



LIVRET HLT
Fascicule 12
Chapitre XXIV
1^e et 2^e parties

Locomotives
électriques
quadricourant
Bo-Bo type 160

figures et schémas

Direction M.A.
Bureau 24-12
Section 8

LOCOMOTIVE ELECTRIQUE
QUADRICOURANT BoBo TYPE 160.

Liste des figures et schémas.

Figures: 1 à 69.

Dessins: 160/A.00.05.01
160/B.00.00.01
à " " " ".043

Courbes: 160/F.02.01.1.11
à " " " " ".16
et 160/F.02.02.1.11
" " " " ".12.

Schémas: 160/A.00.01.01
160/A.16.20.06
160/A.16.30.02
160/D.00.01.01
160/G.00.01.01.

QUARTERLY REPORT

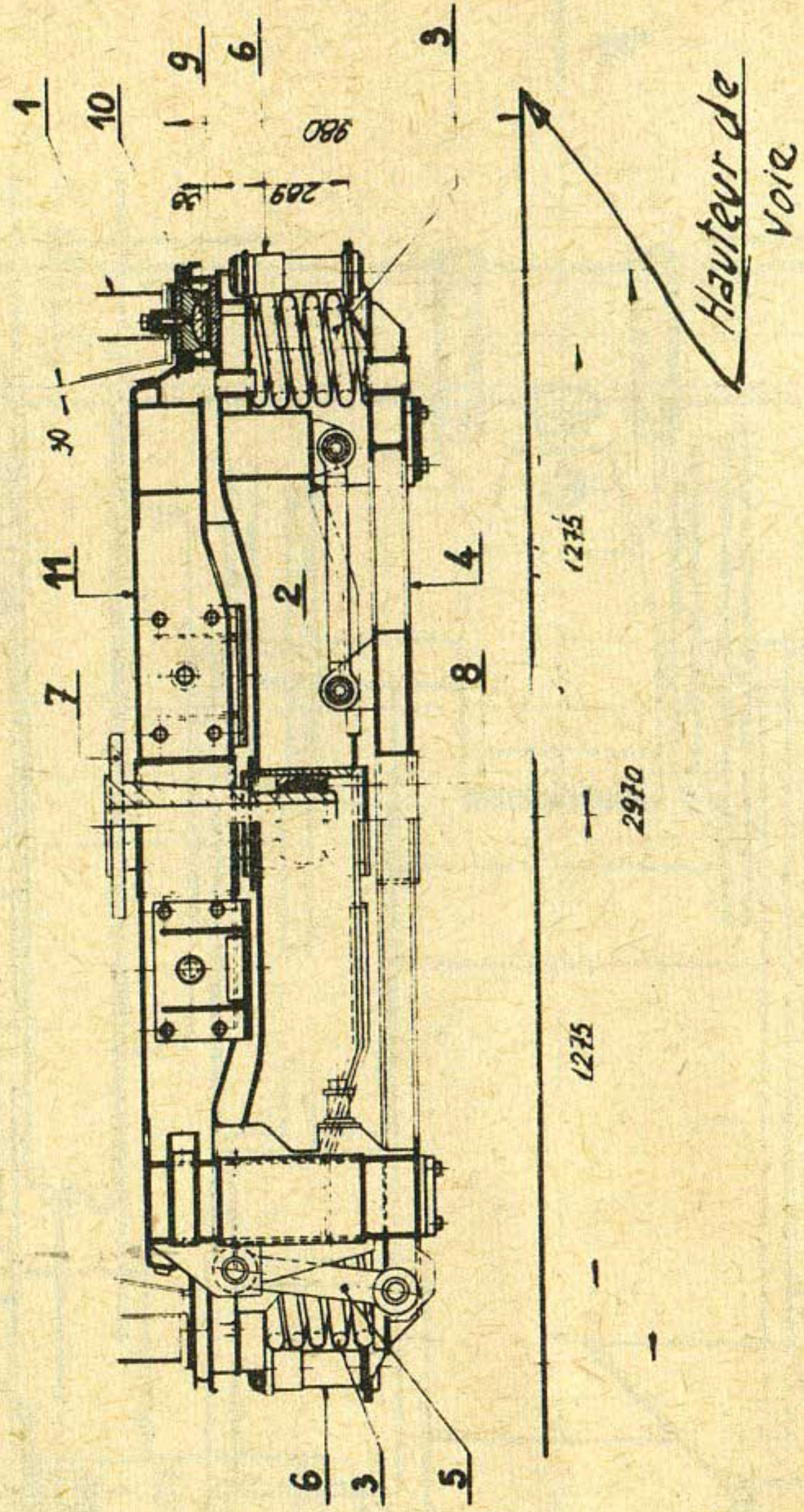
1901

10.30.00.0001

10.30.00.0001

10.30.00.0001

coupe: B8
2730



1/2 coupe: AR
4 530

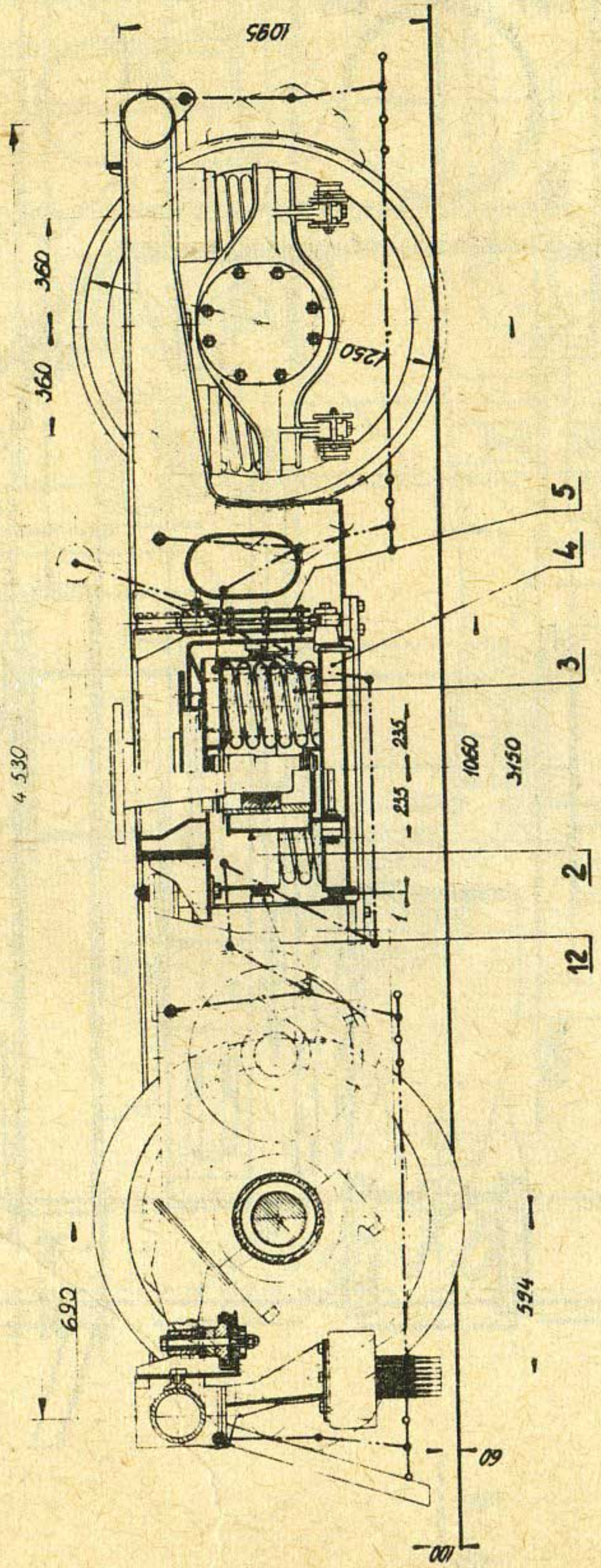


Fig. 1.a.

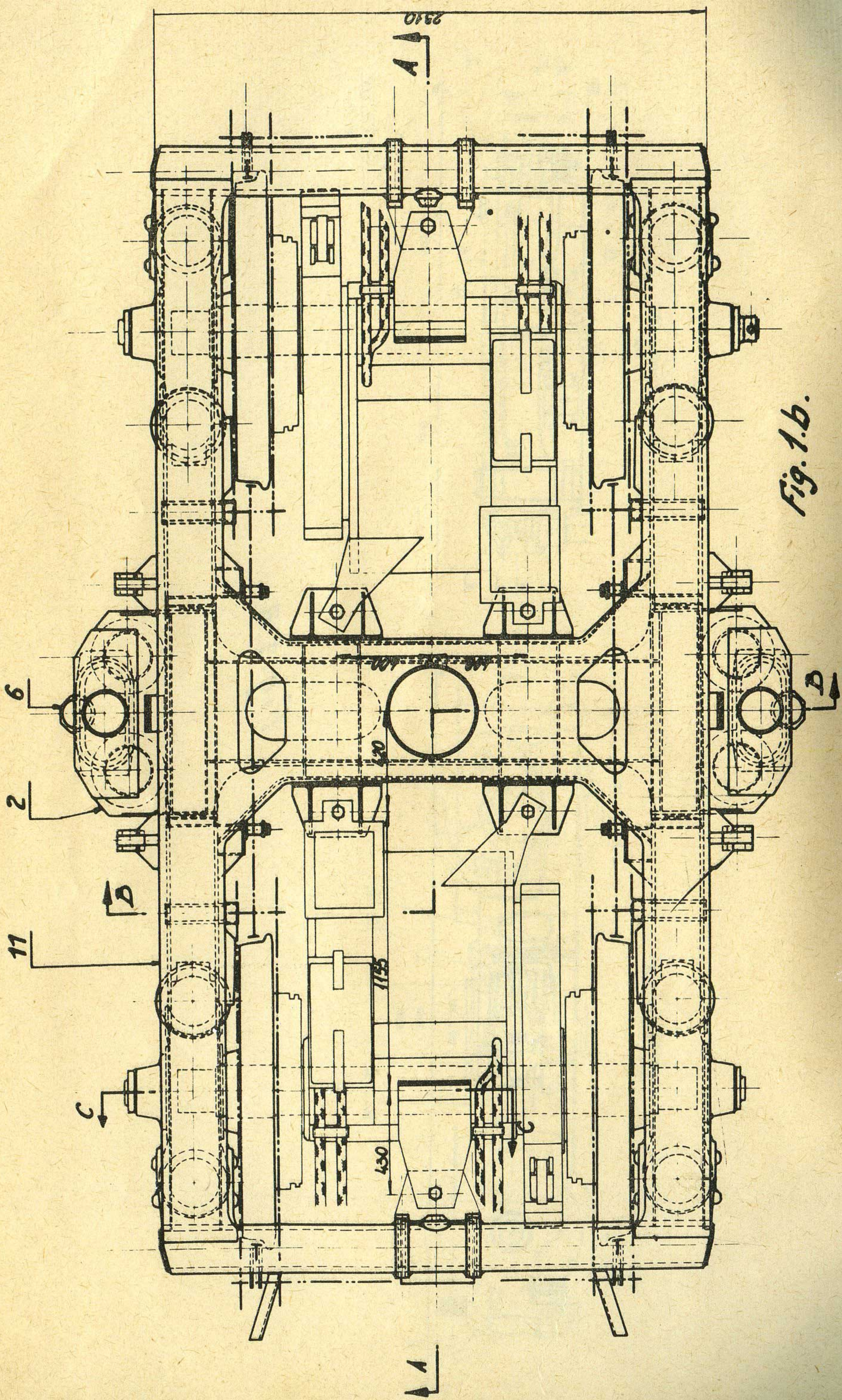


Fig. 1.b.

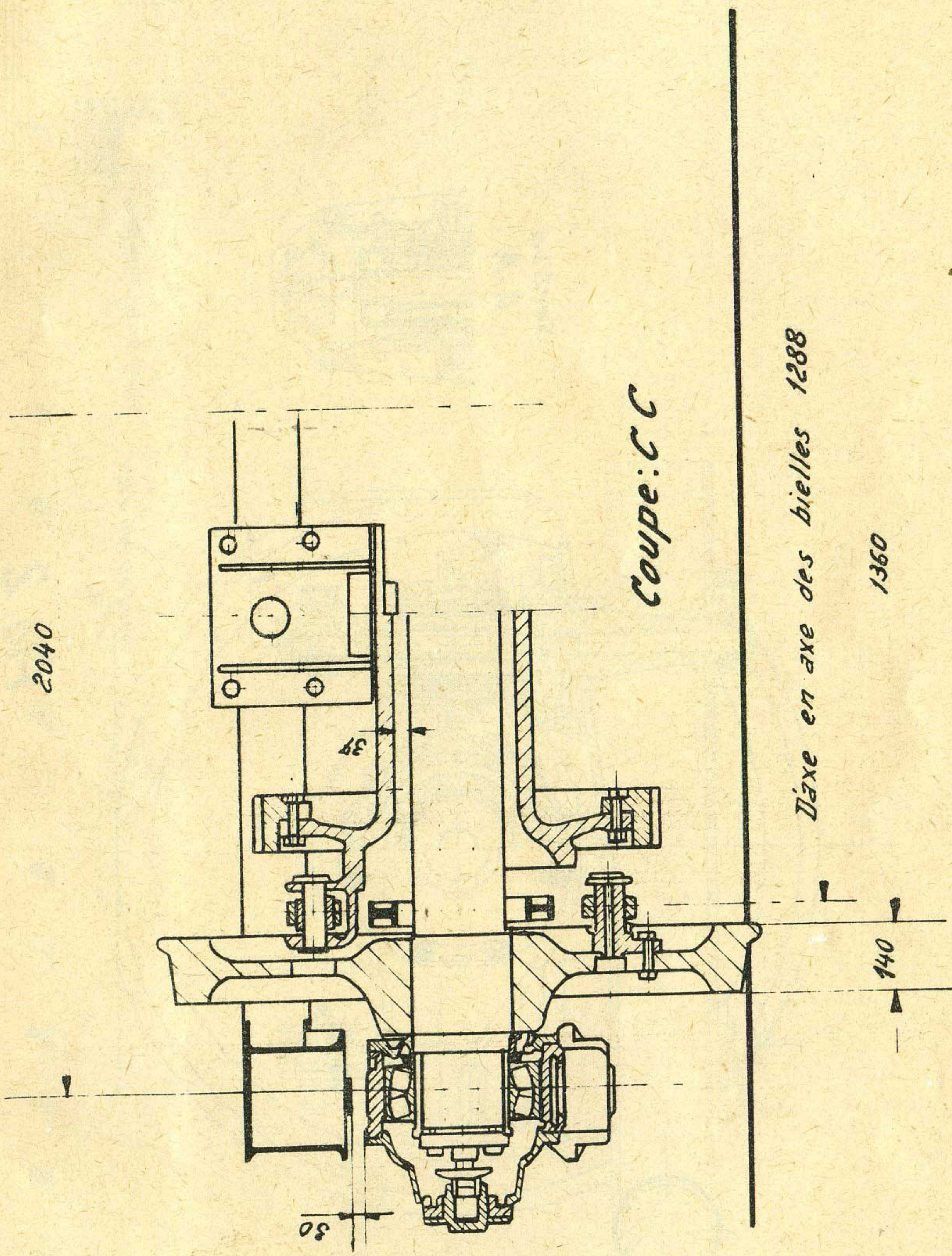


Fig. 1b.

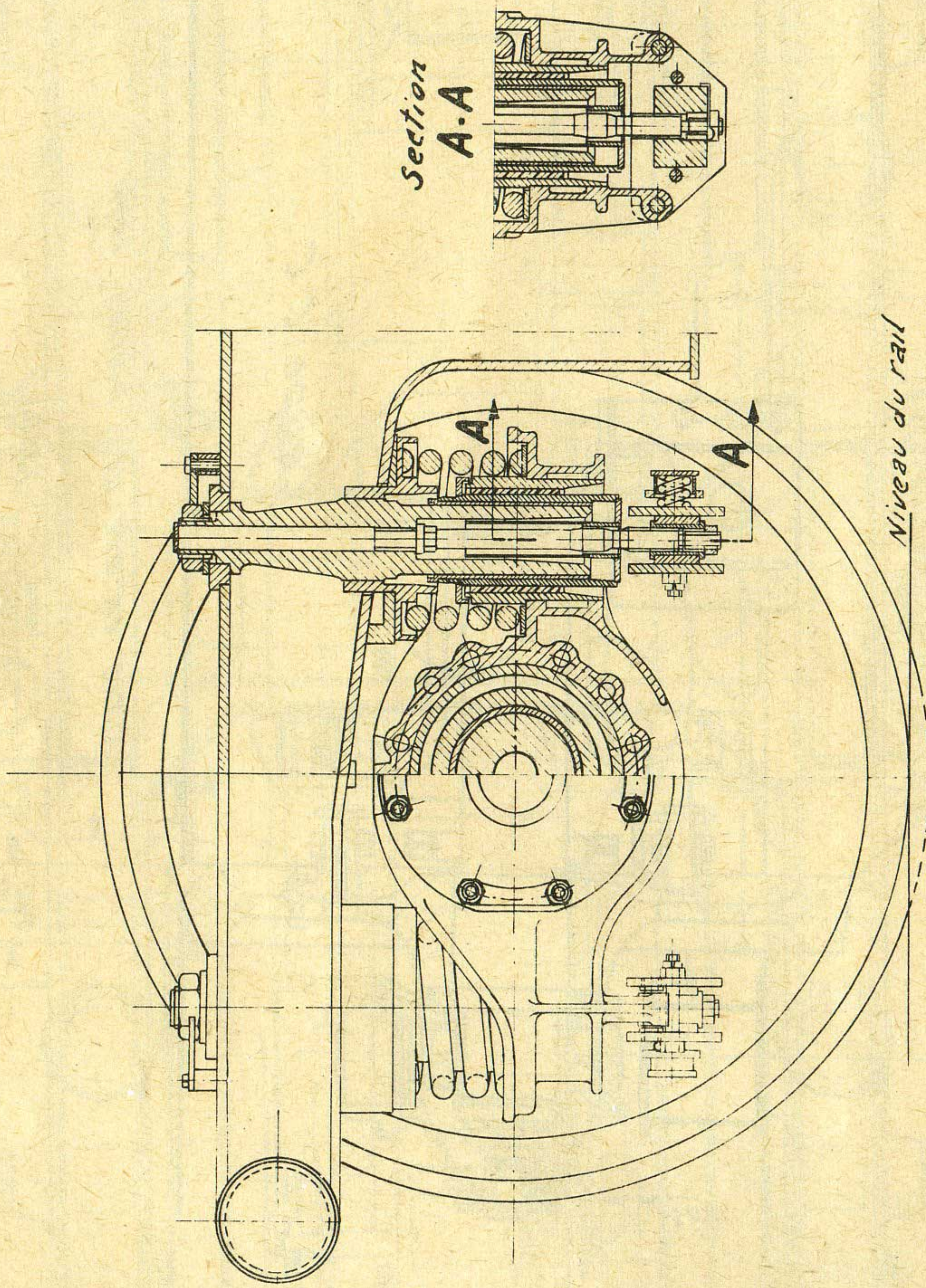
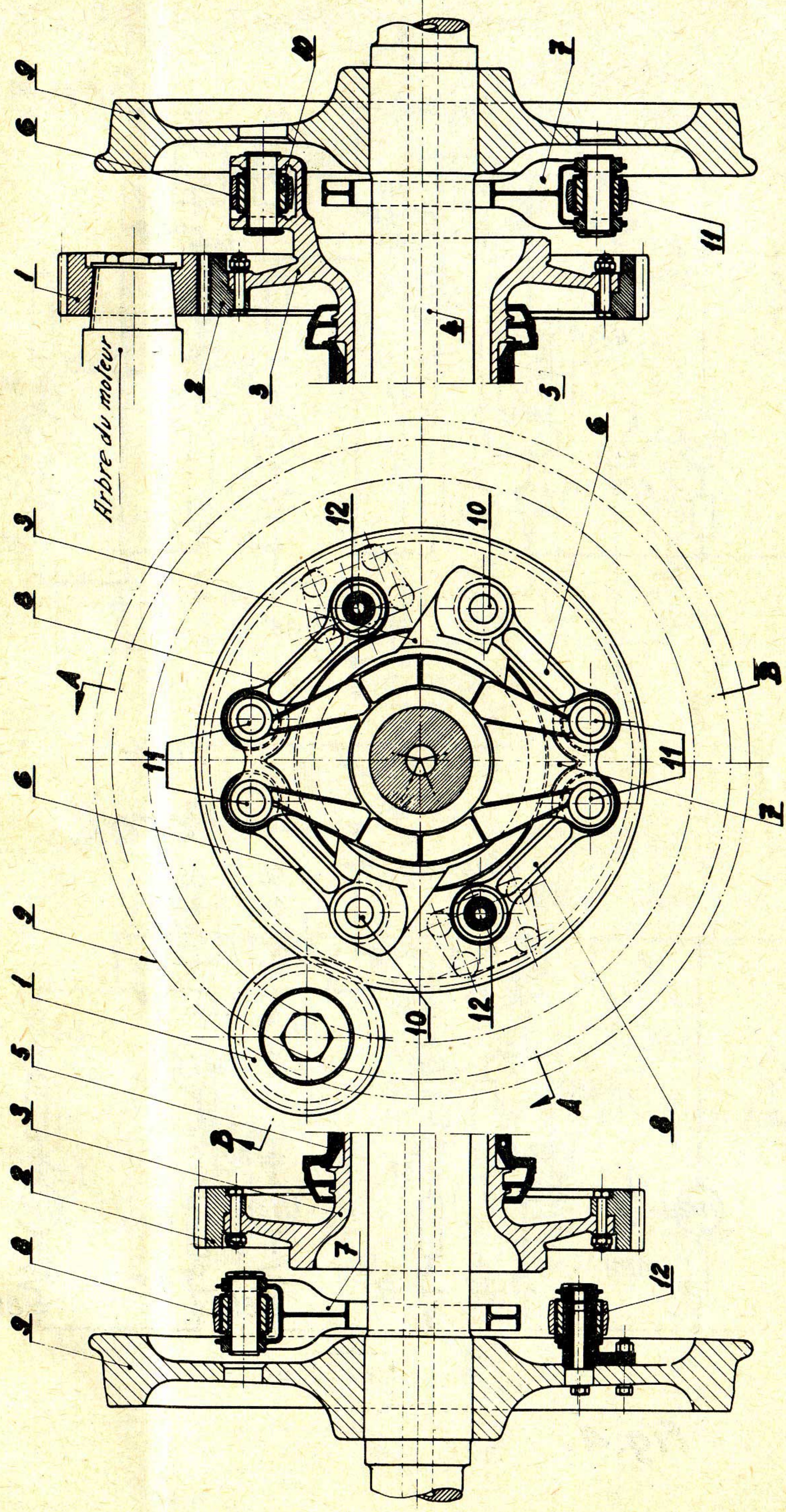


