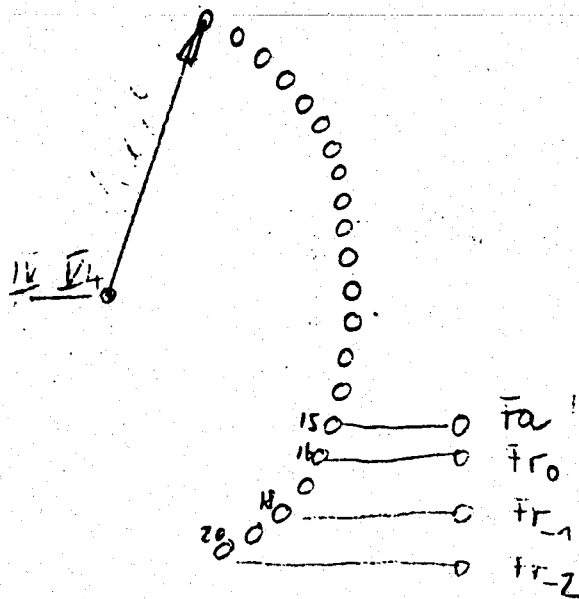
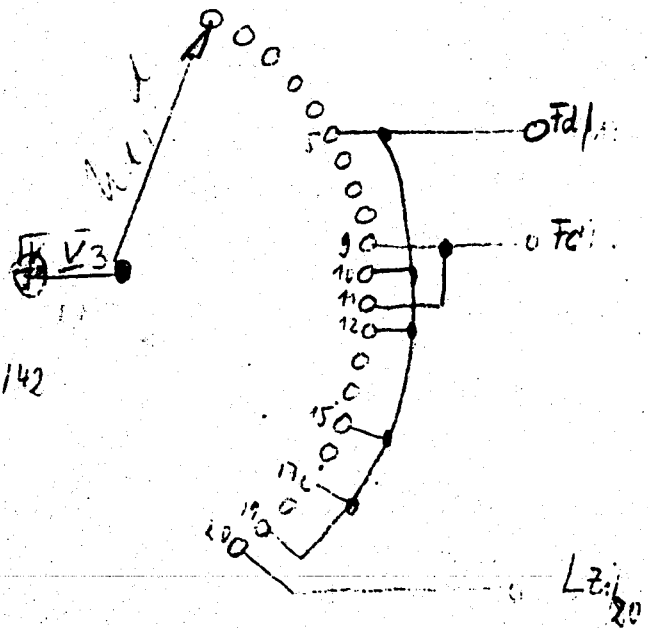
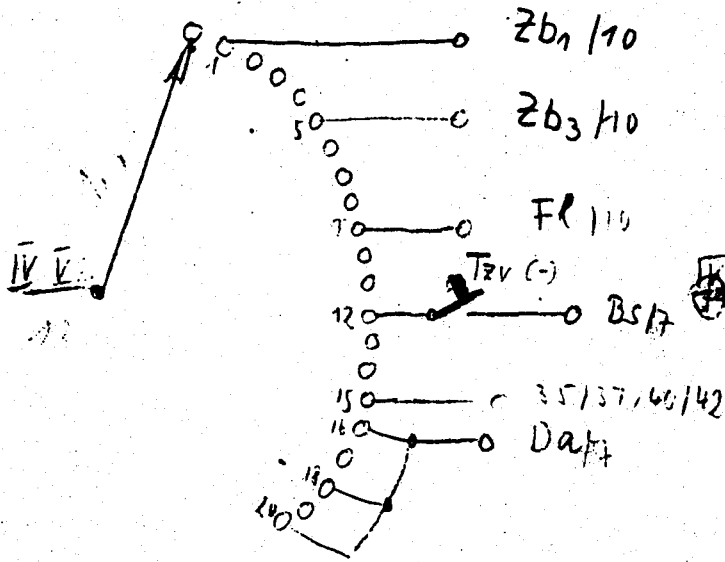
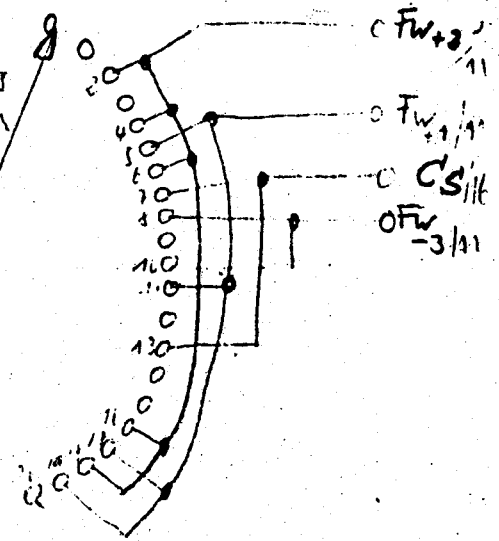
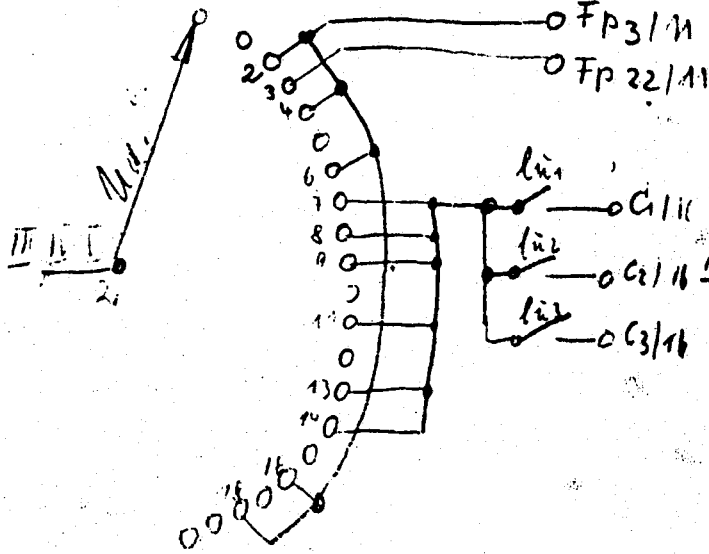