Fig. 2



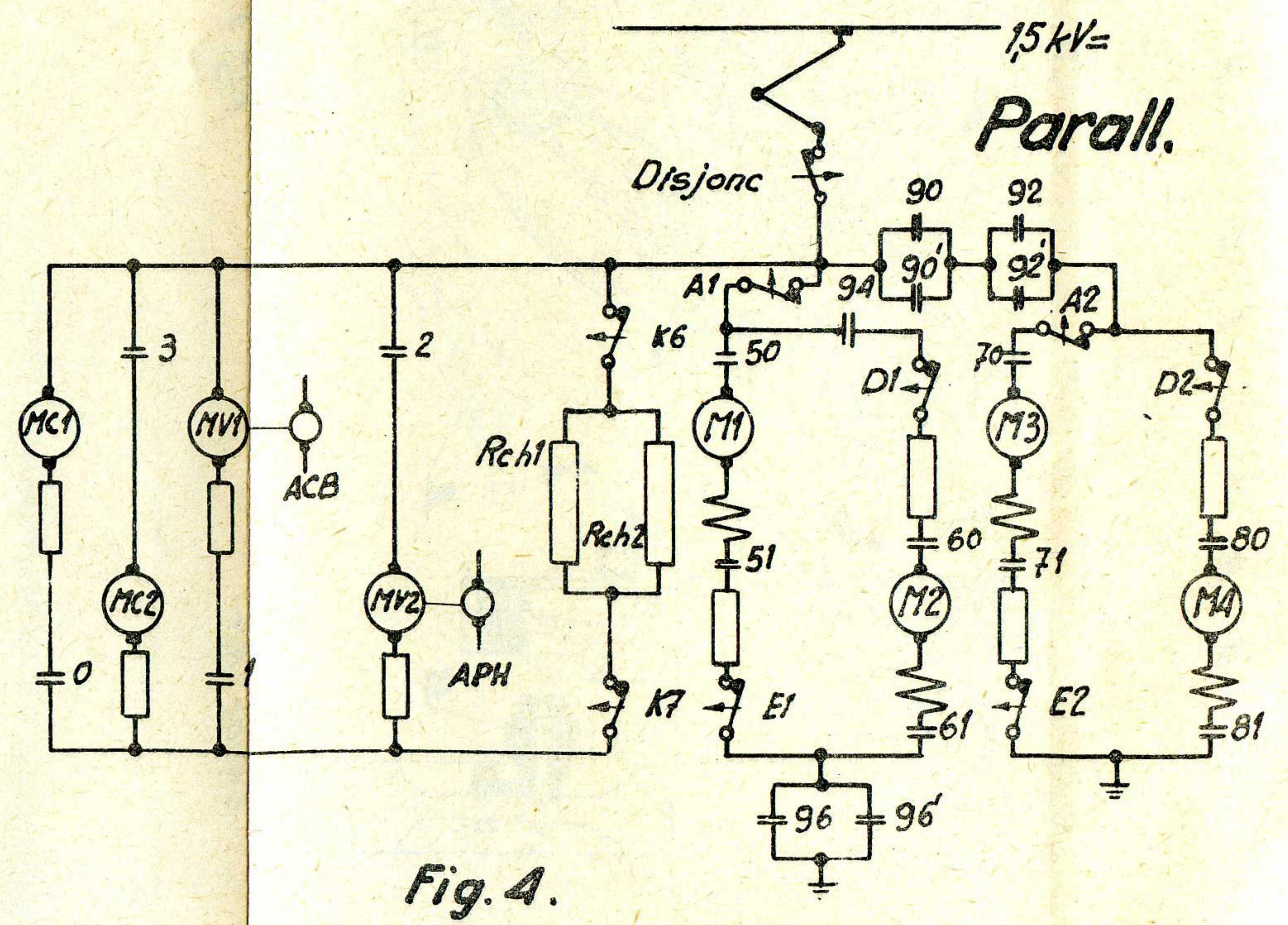
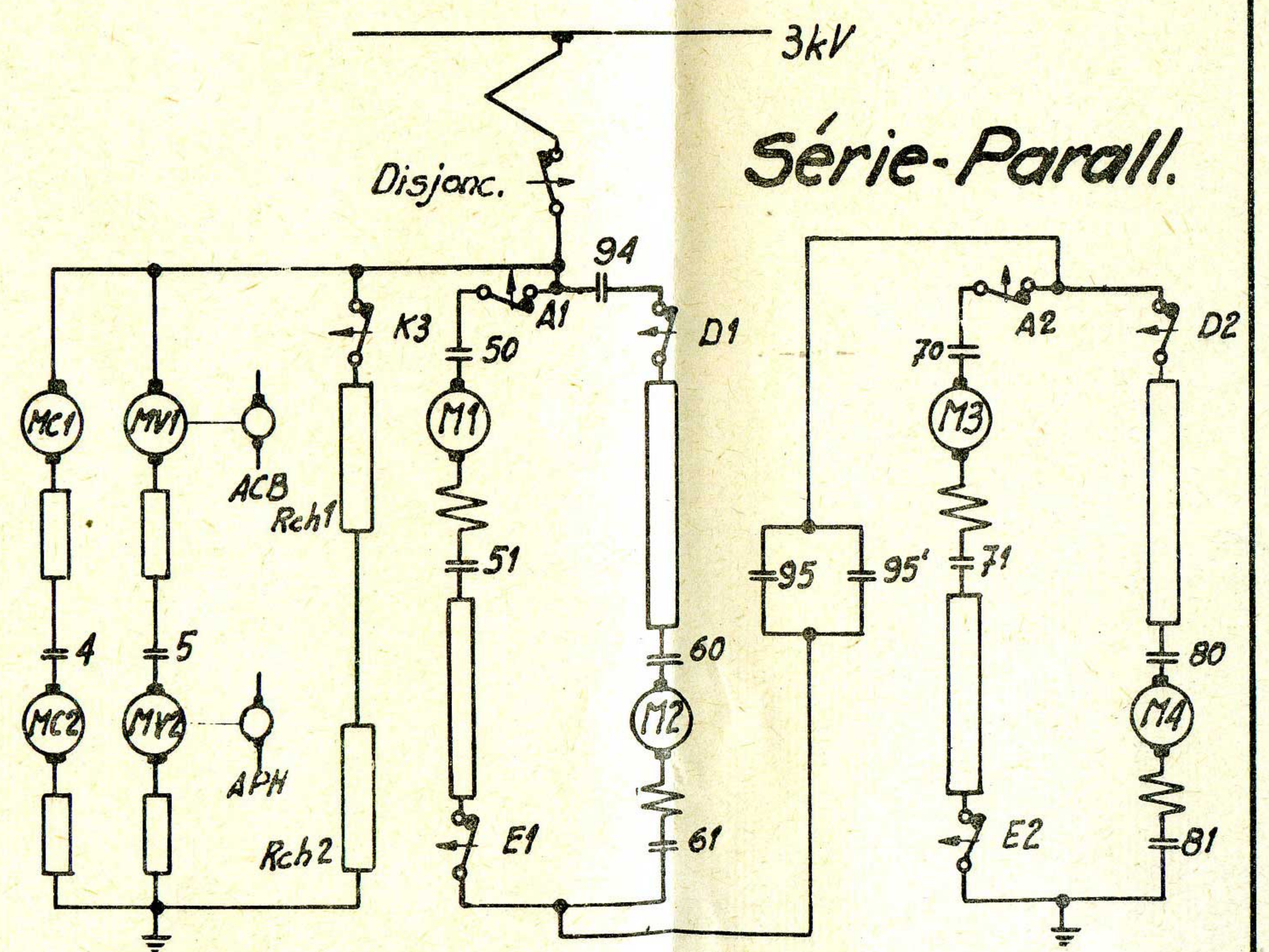
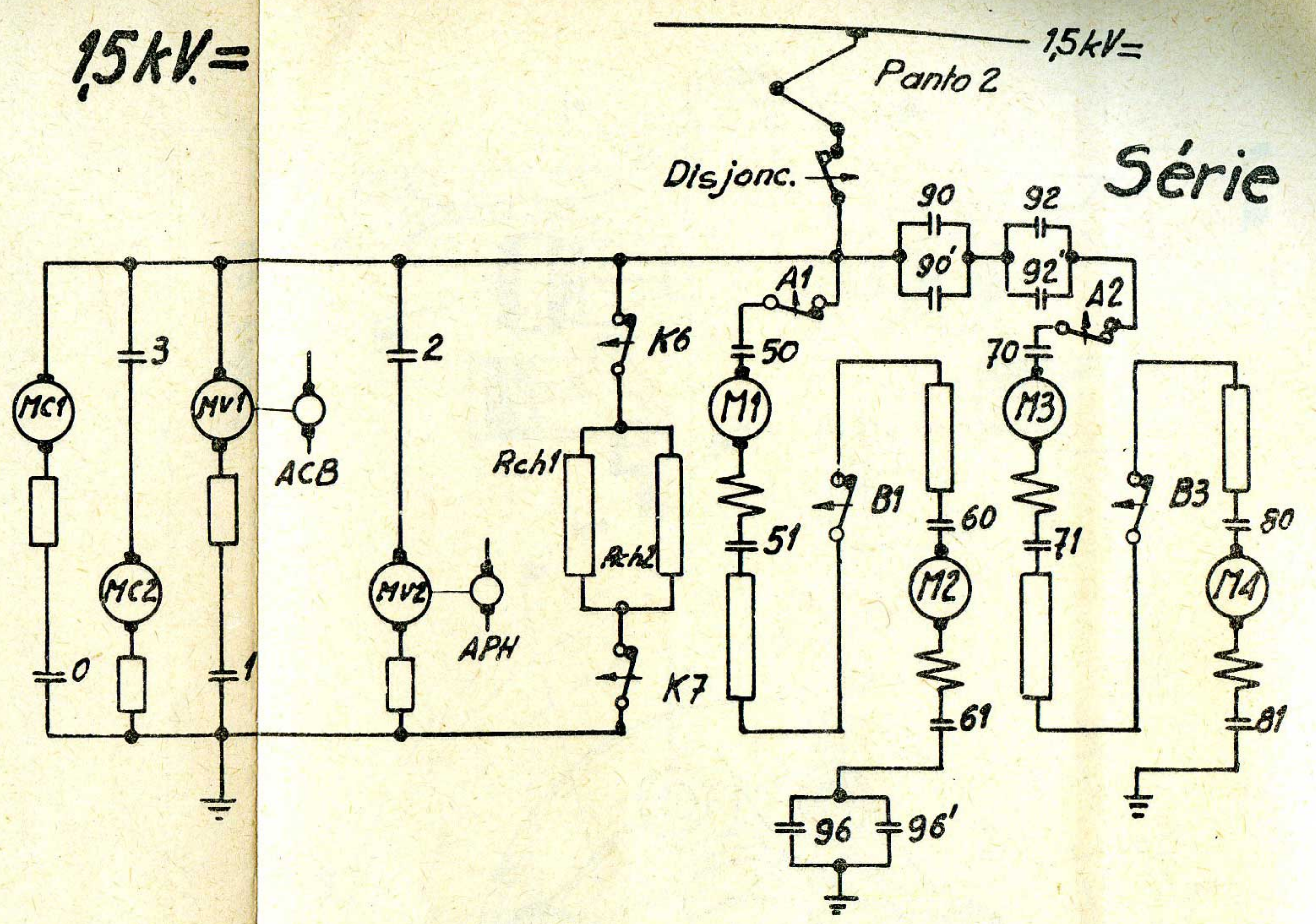
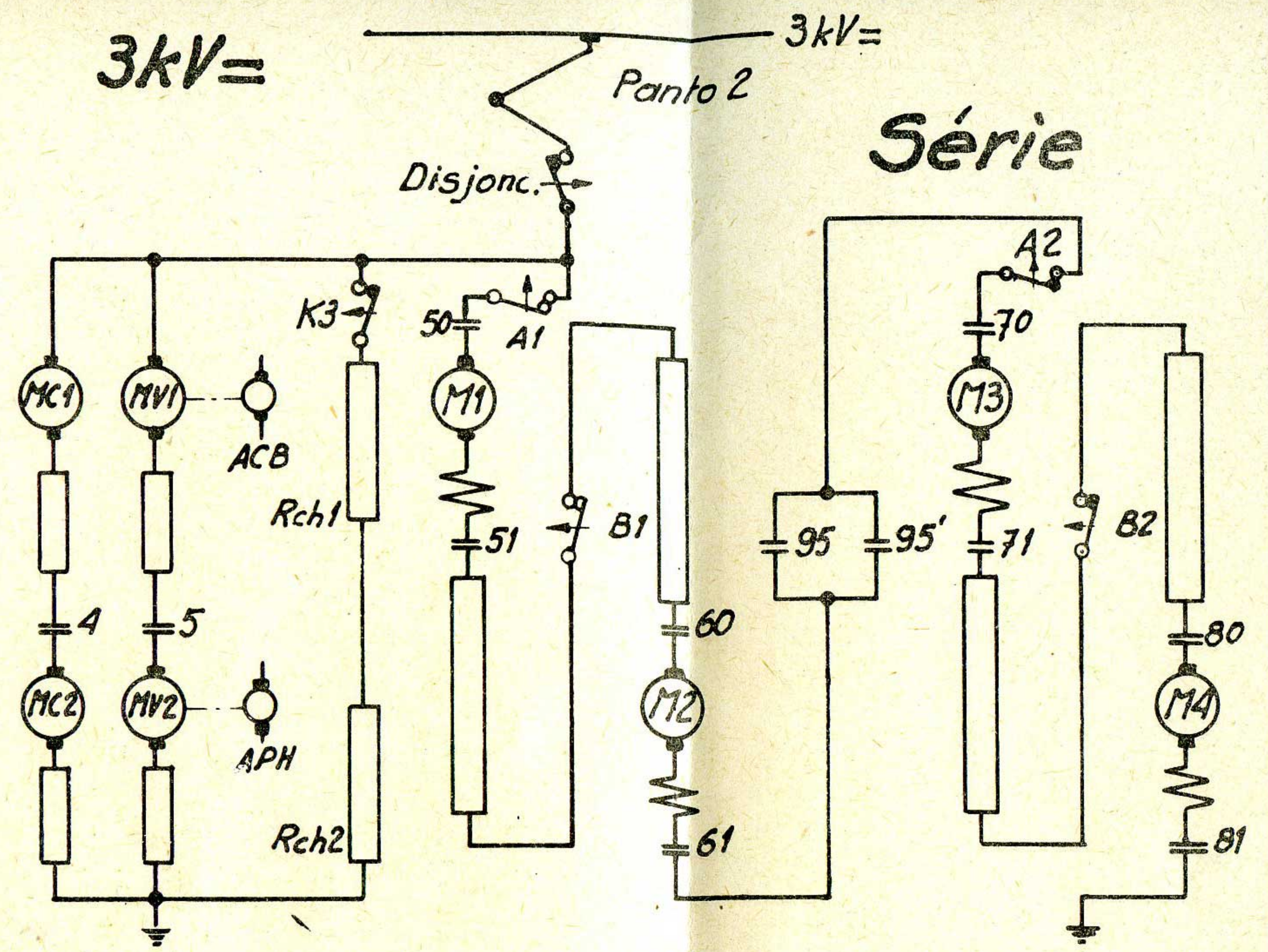


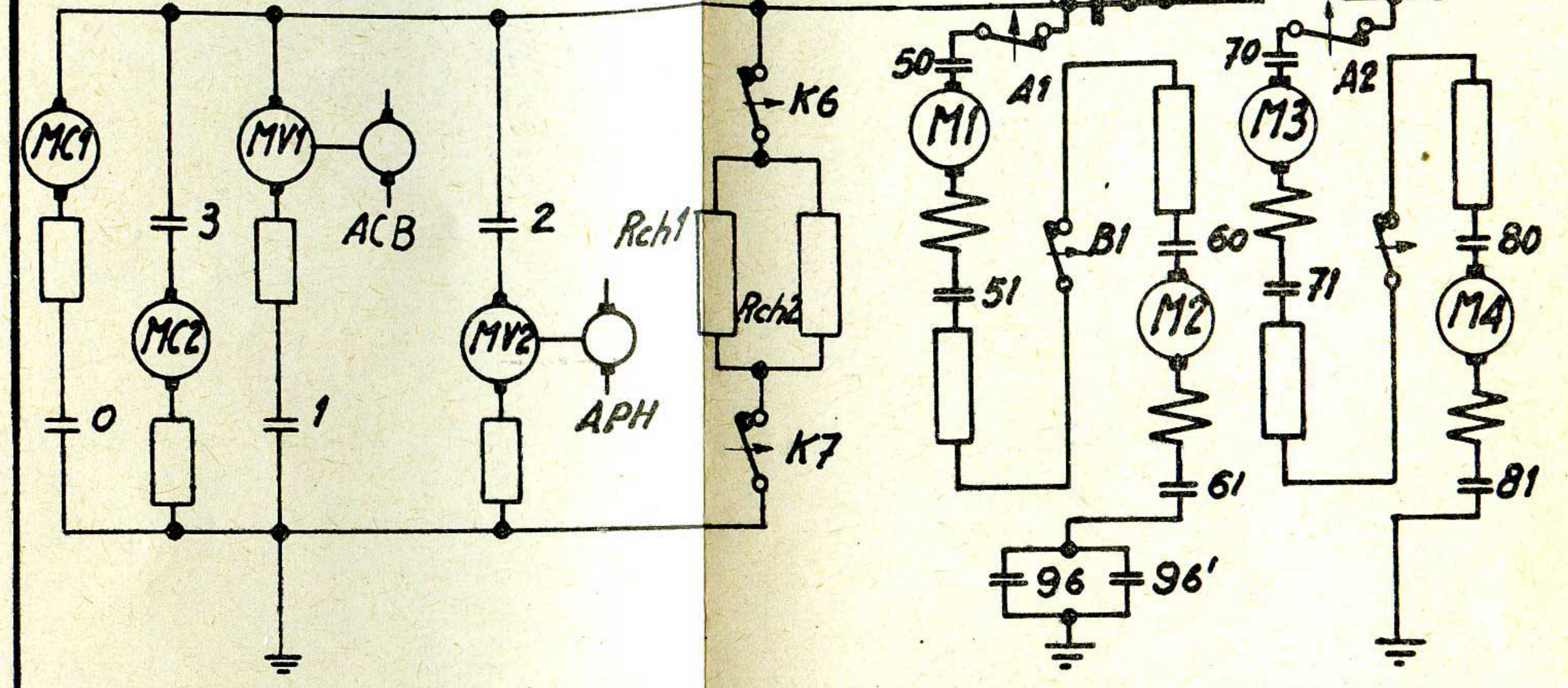
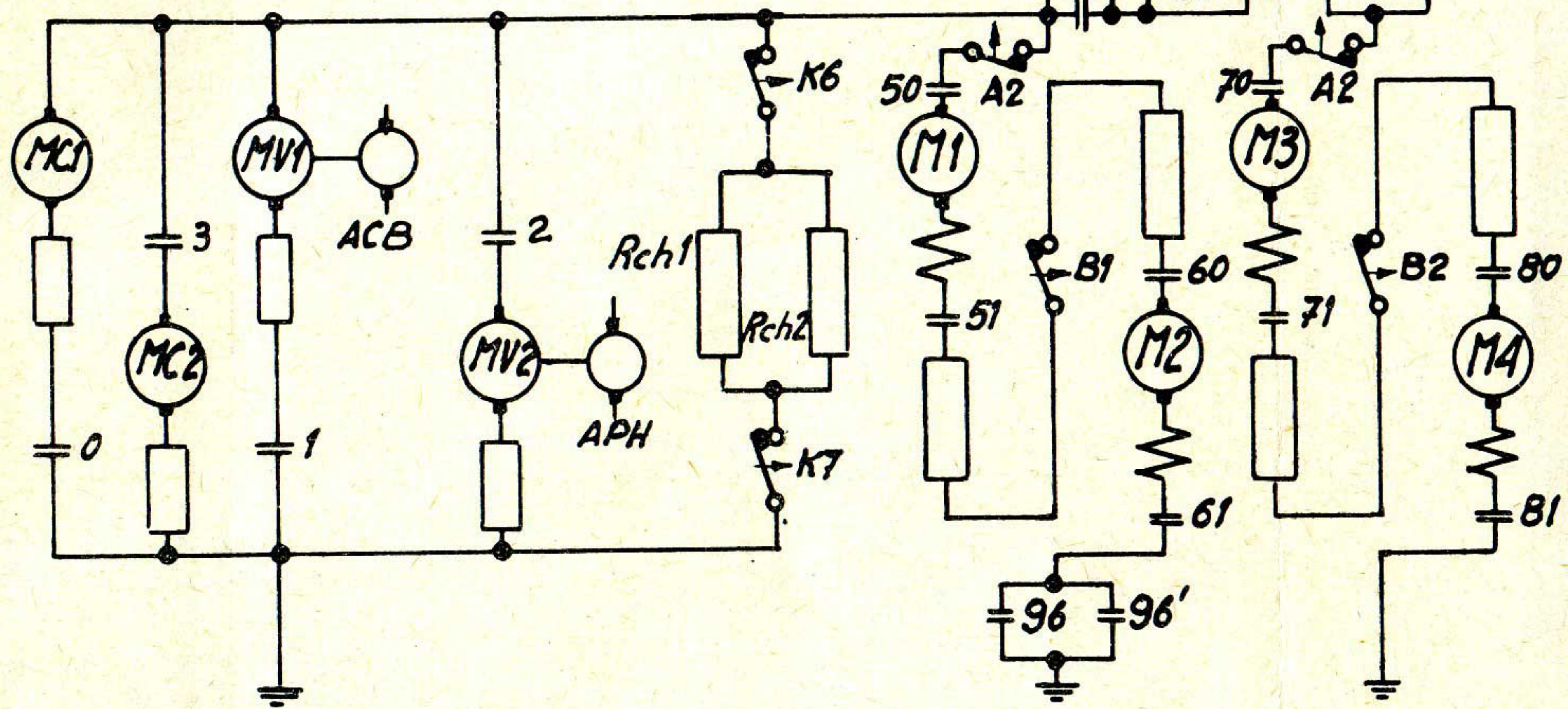
Fig. 4.

25kV ~ 50Hz.

15kV ~ 16 2/3 Hz.

Série

Série



Parall.

Parall.

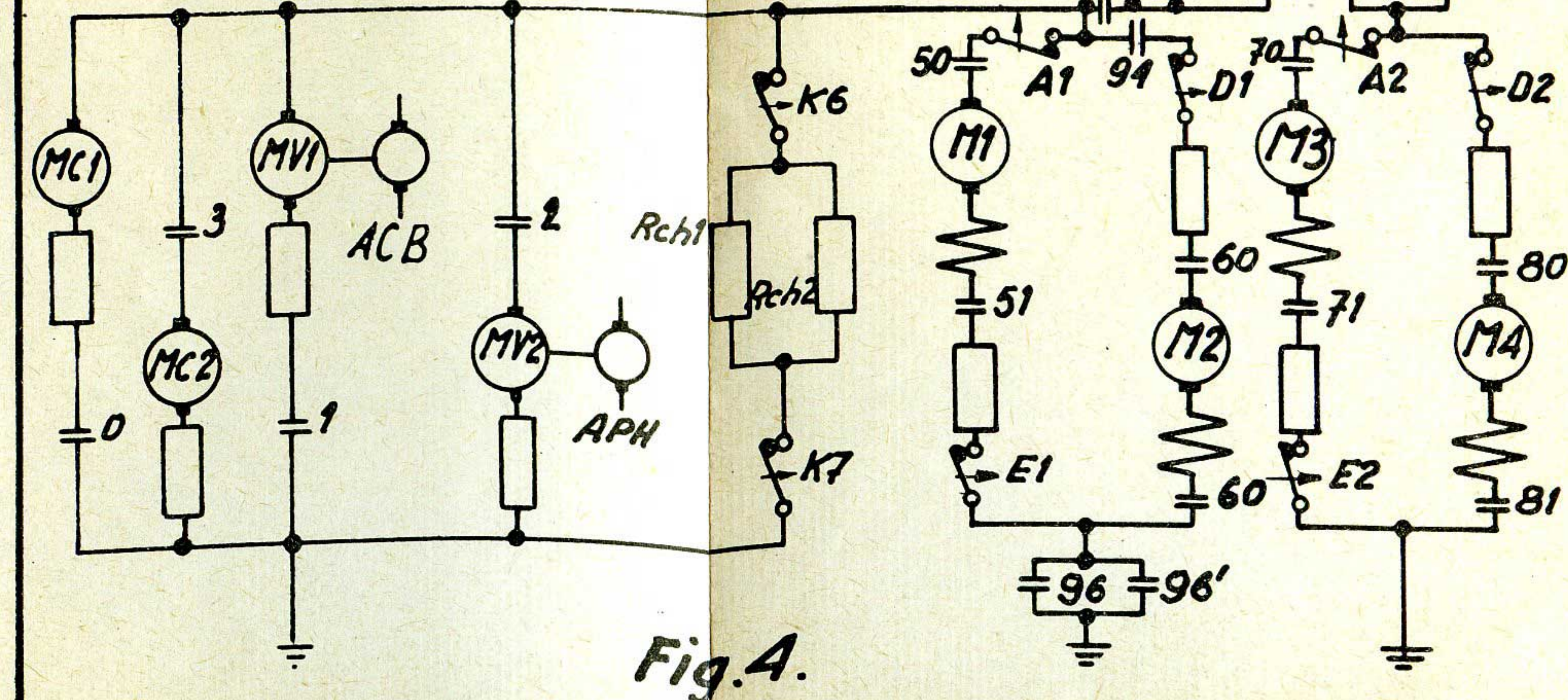
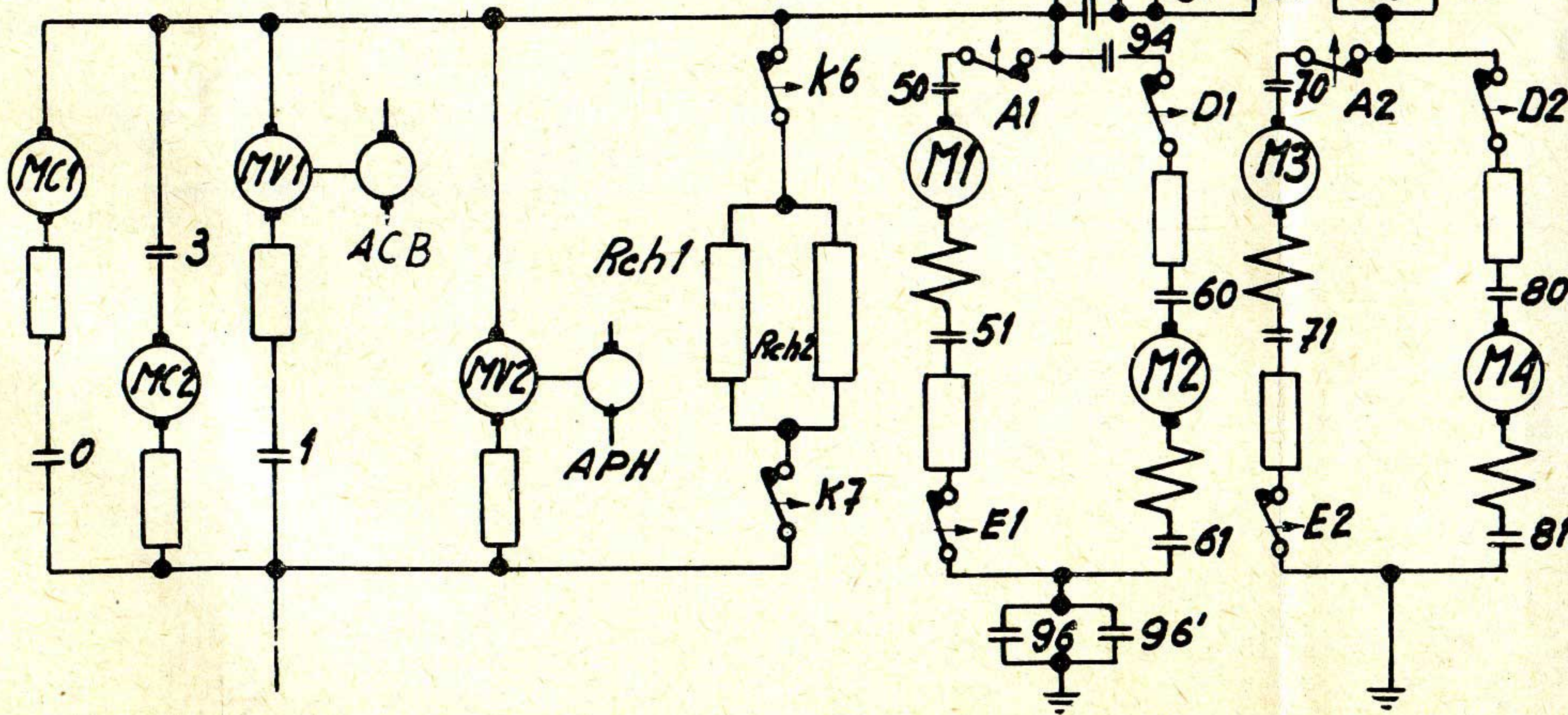


Fig. 4.

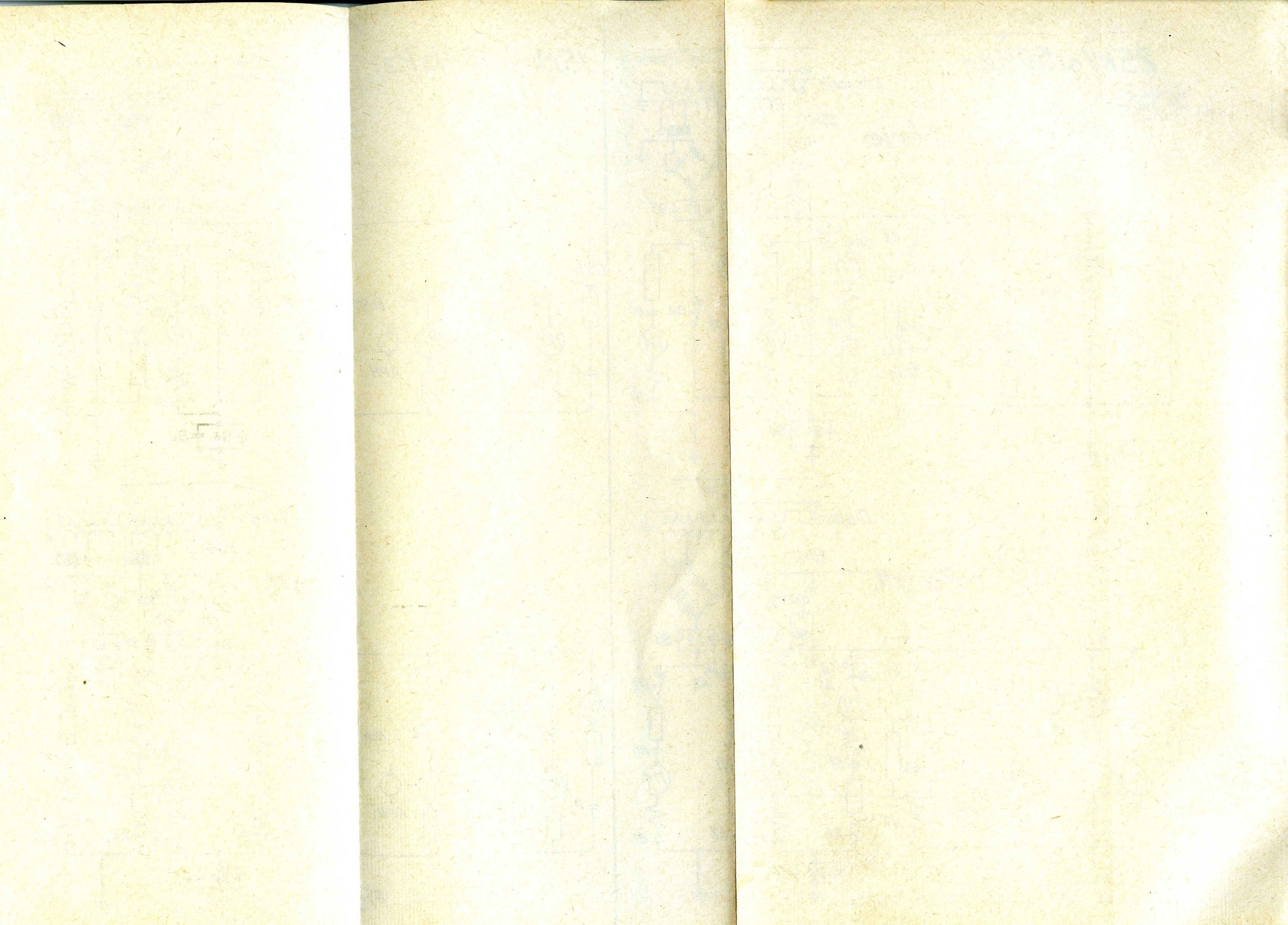
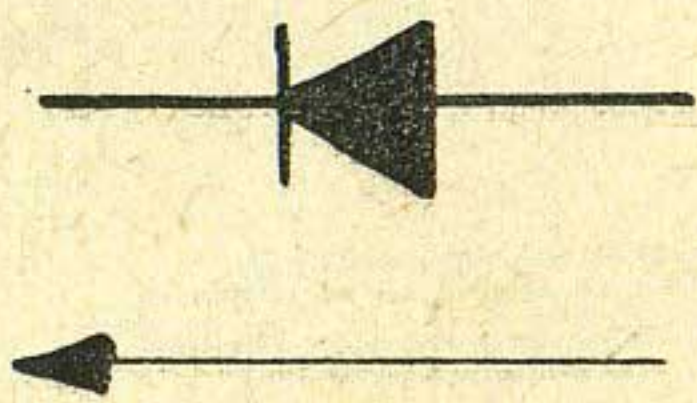
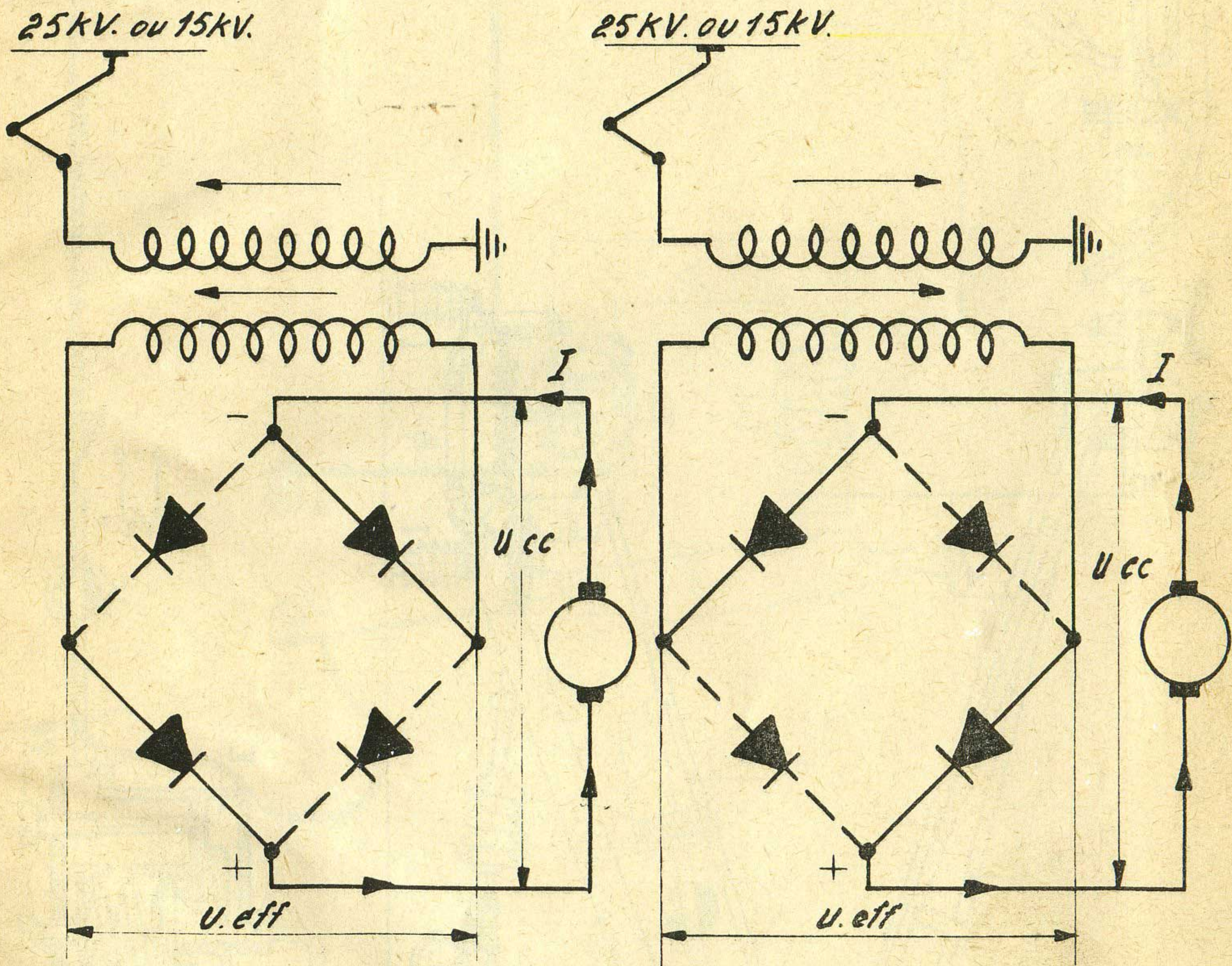


Fig. 5



Première demi-période

Deuxième demi-période



$$U_{eff} = 1,11 U_{cc}$$

Fig. 6.