Vorgang		Ba	Bb	Ci	Fe	Fd	Fk	Fl	Fm	Fb	Fw	Zb	Cs	Cw	Bs
1	Ziff 1	$Z_2 \rightarrow Ba$	$Z_2$									$\frac{1}{X}$			
2	x5	$Be \rightarrow Ba$ $4Be \rightarrow Bb$	Be	4Be	$\boxed{X}$	$\boxed{X}$	$\boxed{X}$	$\boxed{X}$			3 X	+2 X			
3	x2 Ziff 2	$2Be \rightarrow Bb$ $Z_1 \rightarrow Ba$	$Z_1$	2Be		$\boxed{X}$	$\boxed{X}$	$\boxed{X}$	$\boxed{X}$		22 X		$\frac{2}{X}$		
4	x5	$Be \rightarrow Ba$ $4Be \rightarrow Bb$	Be	4Be	$\boxed{X}$	$\boxed{X}$	$\boxed{X}$	$\boxed{X}$			3 X	+2 X			
5	x2 Ziff 3	$2Be \rightarrow Bb$ $Z_2 \rightarrow Ba$	$Z_2$	2Be		X	$\boxed{X}$	$\boxed{X}$	$\boxed{X}$			+1 X	3 X		
6	x5	$Be \rightarrow Ba$ $4Be \rightarrow Bb$	Be	4Be	$\boxed{X}$	$\boxed{X}$	$\boxed{X}$	$\boxed{X}$			3 X	+2 X			
7	Sperrchen	$Be \rightarrow Ci$		Be									X	$\frac{2}{X}$	
8	Korrektur 1-10, oben	1. $\frac{Ci}{8} \rightarrow Bb$		$\frac{Ci}{8}$				$\boxed{X}$	$\boxed{X}$			-3 X		$\frac{2}{X}$	
9		2. $Be \rightarrow Ba$ $\frac{Ci}{4} \rightarrow Bb$	Be	$\frac{Ci}{4}$	X			X						$\frac{2}{X}$	
10		$\frac{Be}{8} \rightarrow Bb$		$\frac{Be}{8}$		X		$\boxed{X}$	$\boxed{X}$			-3 X			
11		3. $Be \rightarrow Ba$ $2Ci \rightarrow Bb$	Be	2Ci	X			$\boxed{X}$	$\boxed{X}$	$\boxed{X}$		11 X		$\frac{2}{X}$	
12	Suppe	$Be \rightarrow Bb$		Be		X									$\frac{2}{X}$
13	Sperrchen	$Be \rightarrow Ci$		Be									X	$\frac{2}{X}$	
14-30	Rückwärts	nach DV 1-7 (S.35)		Ci											