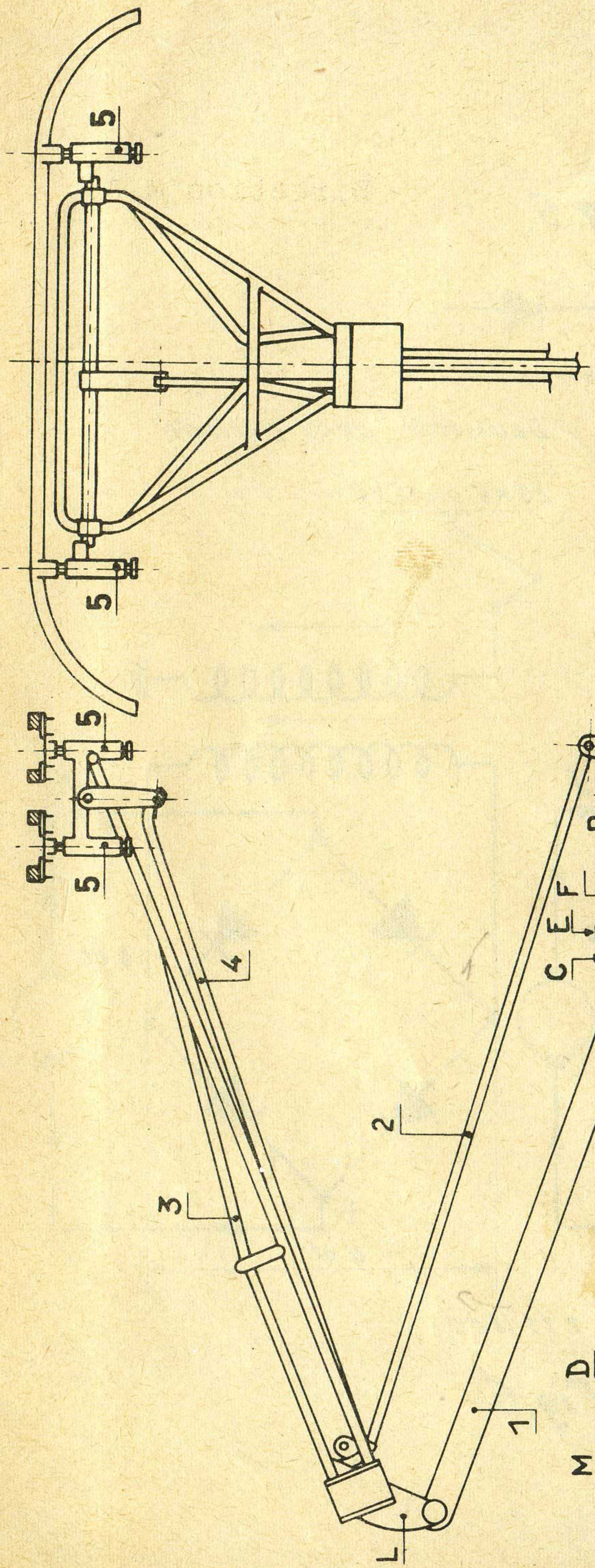


Fig. 7

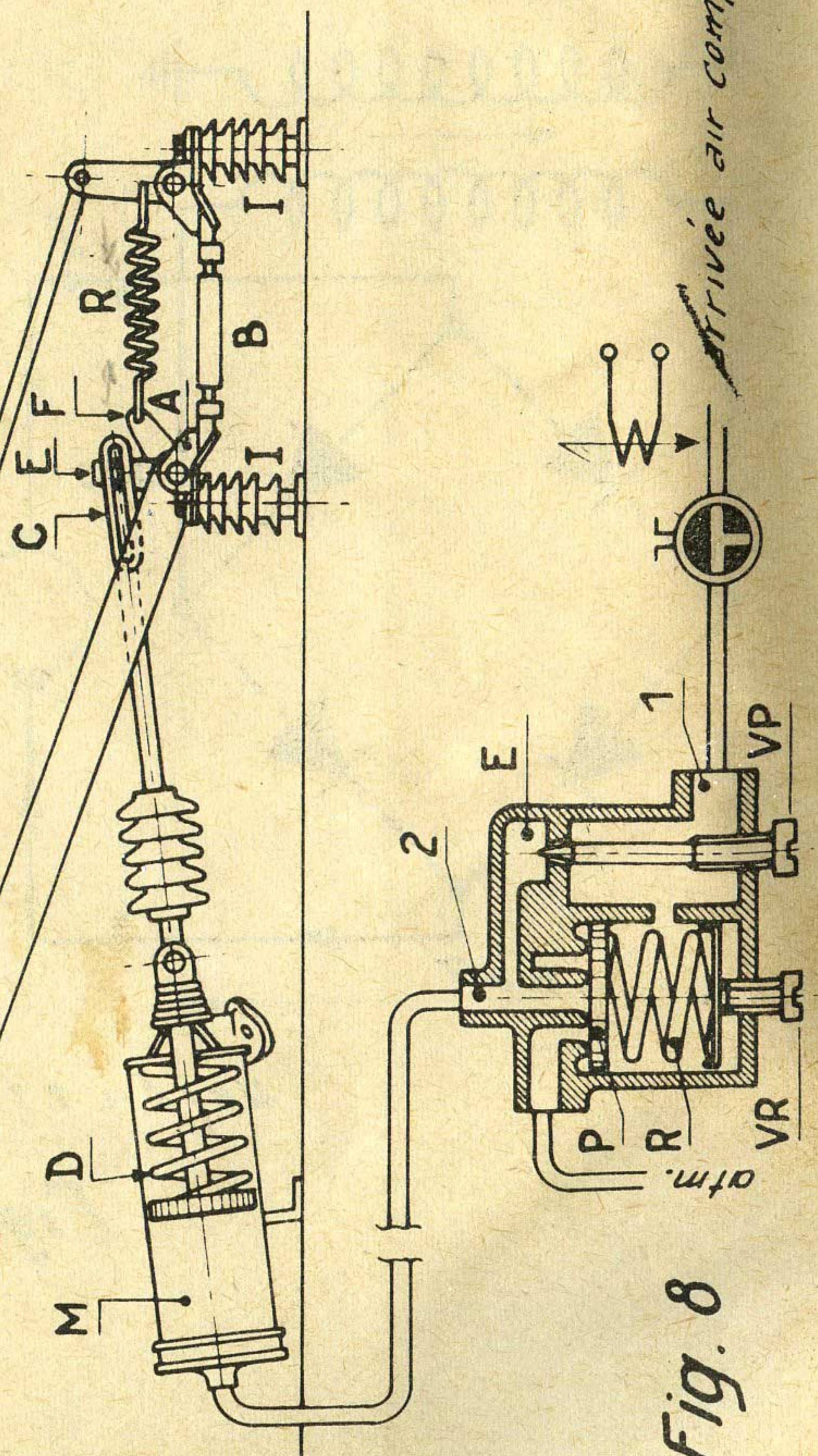


Fig. 8

Arrivée air comprimé

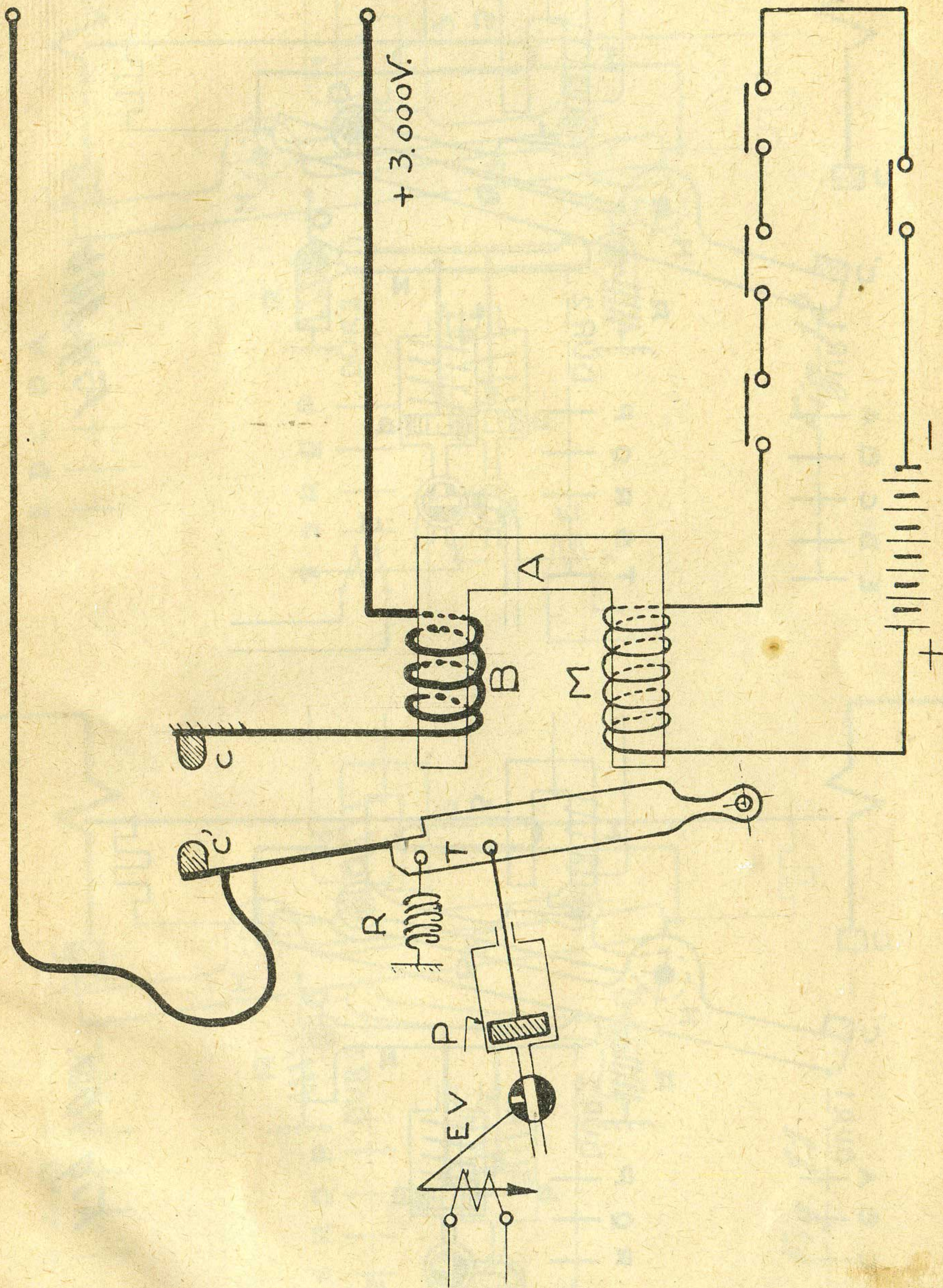


Fig. 9

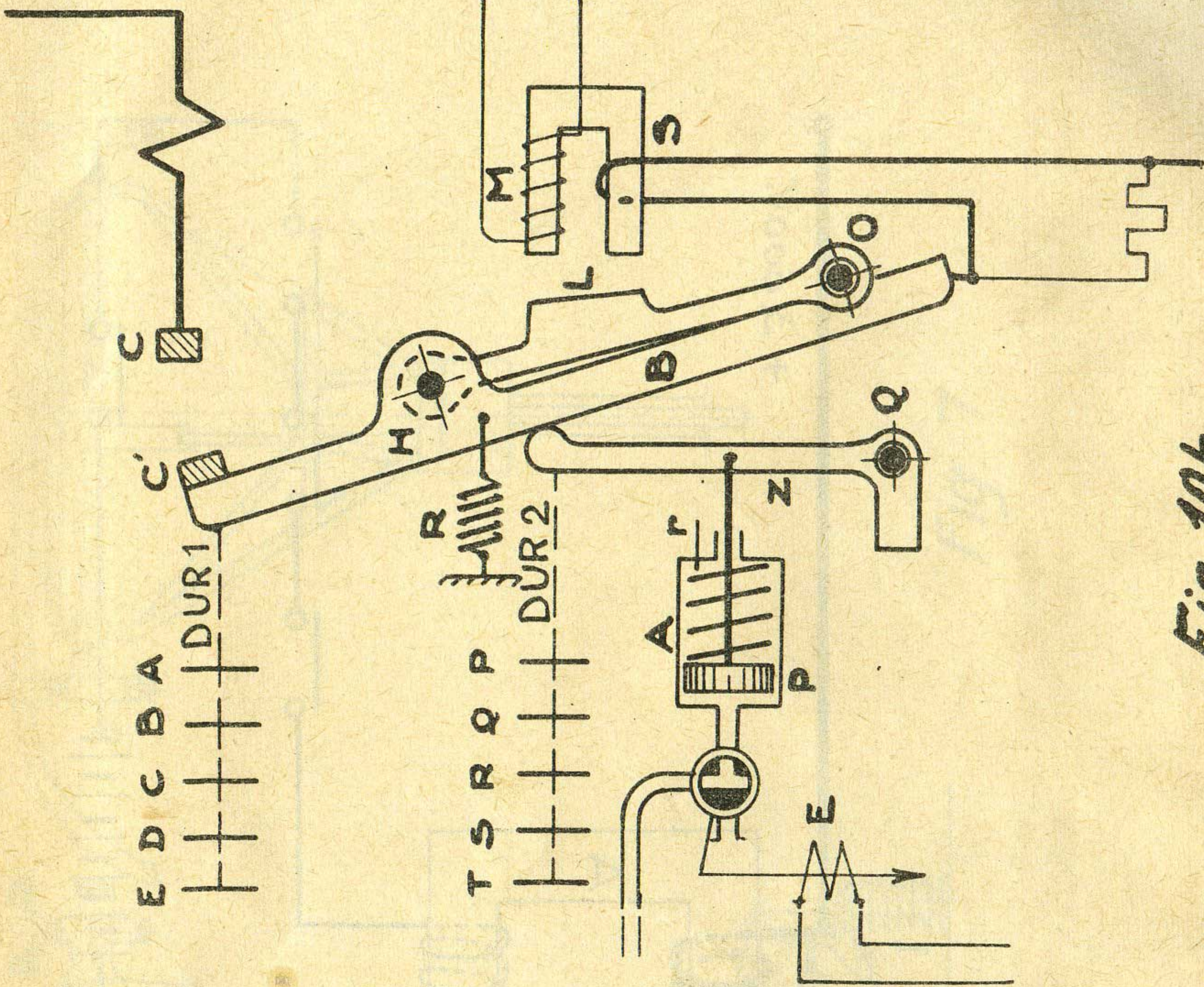


Fig. 10a.

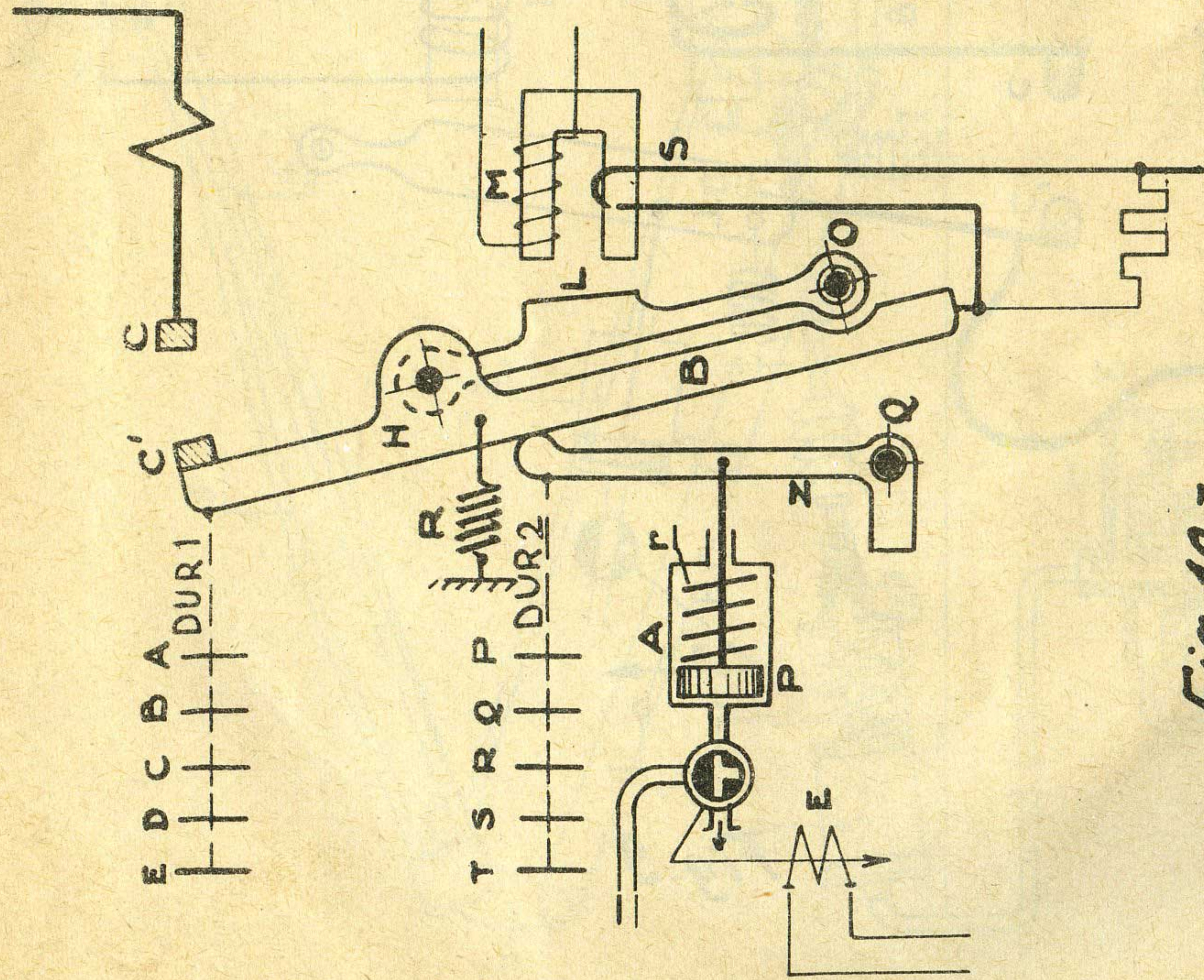


Fig. 10b.

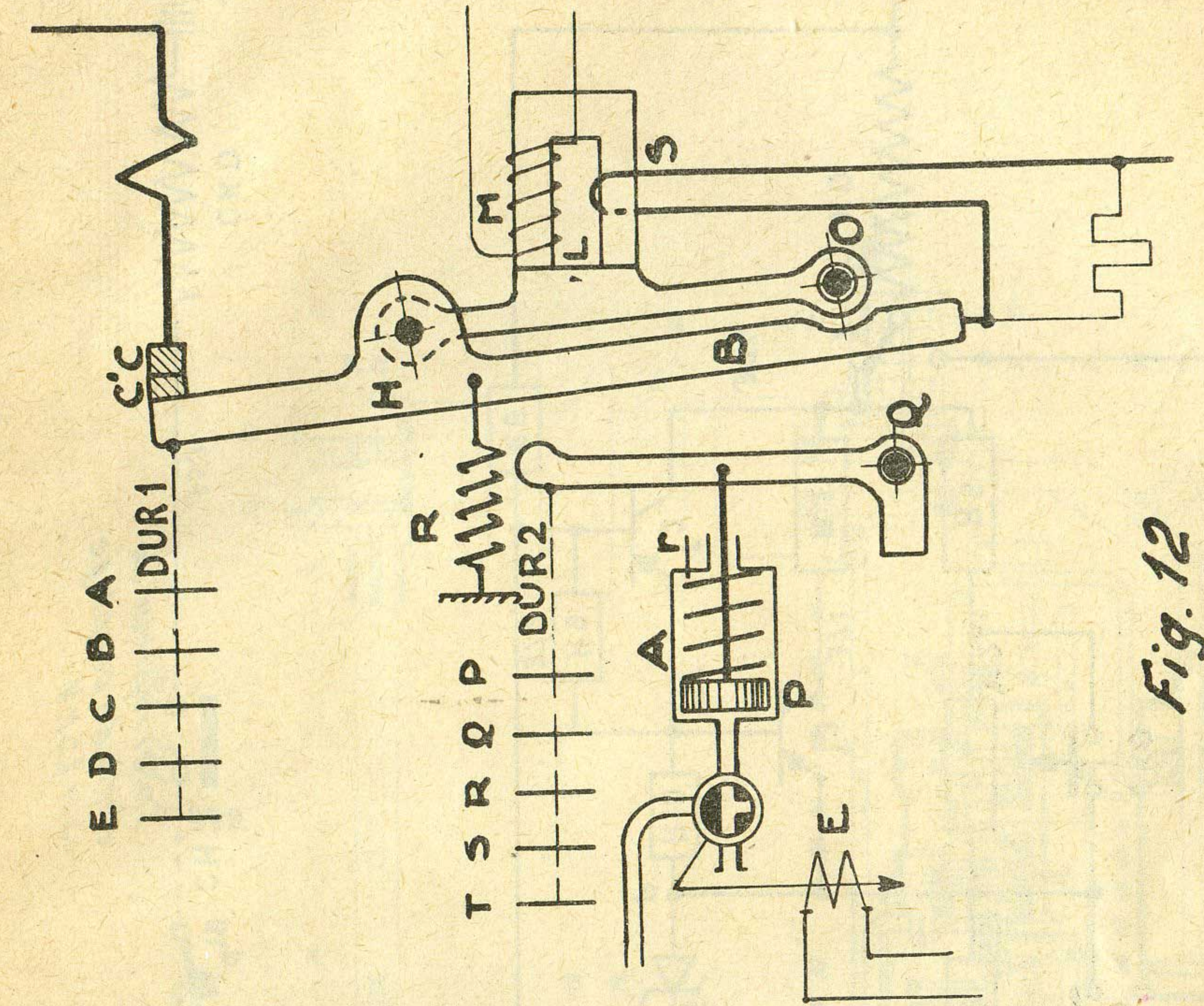


Fig. 11

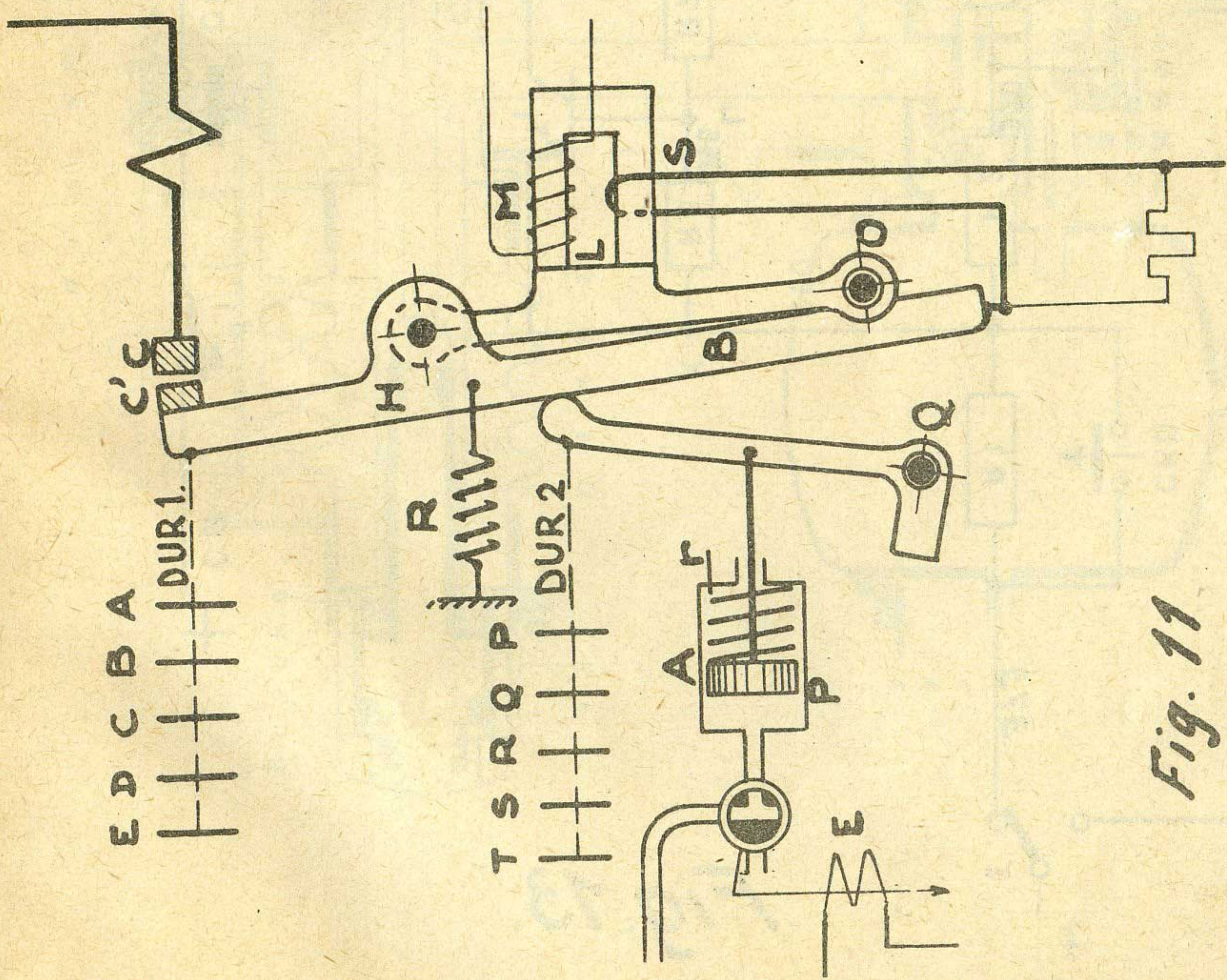
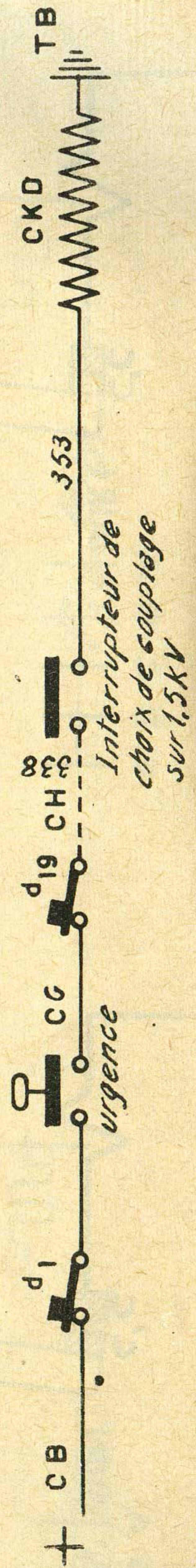
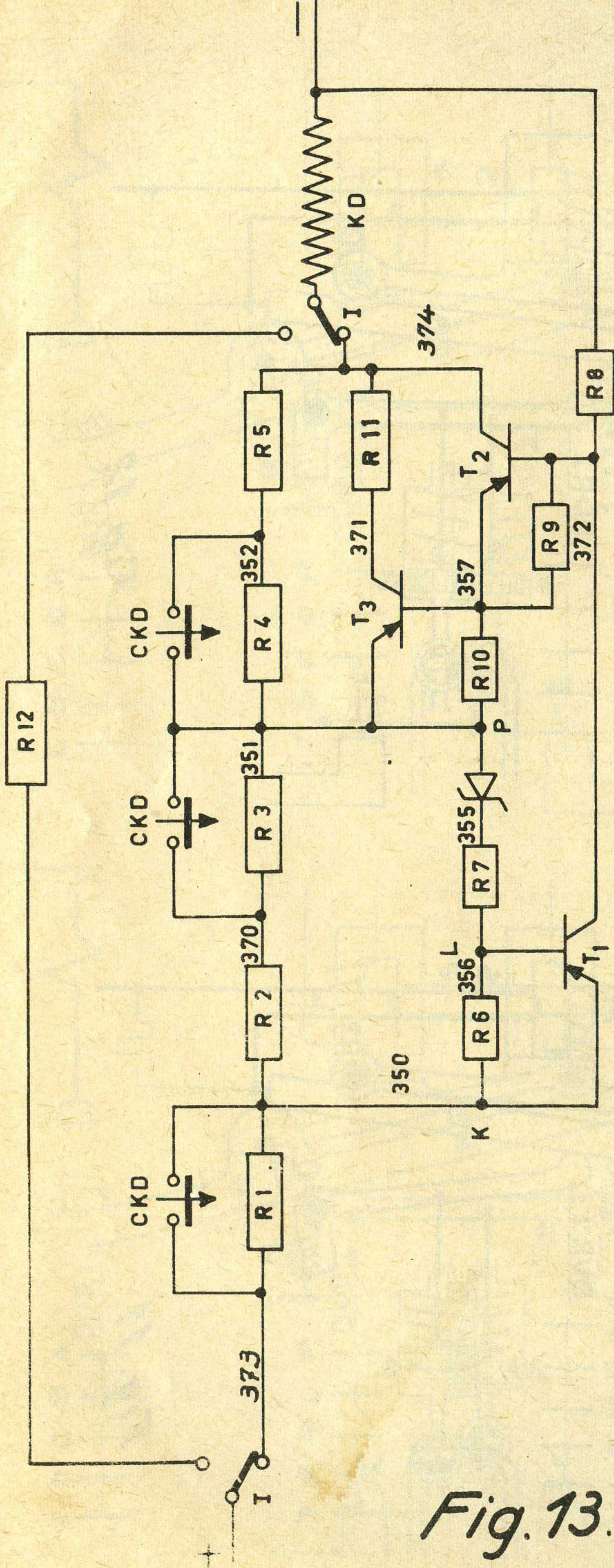


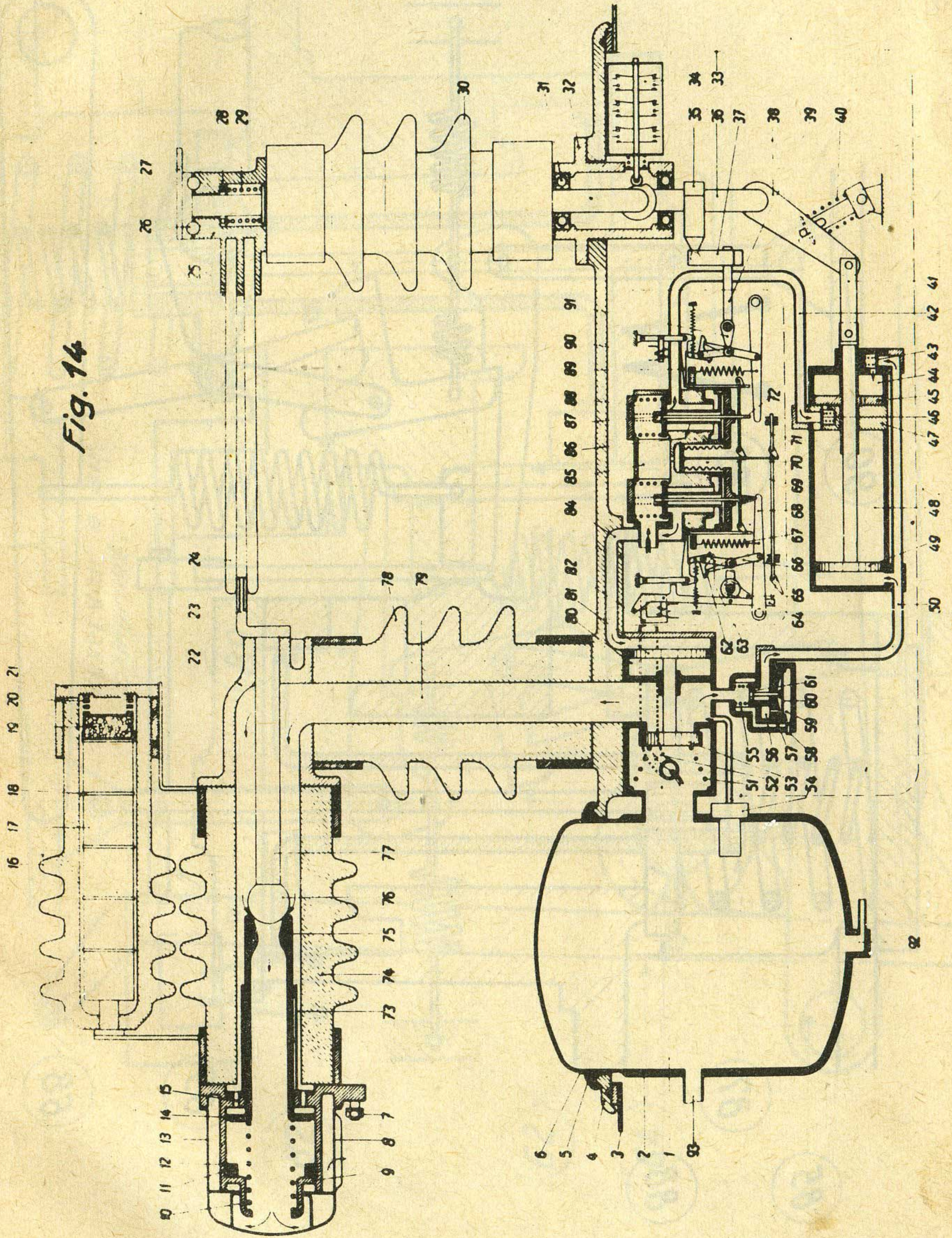
Fig. 12



Interrupteur de
choix de couplage
sur 1,5kV

Fig. 13.

Fig. 14



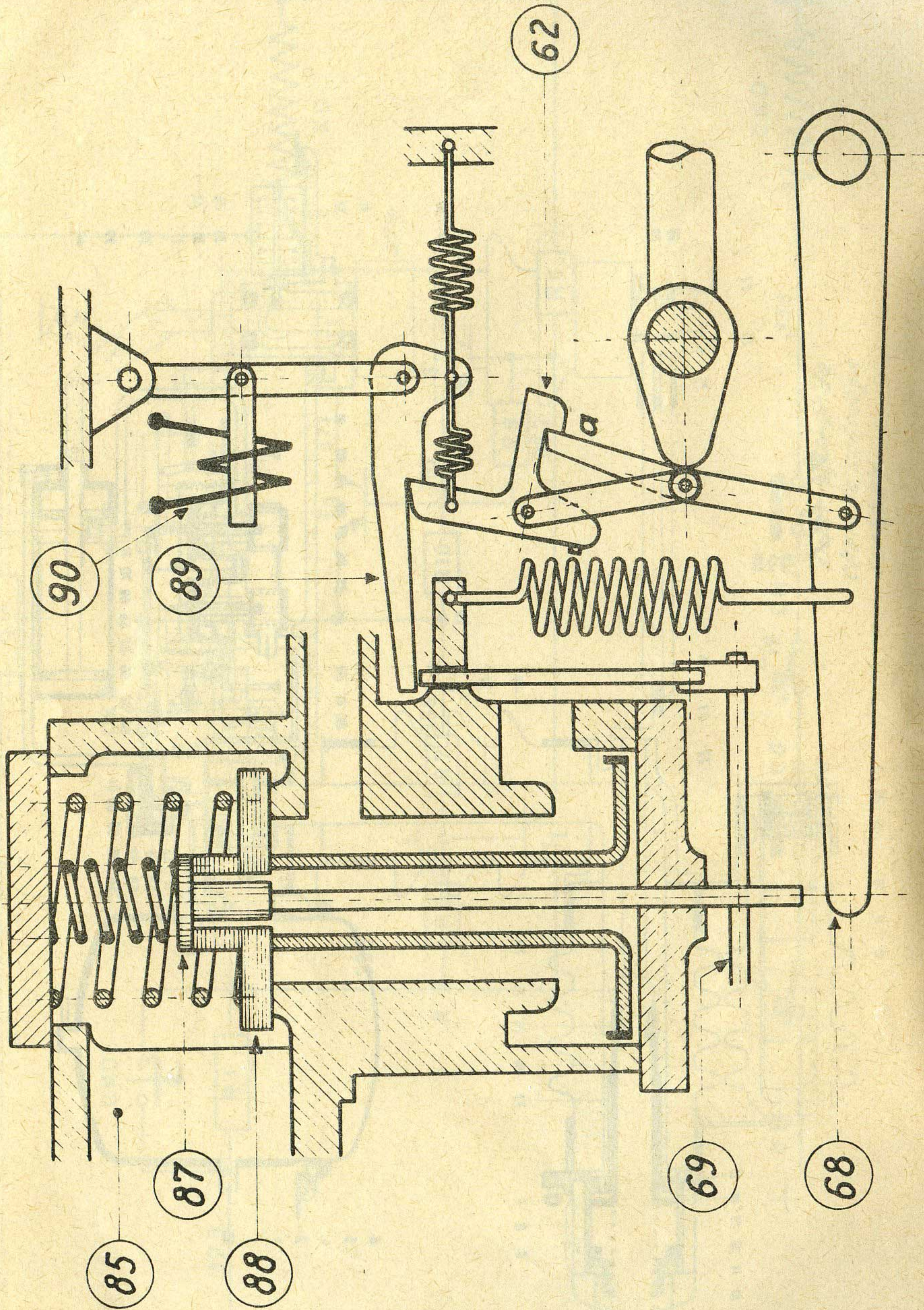


Fig. 15

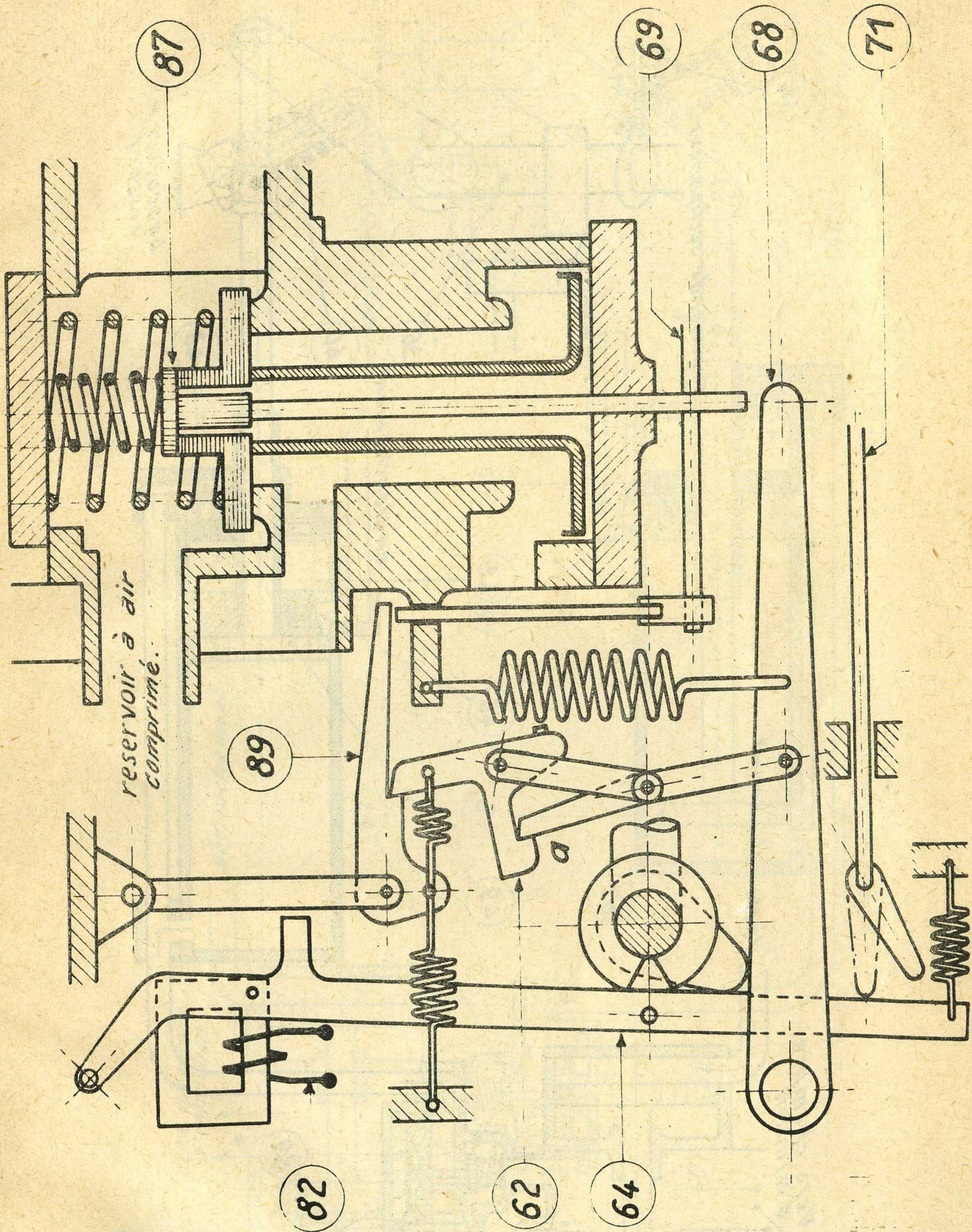


Fig. 16

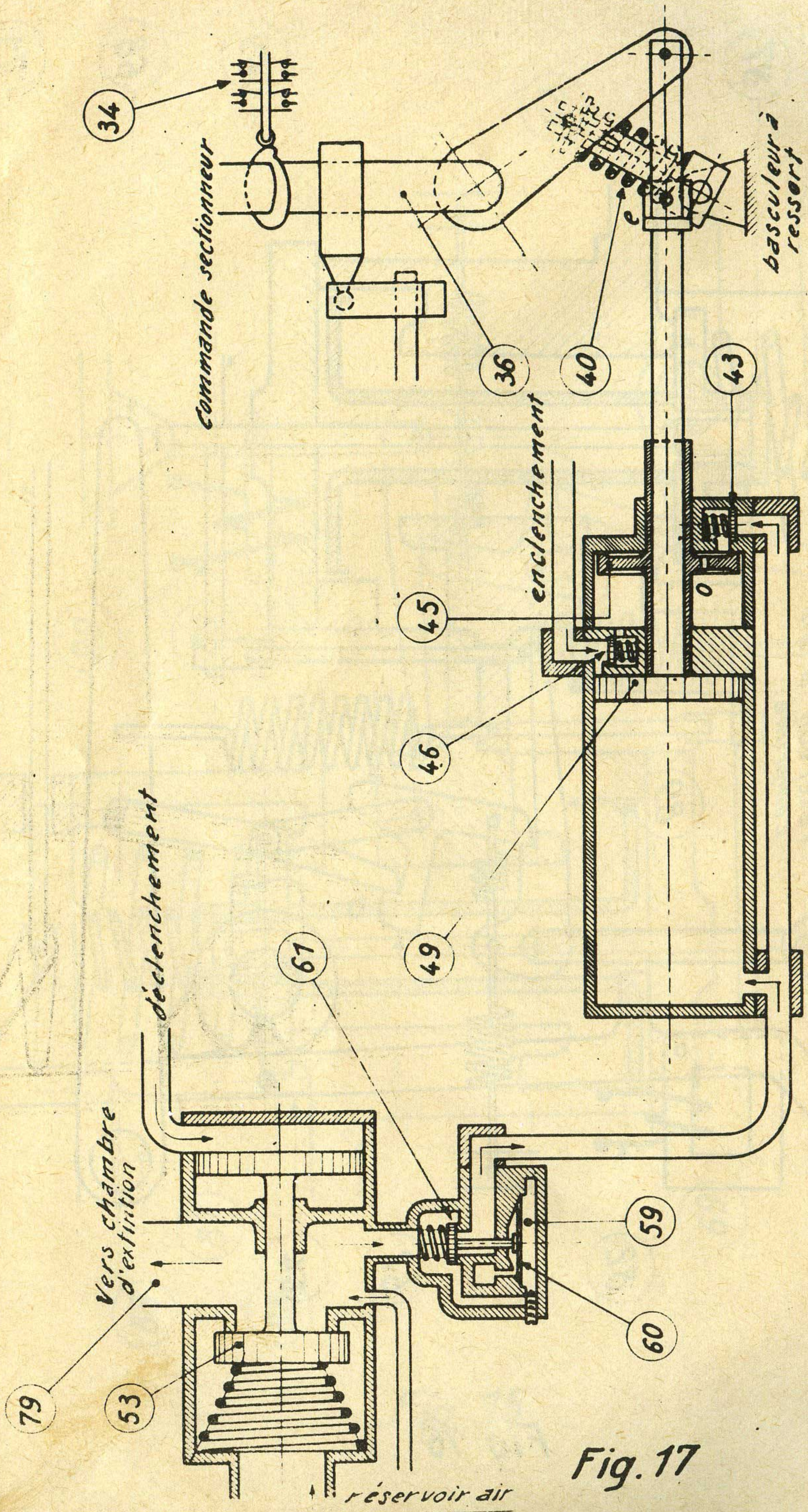


Fig. 17

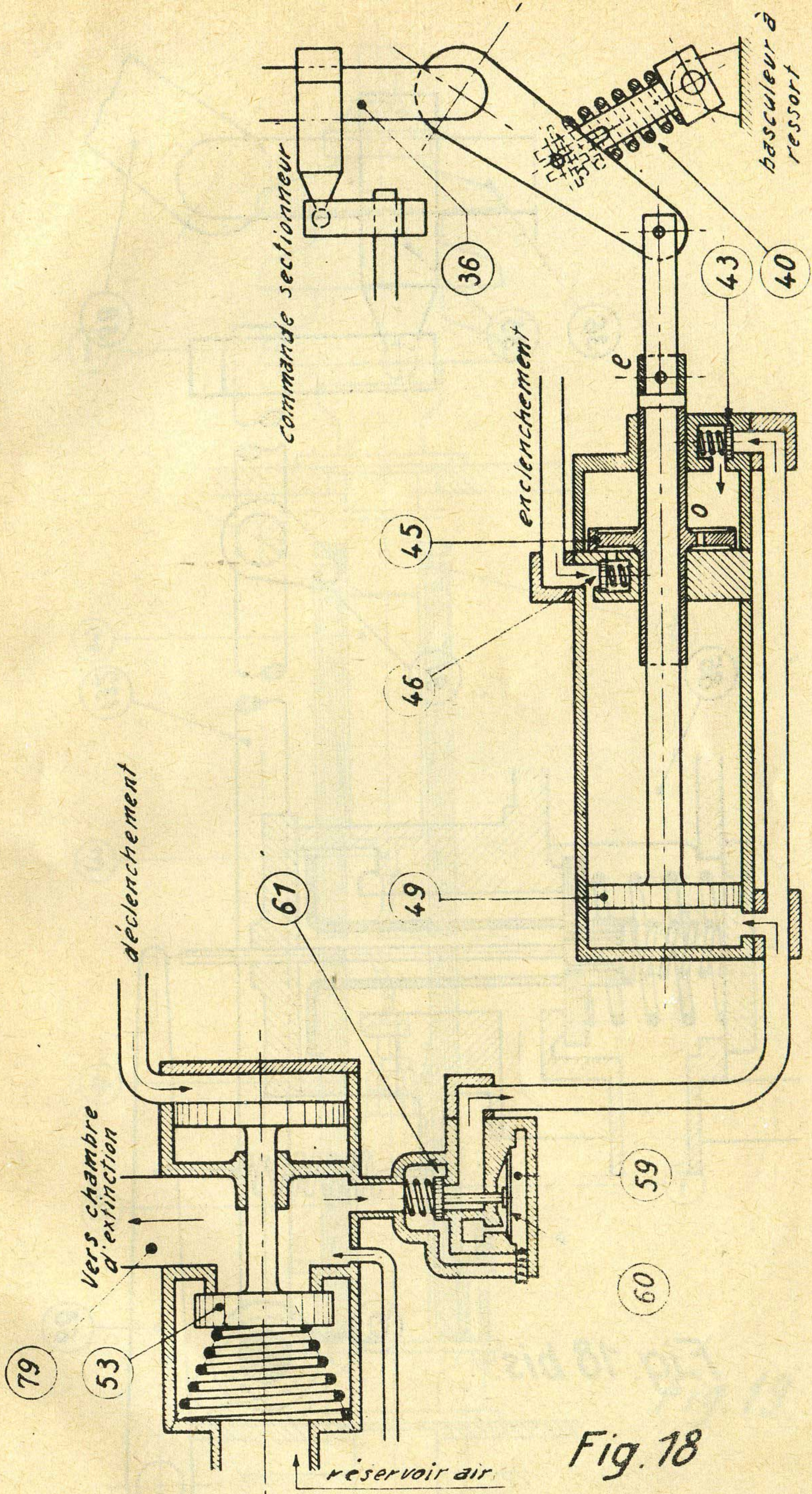


Fig. 18

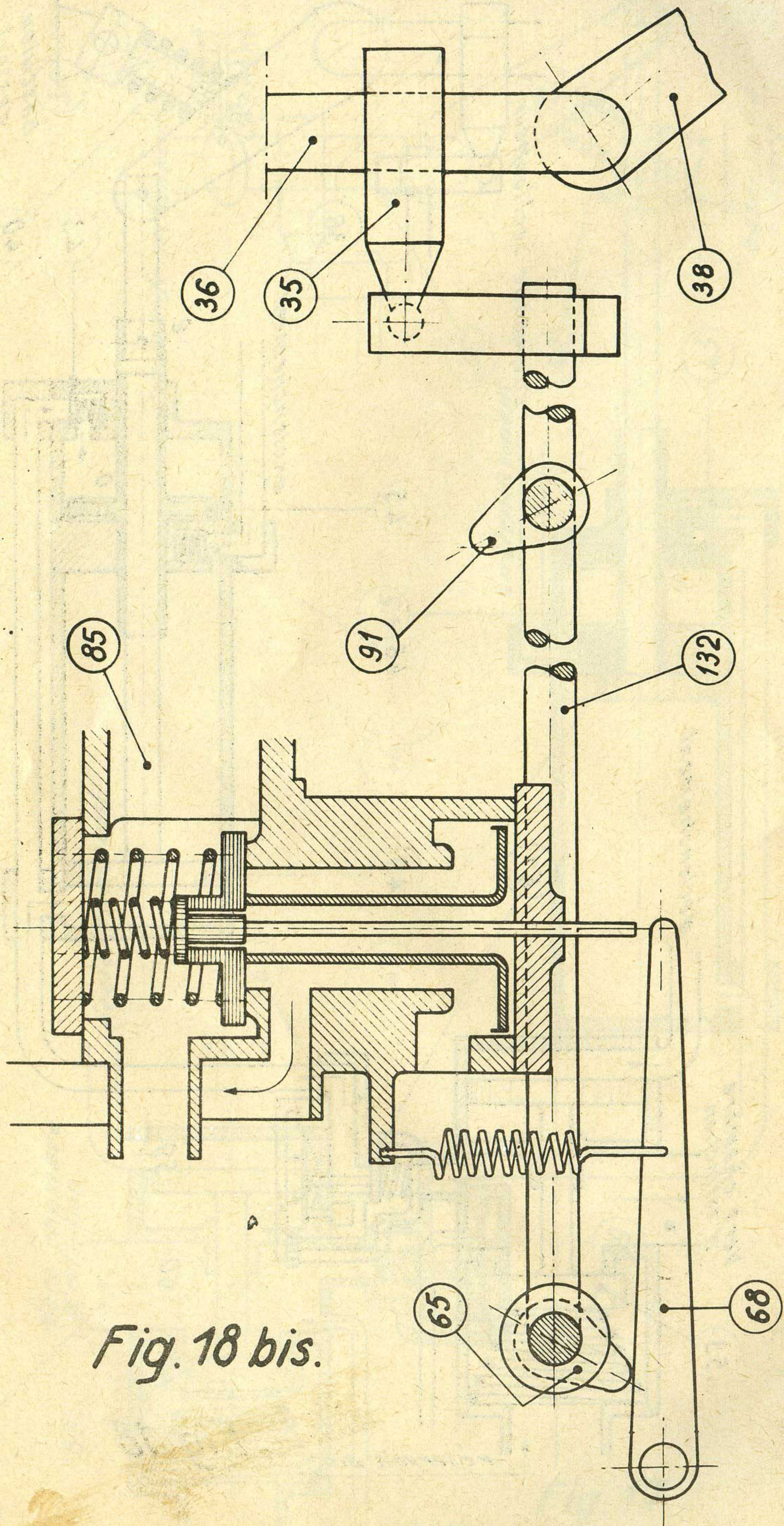


Fig. 18 bis.

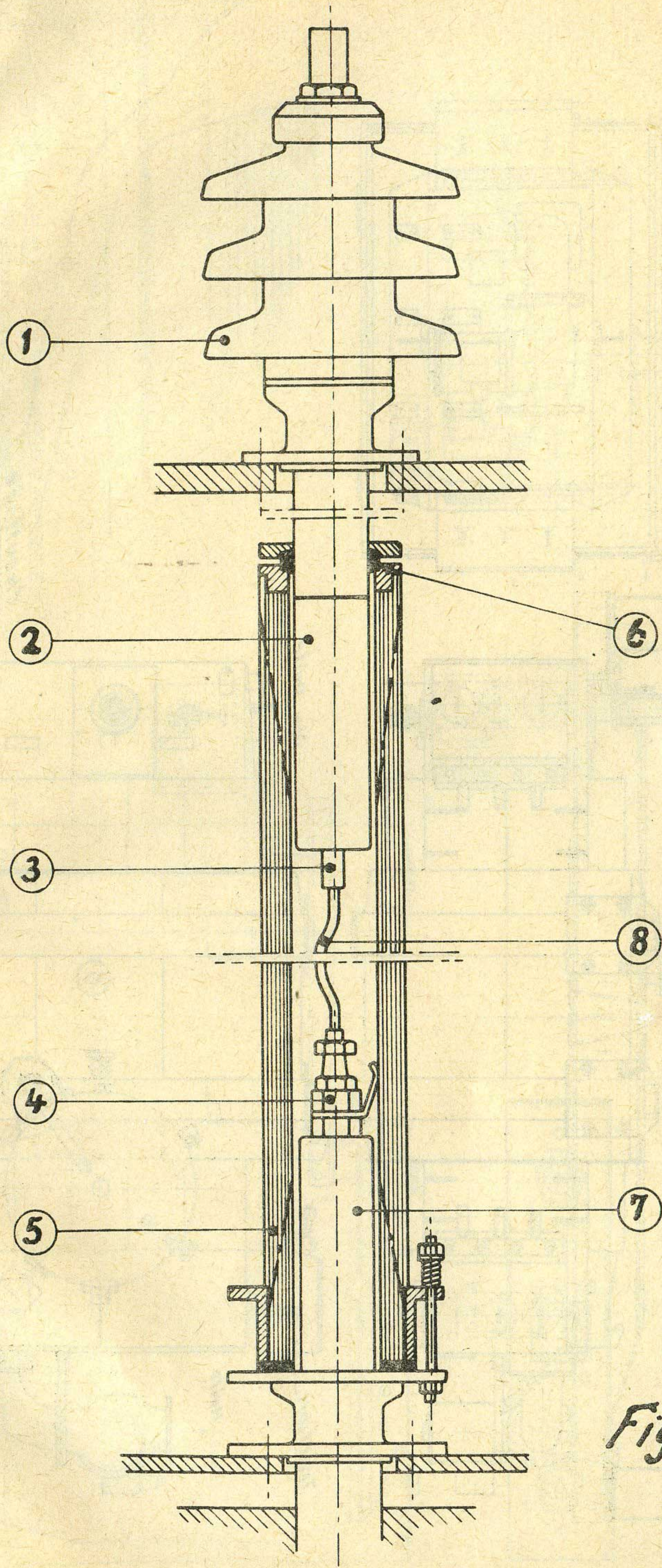


Fig. 19

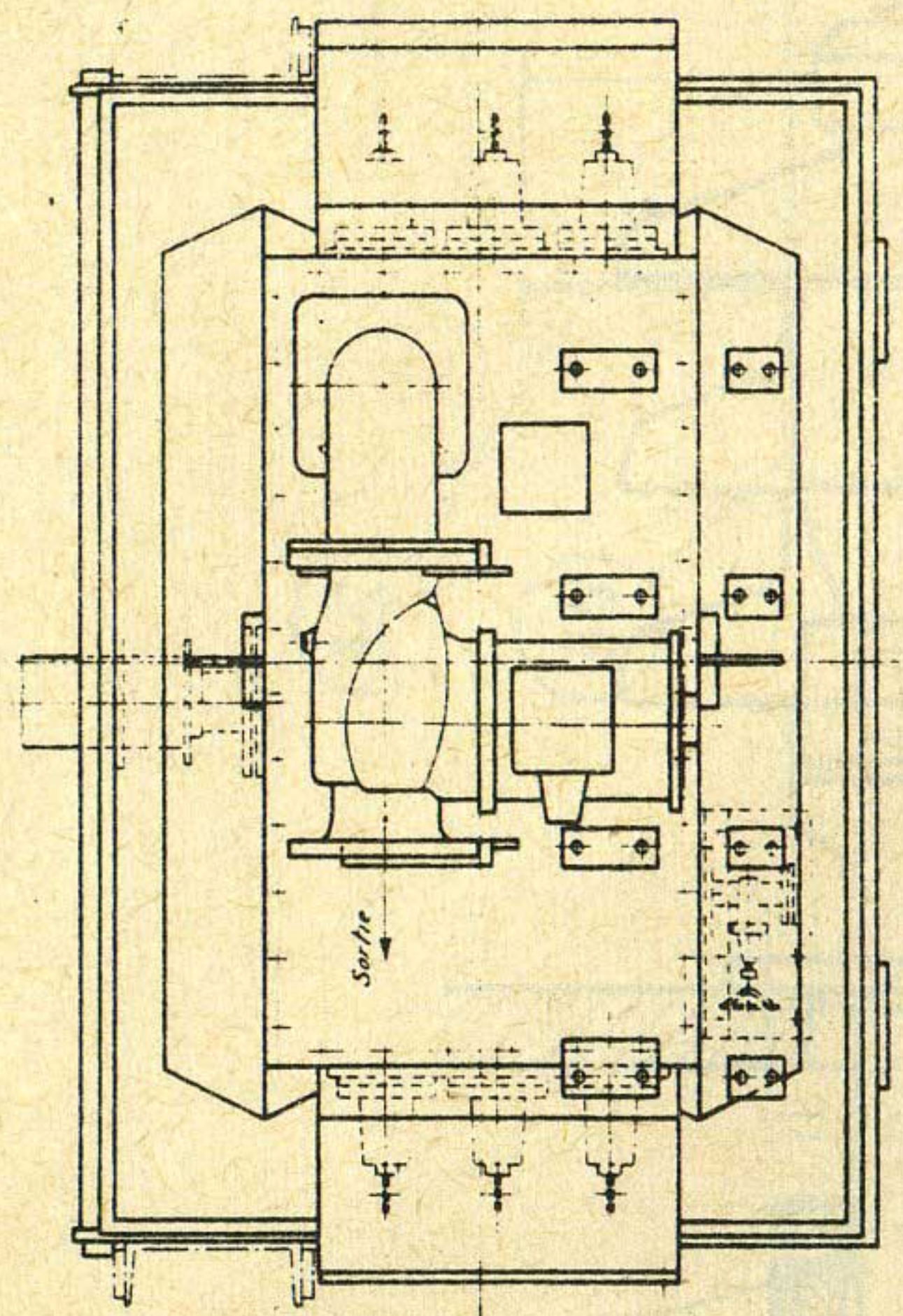
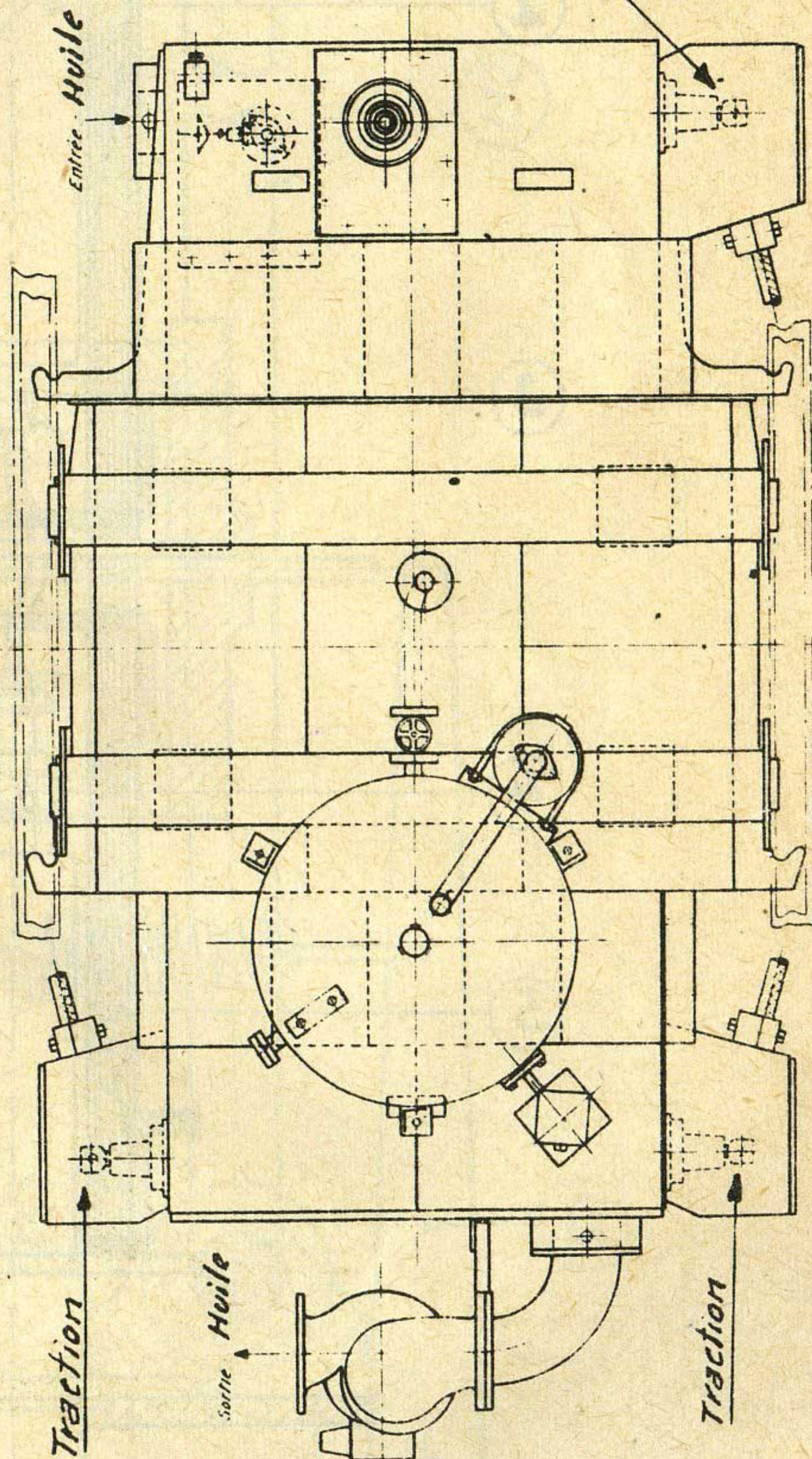
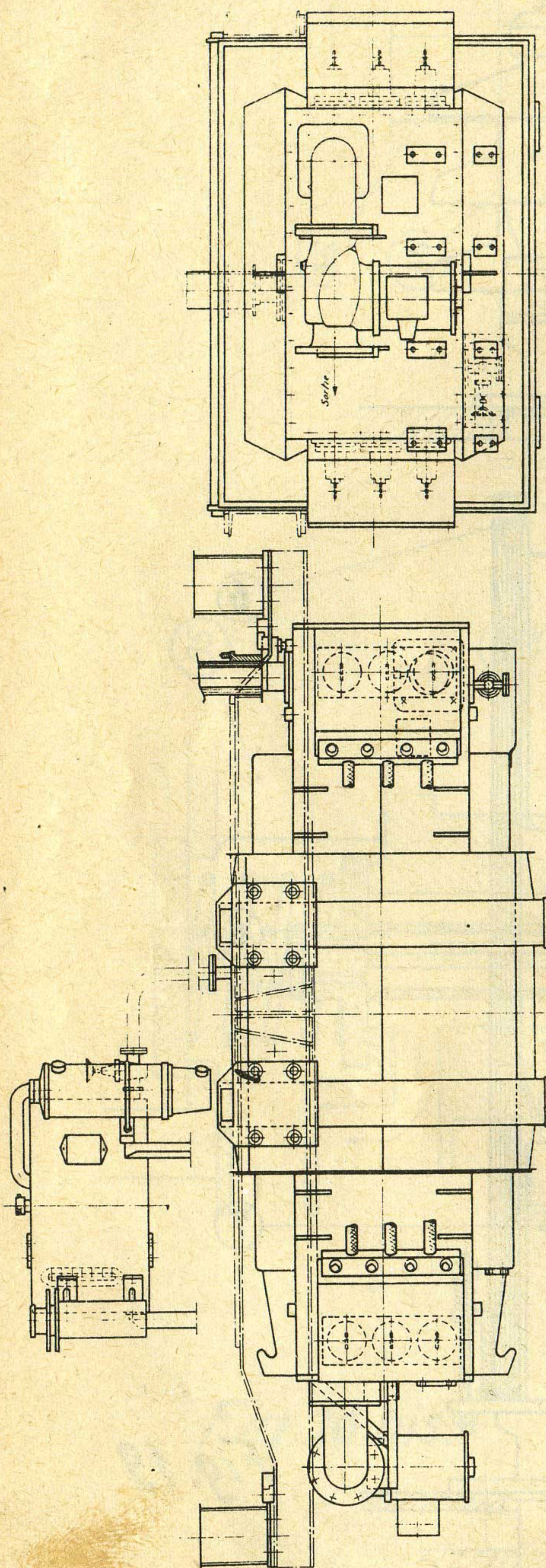
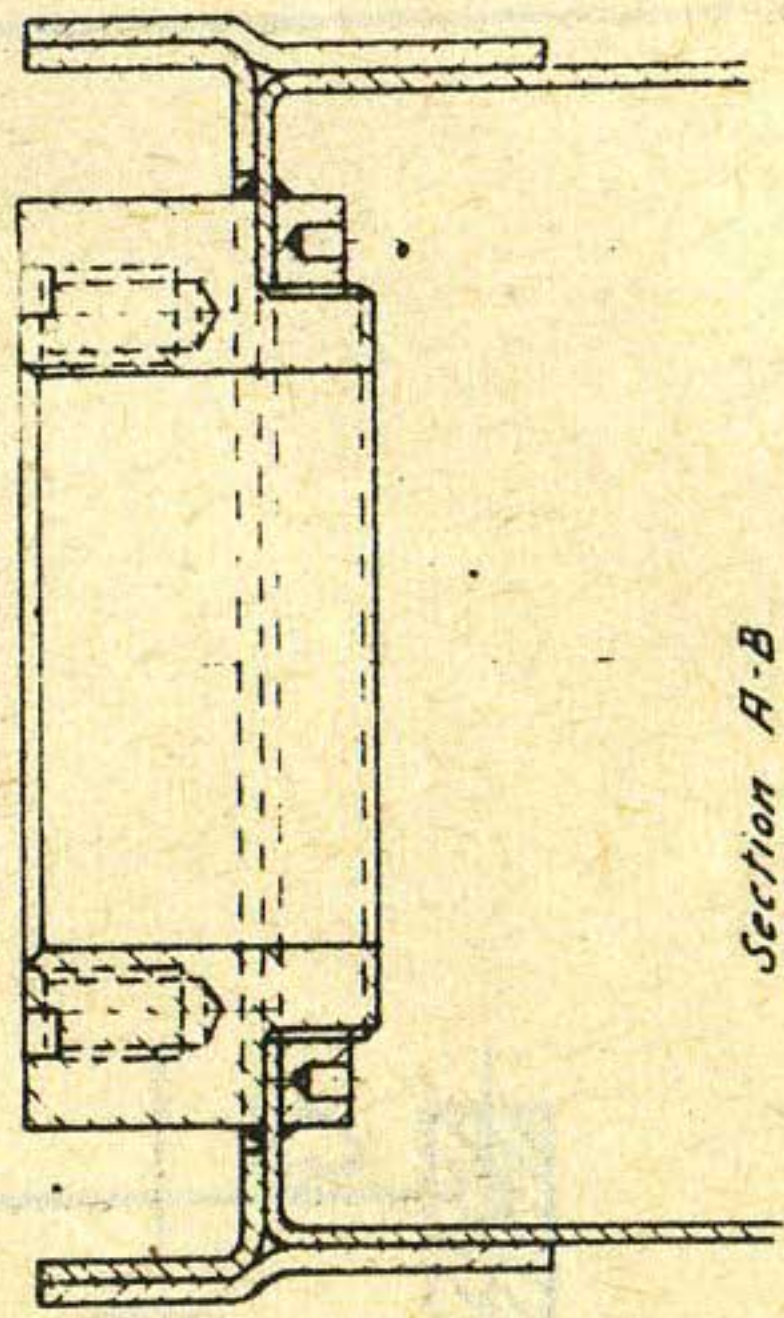
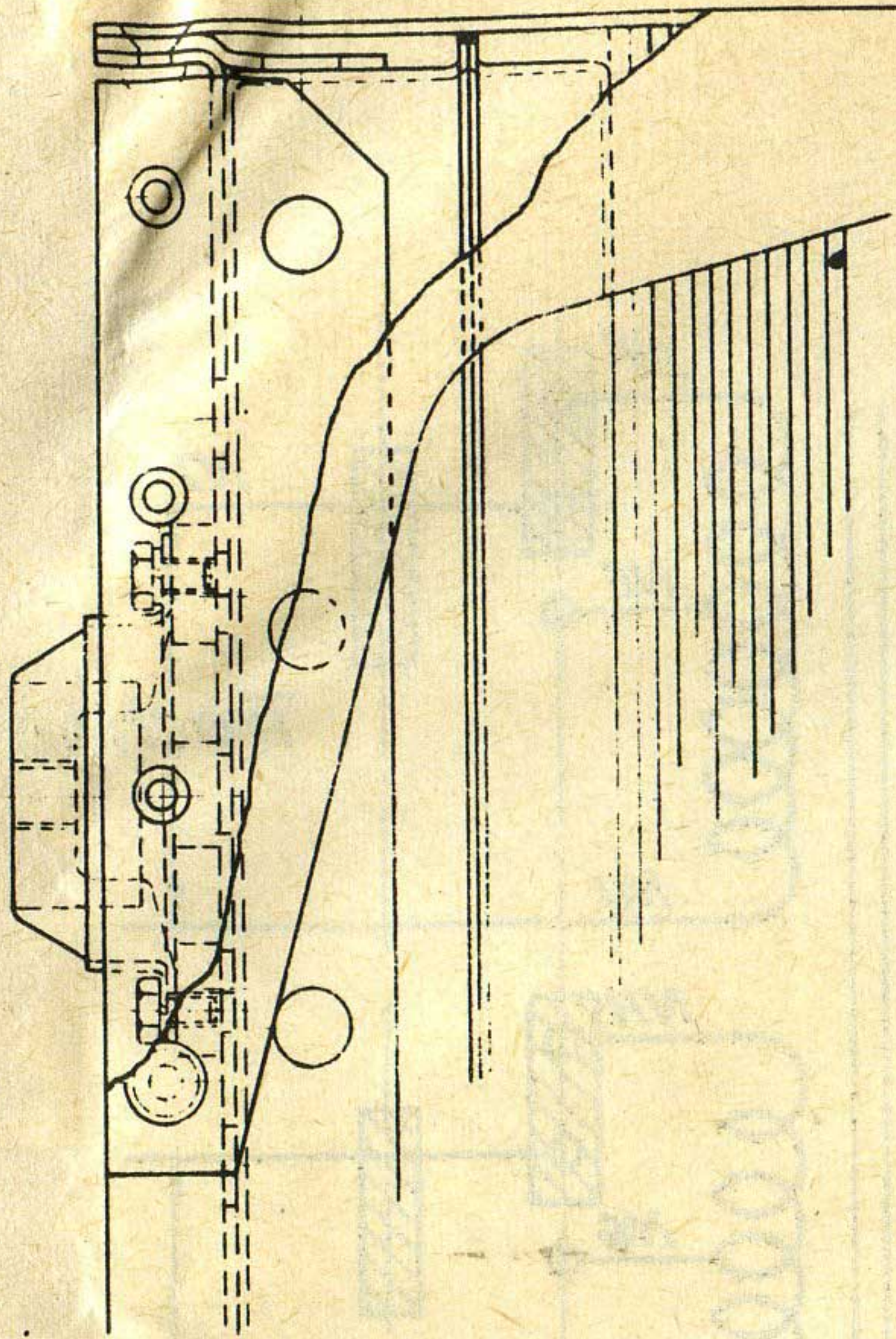


Fig. 20



Section A-B

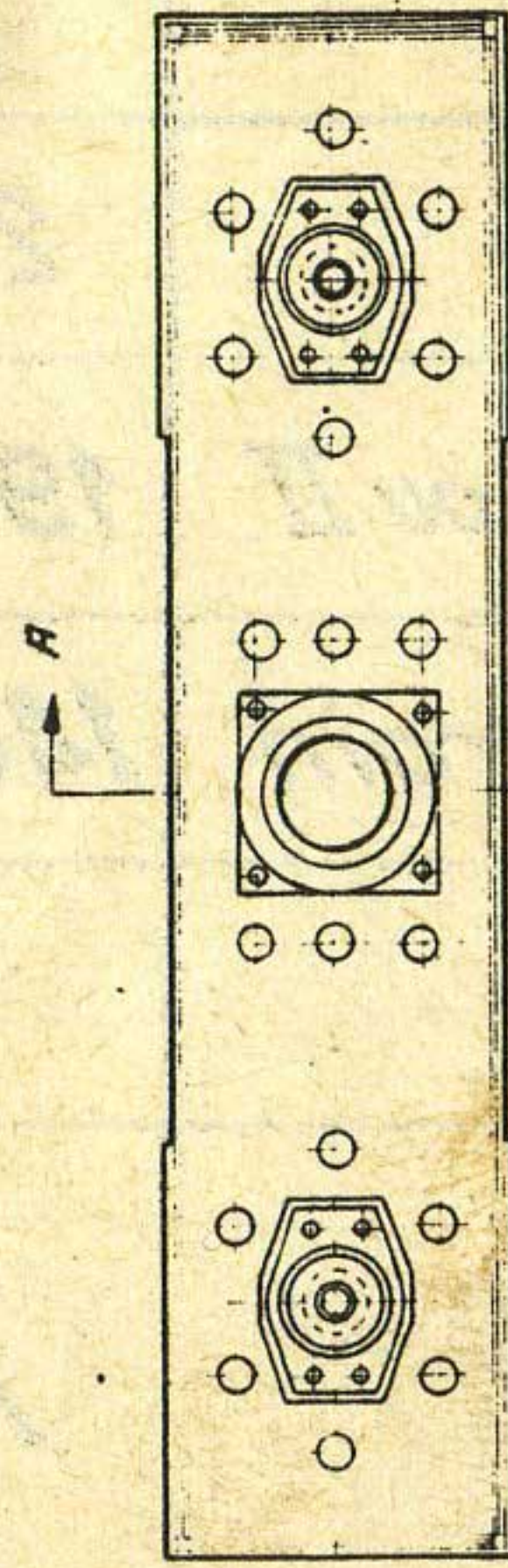
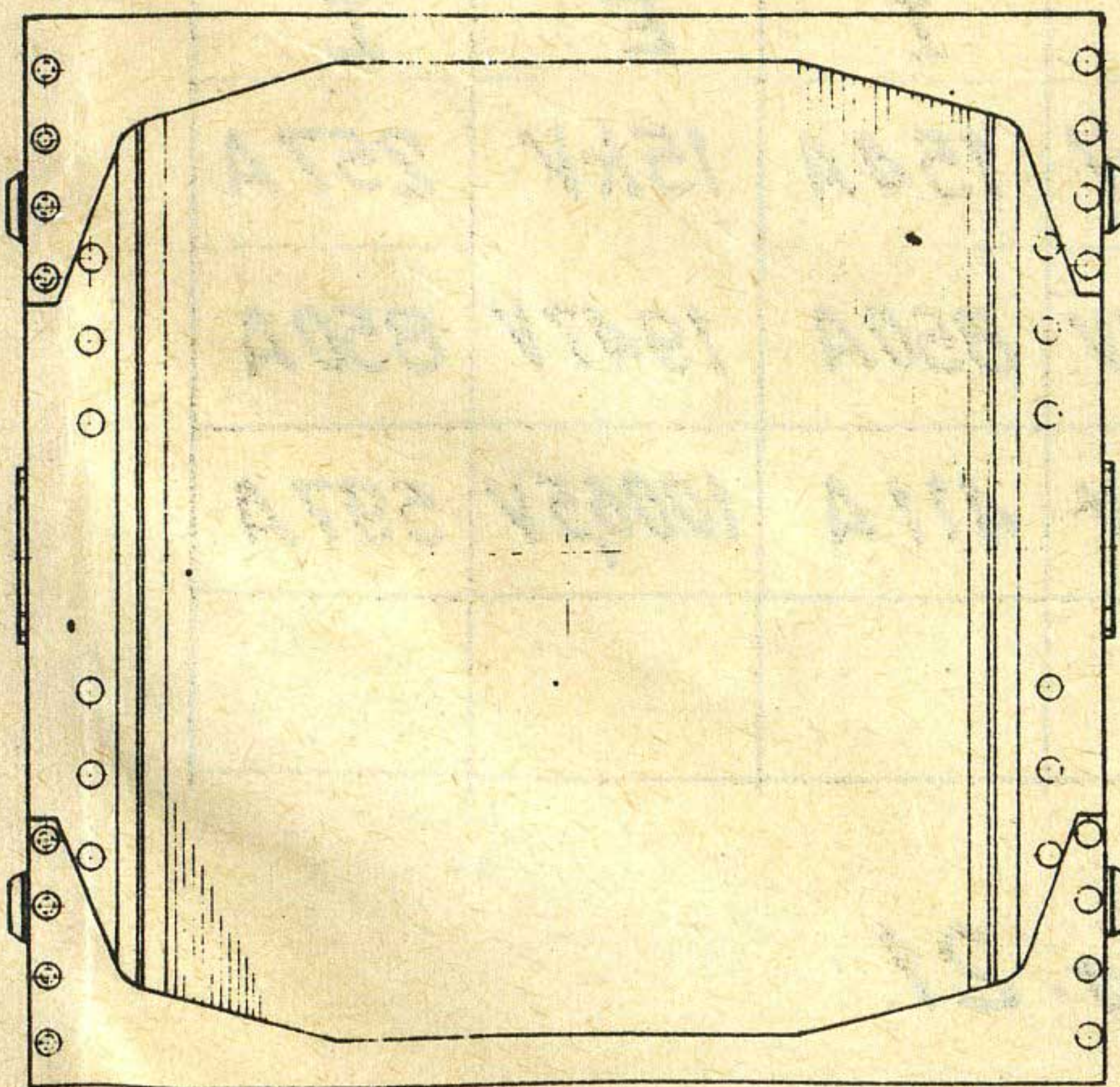
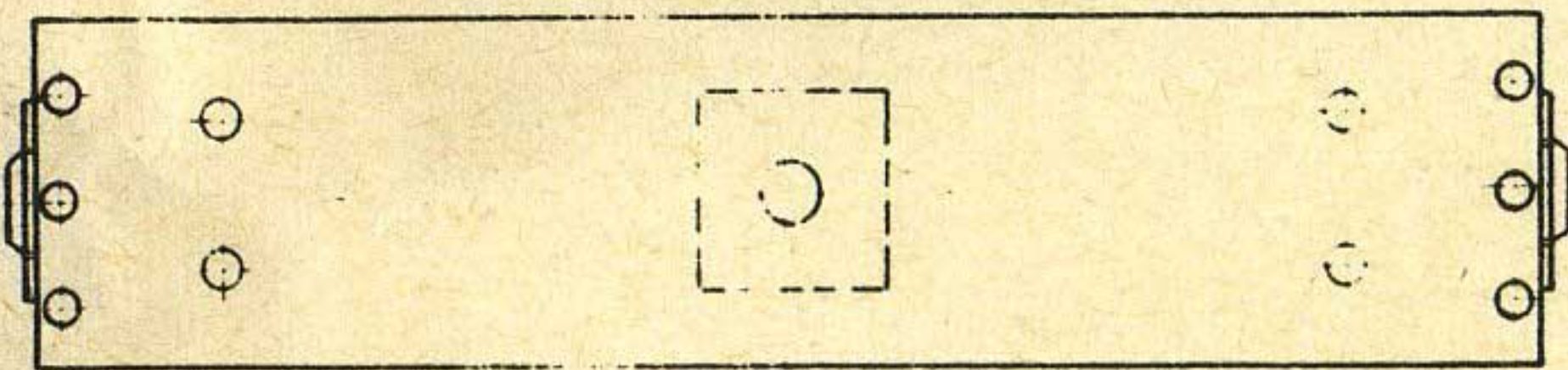
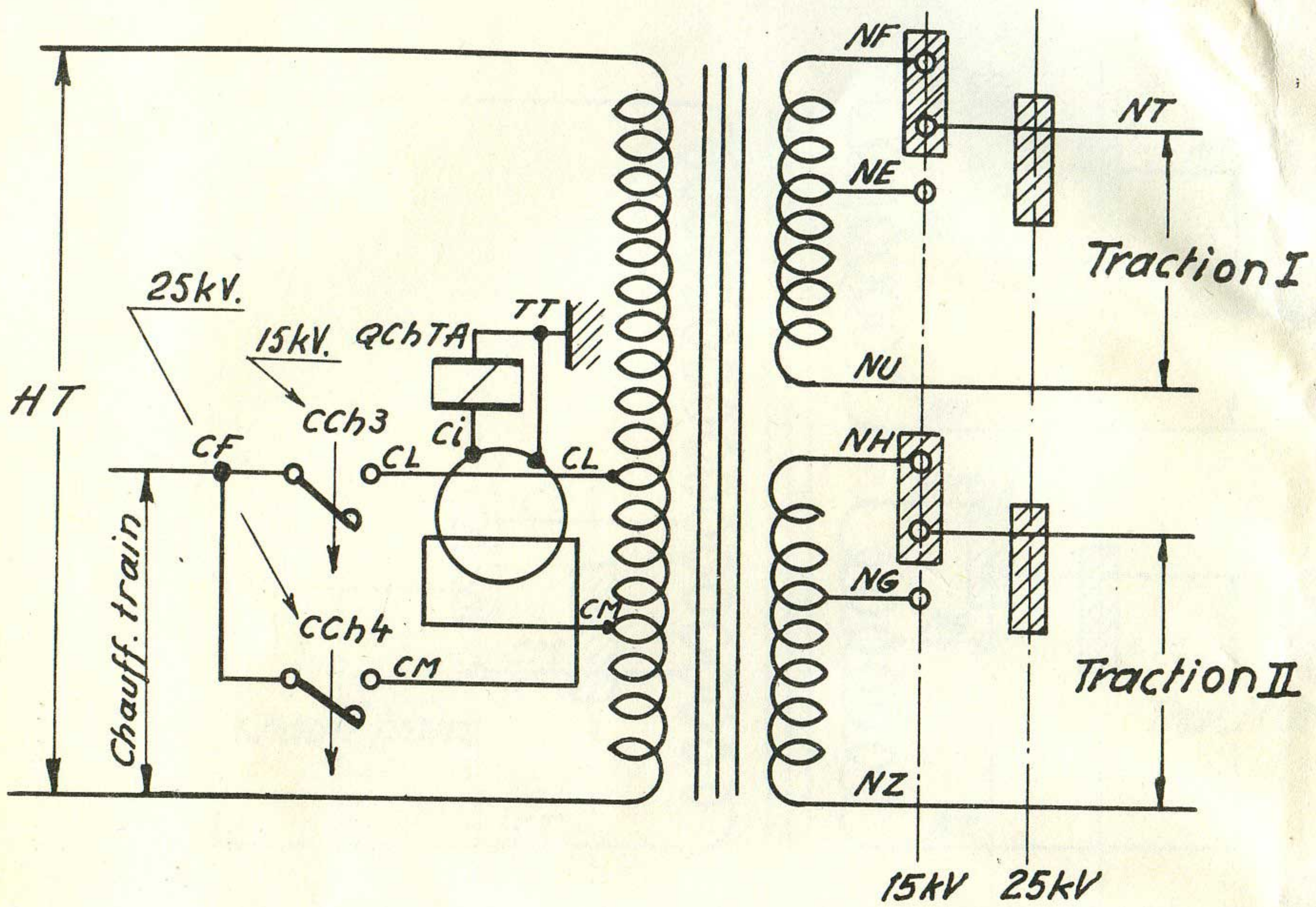


Fig. 20a.



| | 50 Hz | | 16 $\frac{2}{3}$ Hz | |
|------------------|-------|------|---------------------|------|
| | E | I | E | I |
| HT | 25kV | 154A | 15kV | 257A |
| Traction I ou II | 1947V | 850A | 1947V | 850A |
| Chouff. train | 1461V | 411A | 1006,5V | 597A |
| | | | | |

283944

Fig. 21.

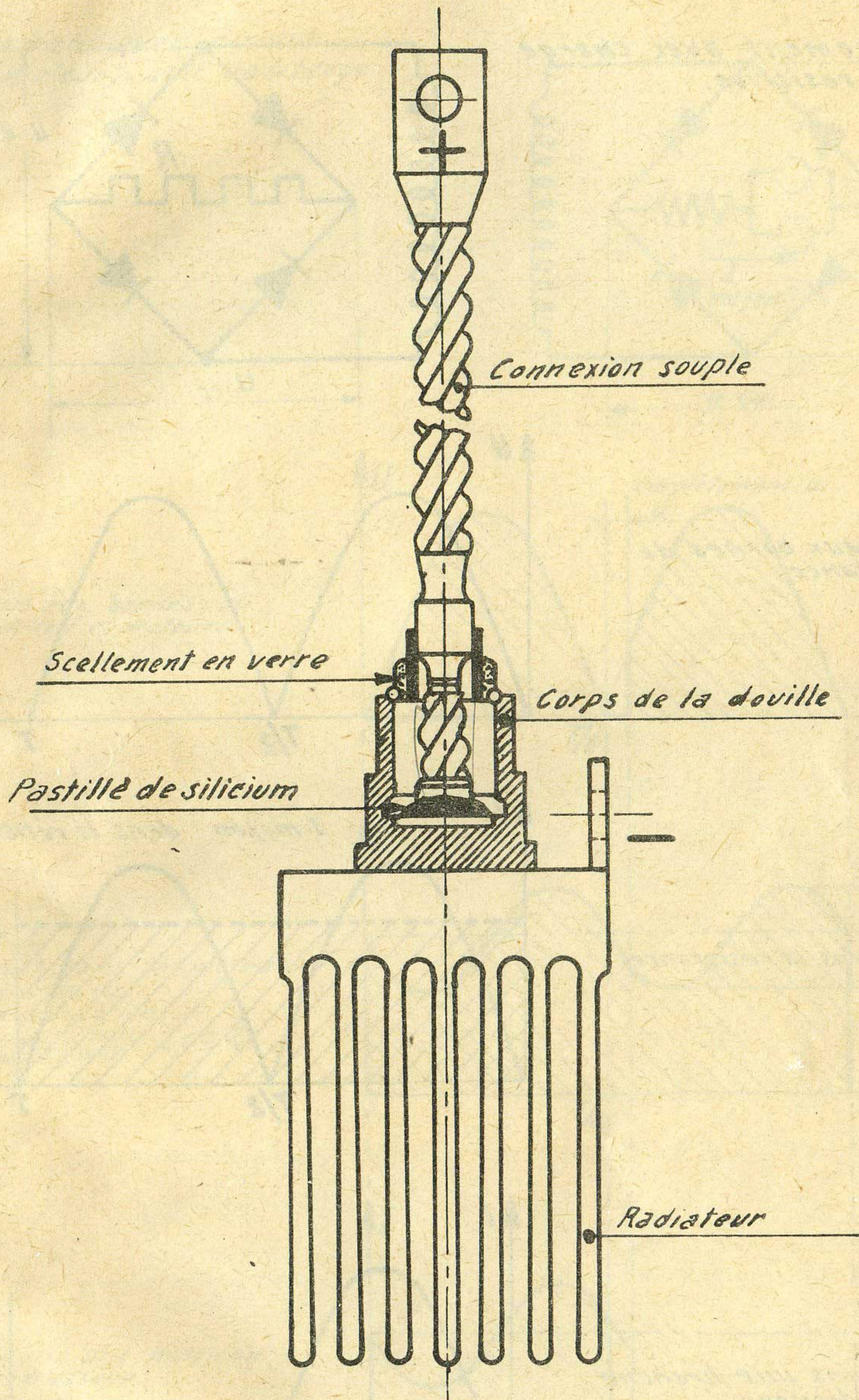
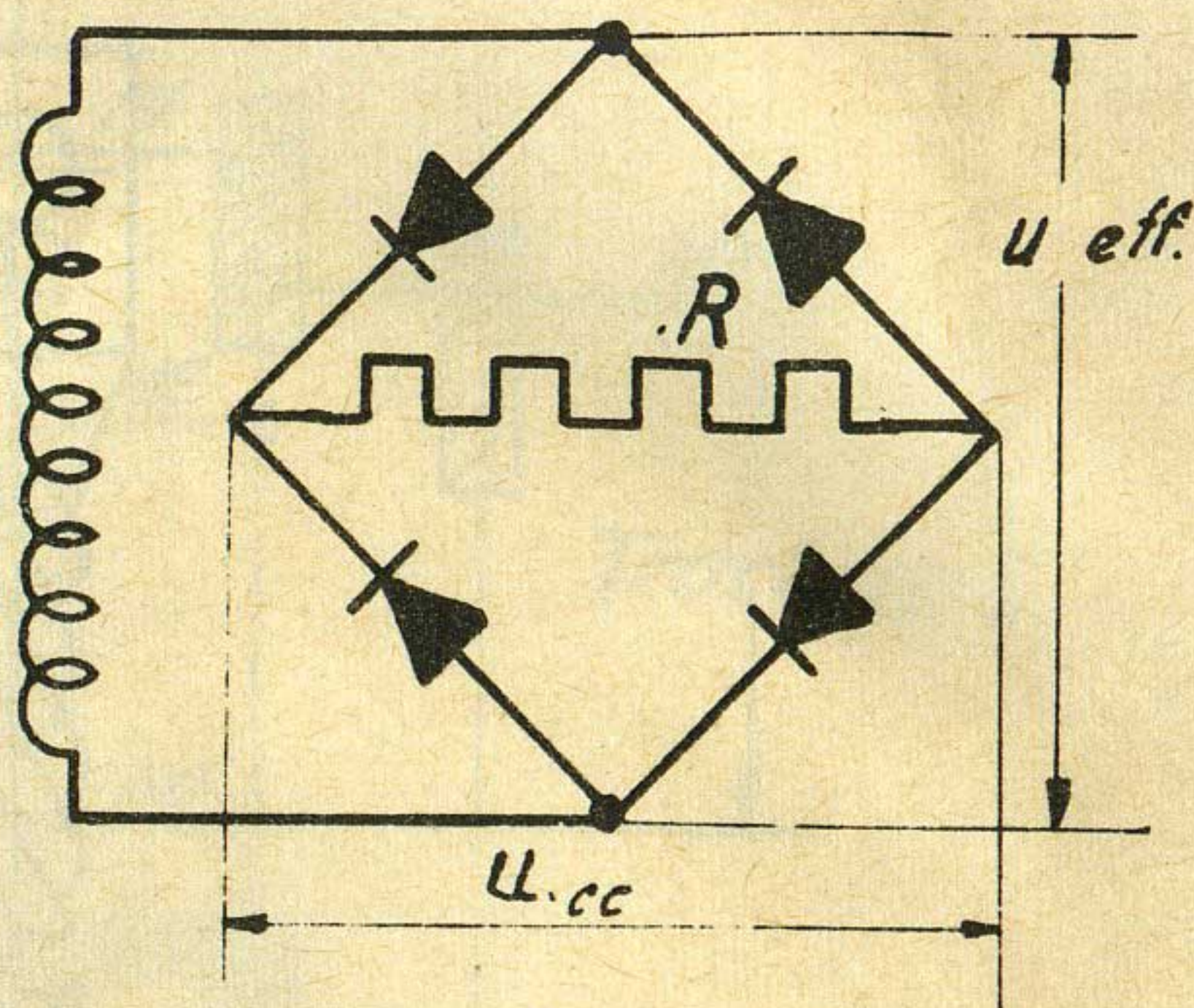
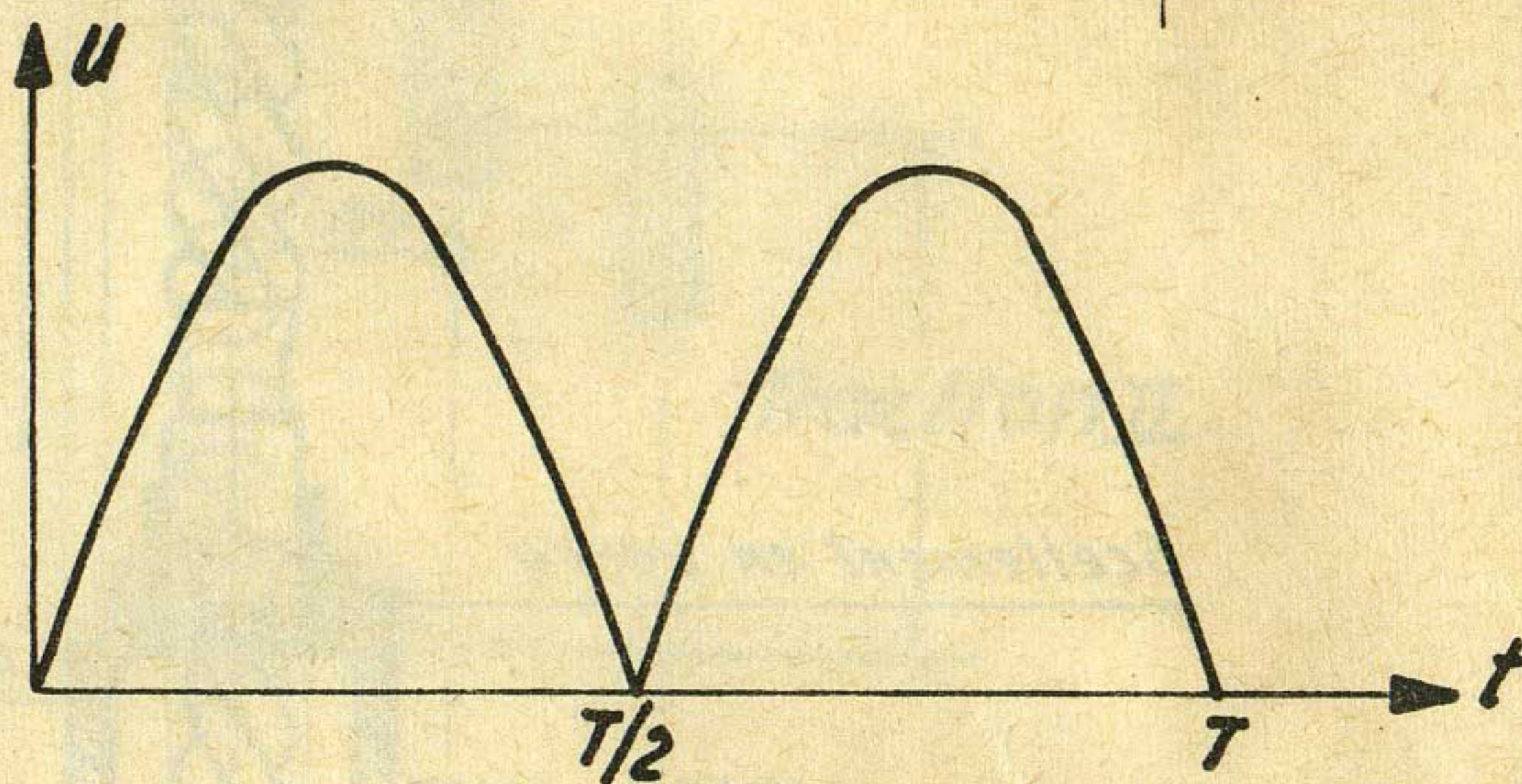


Fig. 22.

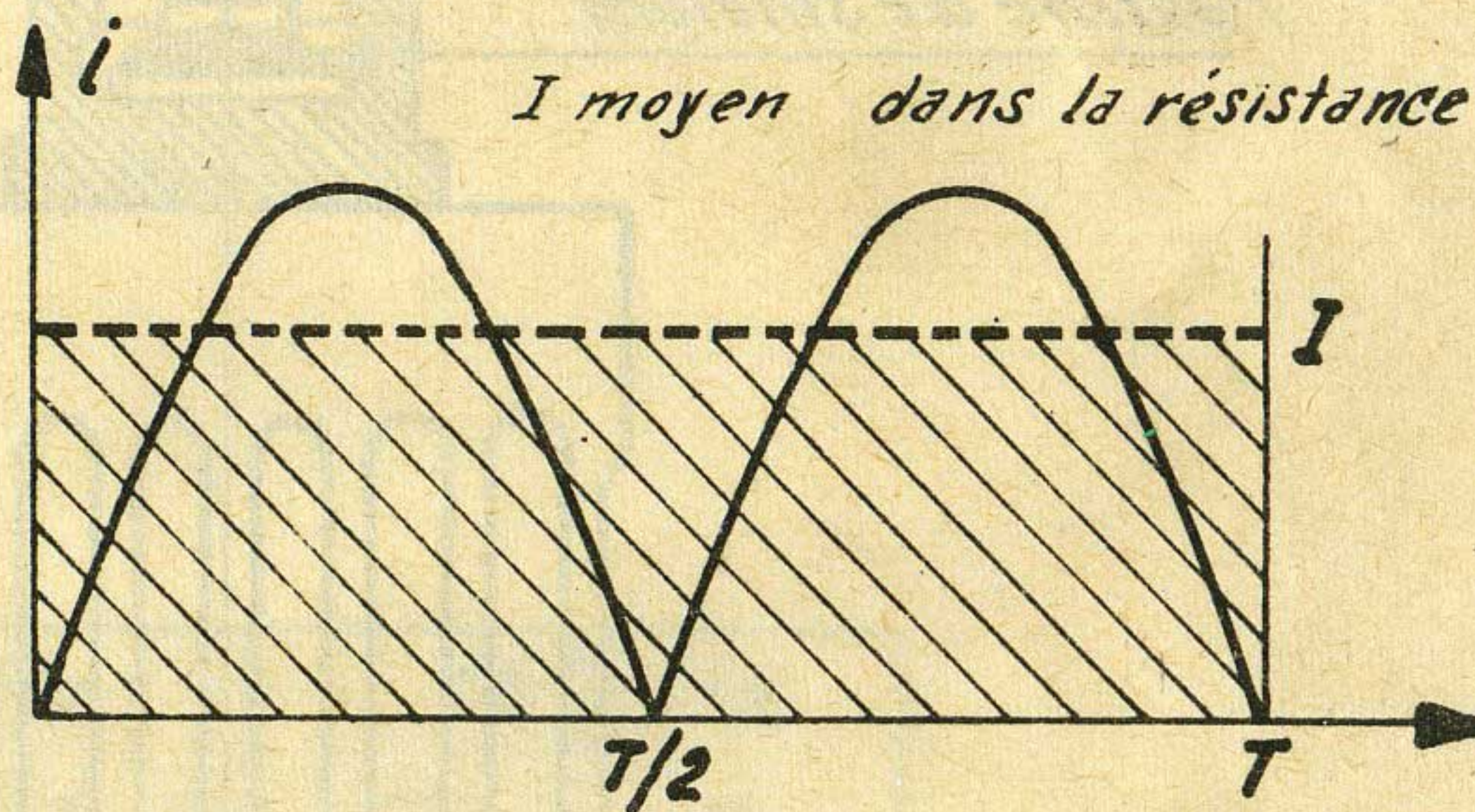
Redressement avec charge résistive.



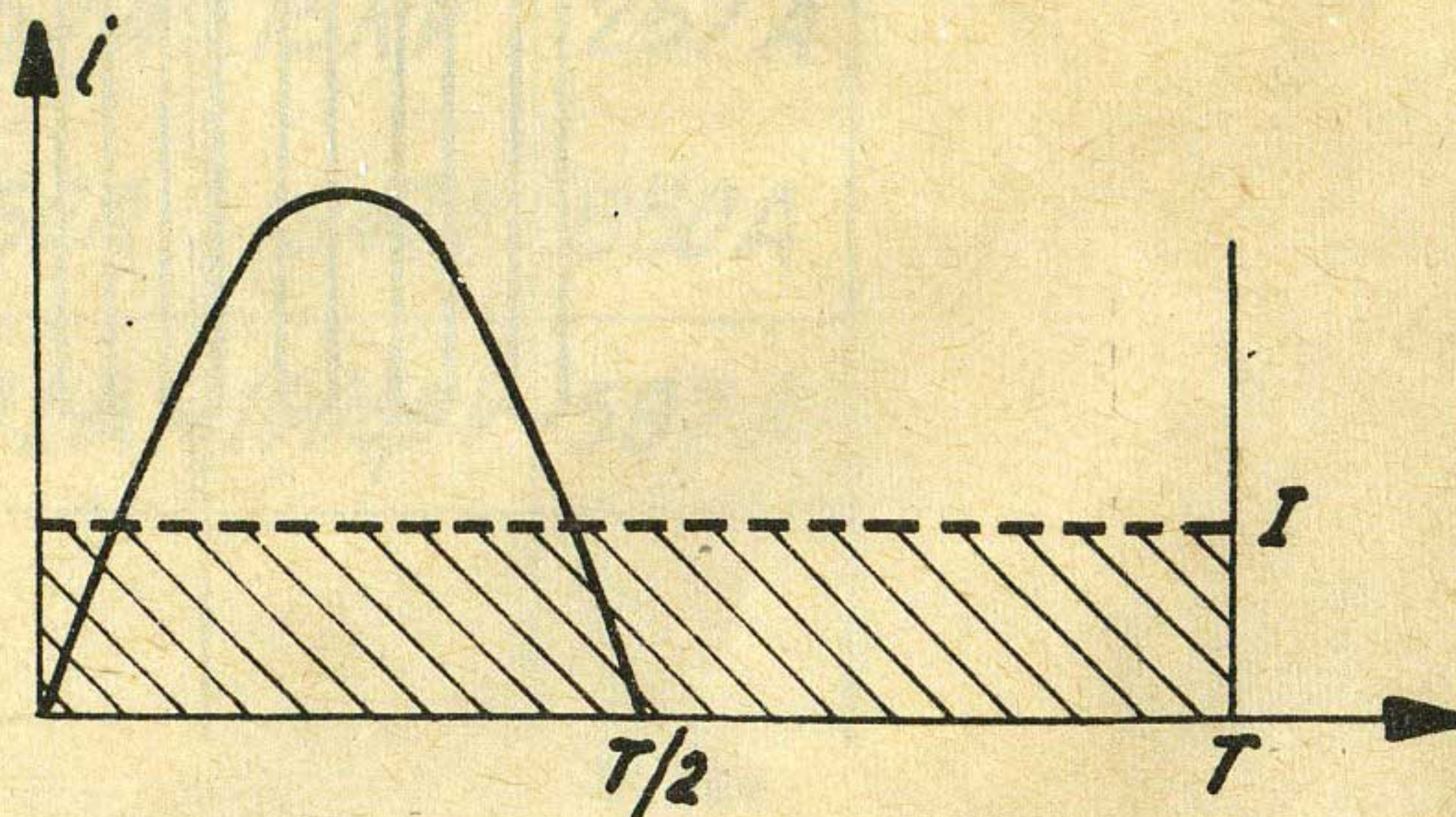
Tension aux bornes de la résistance.



Courant dans la résistance



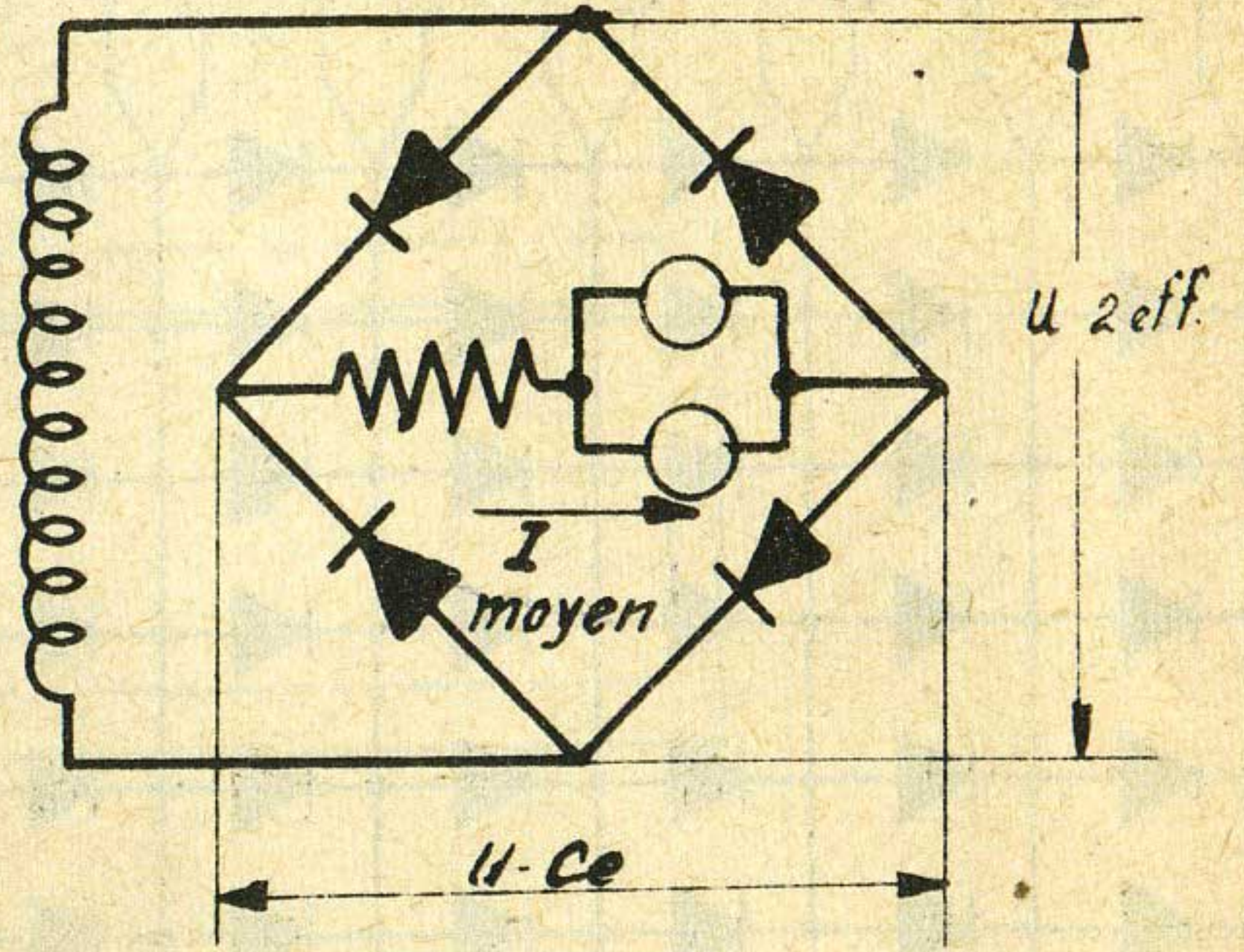
Courant dans une branche du pont redresseur