U

S<sub>2</sub>

40



S

 $\delta L$  u.  $\delta r$  $S_2$ 

L

$$\delta l = (Fl_1 - HL) + (Fl_2 - K) = A_1 + A_2$$

$$\delta r = (Fl_1 - HL) - (Fl_2 - K) = A_1 - A_2$$

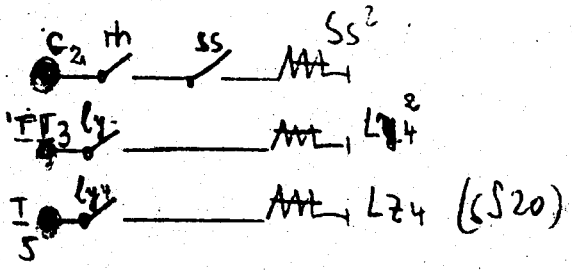
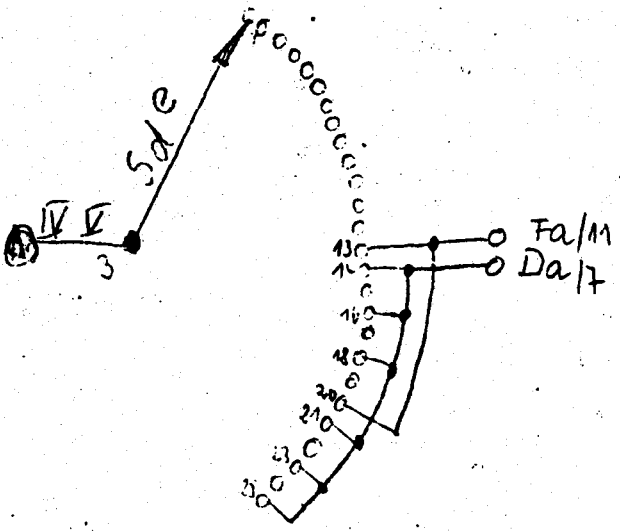
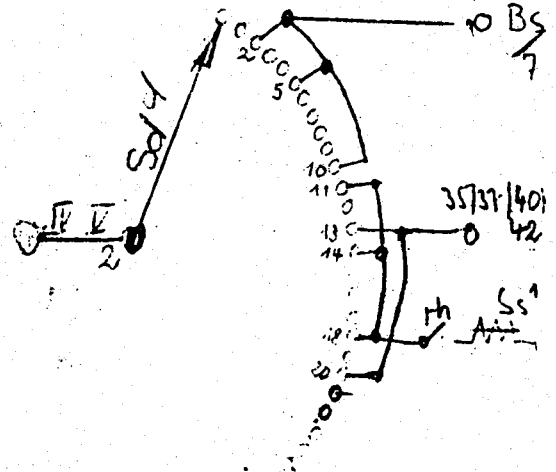
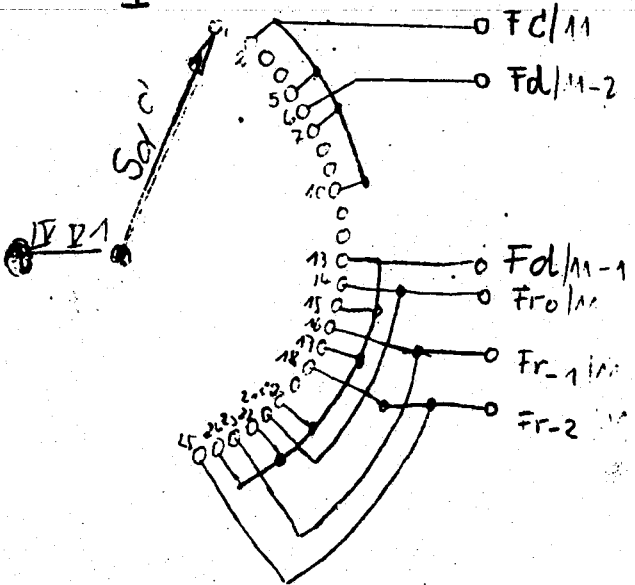
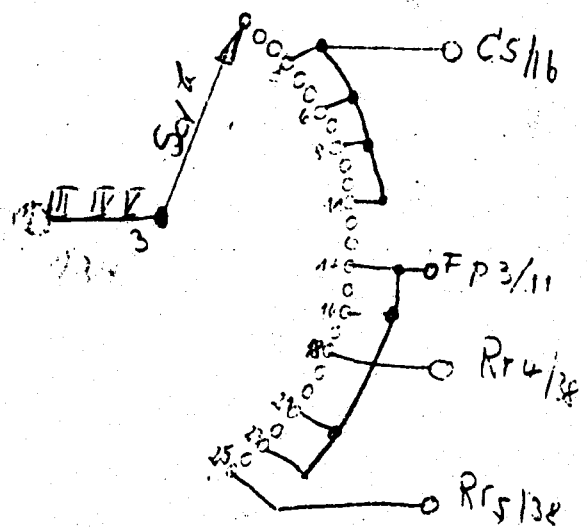
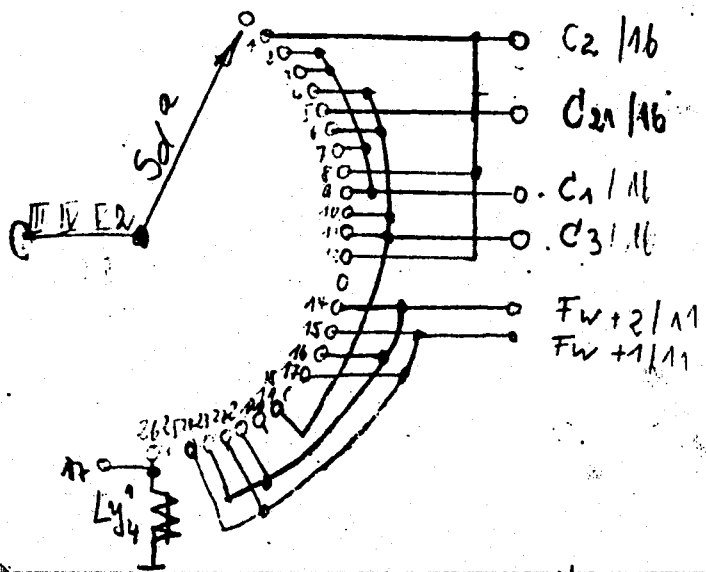
Spiel	Vorgang	Ba	Bb	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>5</sub>	Cw...	Fc	Fd	Bs	Ss	Ly	Rg
1	C <sub>2</sub> (H <sub>1</sub> ) → Bb		FL <sub>1</sub>					2 X						
2	Be → Ba C <sub>1</sub> (HL) → Bb	FL <sub>1</sub>	HL					1 X	X		X			
3	Be → C <sub>1</sub>			A <sub>1</sub>			X	1 X						
4	C <sub>3</sub> (FL <sub>2</sub> ) → Bb		FL <sub>2</sub>					3 X						
5	Be → Ba C <sub>1</sub> (K) → Bb	FL <sub>2</sub>	K					2 X	X		X			
6	Be → C <sub>3</sub> → Bb		A <sub>2</sub>			A <sub>2</sub>	X	3 X		X				
7	Be → Ba C <sub>1</sub> → Bb	A <sub>2</sub>	A <sub>1</sub>					1 X	X					
8	Be → C <sub>2</sub>				δl		X	2 X						
9	C <sub>1</sub> → Bb		A <sub>1</sub>					1 X						
10	Be → Ba C <sub>3</sub> → Bb	A <sub>1</sub>	A <sub>2</sub>					3 X	X		X			
11	Be → C <sub>3</sub>					δ <sub>15</sub>	X	3 X					X	
12	C <sub>2</sub> → Bb		δl					2 X						
13-17	siehe D.V. 2-6 (SS 34)													
18	3. Differ						Da, Fr-2						X	X
19	C <sub>3</sub> → Bb		δ <sub>15</sub>					3 X						
20-24	siehe D.V. 2-6 (SS 34)													
25	3. Differ						Da, Fr-2							X
26	Löschen												X	

S'

el. 40.10.

S' 2

42



HL = Kuhn

43

a	b
c	d

$$\sum_{i=1}^n (a_i + c_i - b_i - d_i) \cdot K_i = HL$$

Pos	Bestandteil	Ba	Bb	K	Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
1	a	1x 20	4x 20		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
2	a	1x 20	2x Be		Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp	
3	a	1x 20	4x 20	B10											
4	b	1x 20	2x Be		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
5	b	1x 20	2x Be		Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp	
6	b	1x 20	2x Be	B11											
13	c	1x 20	4x 20		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
14	c	1x 20	2x Be		Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp	
15	a + c	Be	Be		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
16	a + c	Be	Be	B10											
17	d	1x 20	4x 20		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
18	d	1x 20	2x Be		Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp	
19	d	Be	Be		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
20	b + d	Be	Be		Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp	
21	a + c + b + d	Be	B10		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
22	a + c + b + d	Be	B10		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
23	x	Be	B10		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
24	y	Be	B10		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp
25	z	Be	B10		Fc	Fd	Fk	Fm	Fu	Fv	Fw	Fx	Fy	Fz	Gp

$S_2 \mid 44$

$$\sum [(a_i - d_i) + \overset{c_i - b_i}{(b_i - d_i)}] \cdot k_i' = FL_1$$

$$\sum [(a_i - d_i) - \overset{c_i - b_i}{(b_i - d_i)}] \cdot k_i'' = FL_2$$

752



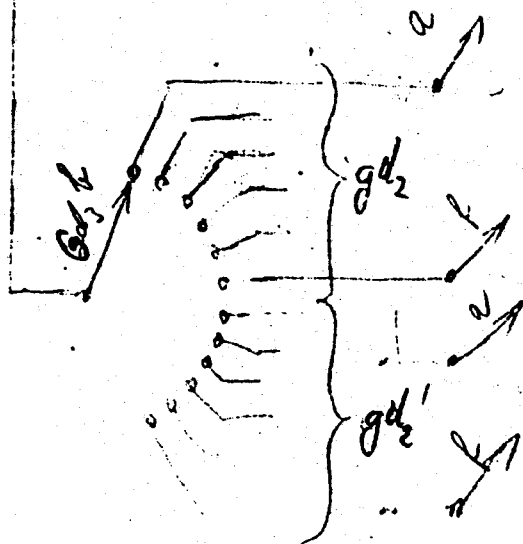
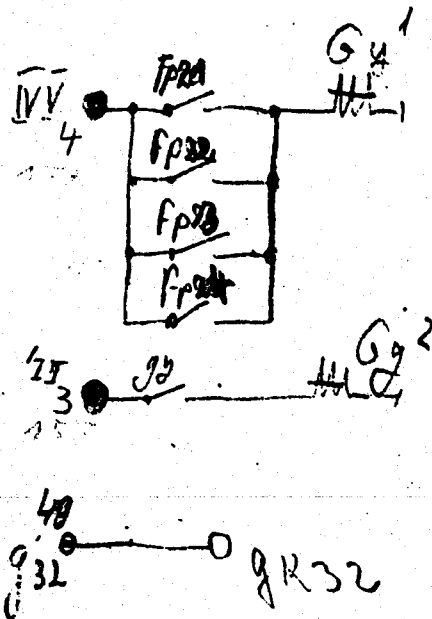
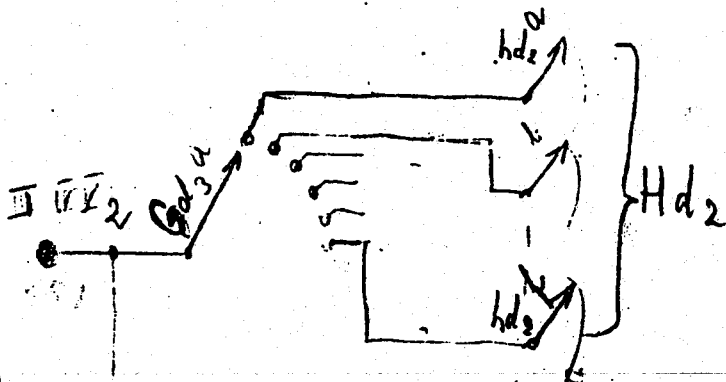
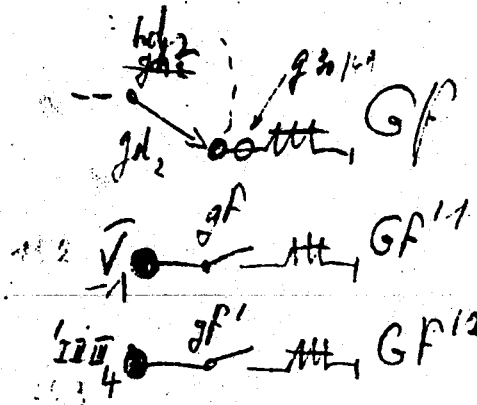
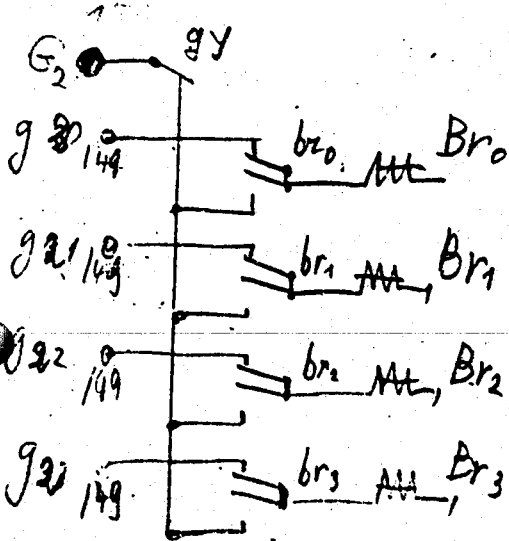
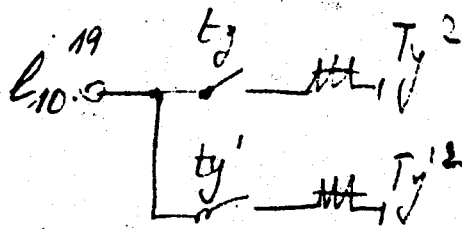
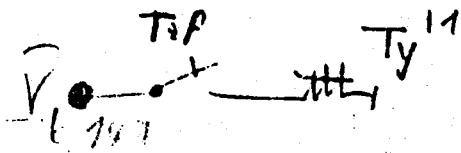






Leistung

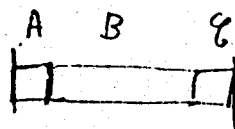
$S_2$  48



Anschlüsse Rel.

g +4	Fw +4	Multiplikation
+3	+3	
+2	+2	
+1	+1	
0	0	
-1	-1	
-2	-2	
-3	Fw -3	
10	Fp 10	Zählens = 0
11	11	
12	12	
13	Fp 13	
		Verschiebung
20	Bz 0	Vorzeichen
21	" 1	
22	" 2	
23	Bz 3	
		Worms
		Zählens
30/15	GF	Anw. Umschaltg.
31/17	LY 1	
g 32/18	G 8	
		Zählenszeichen
		Bezugsbefehl

Aufbau eines Fiktors

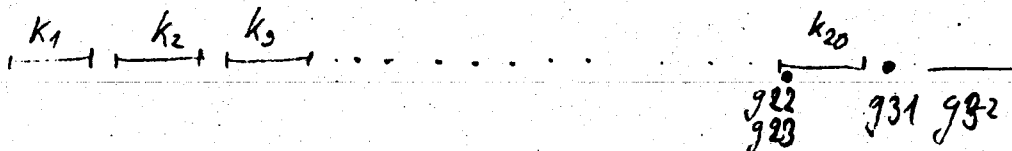


A.  $g_{20} - 23$

B.  $g_{+4} \div g_{-3}$

C.  $g_{10} \div g_{13}$

Schema des H-L Ablaufs:



Schema des FL-Ablaufs:

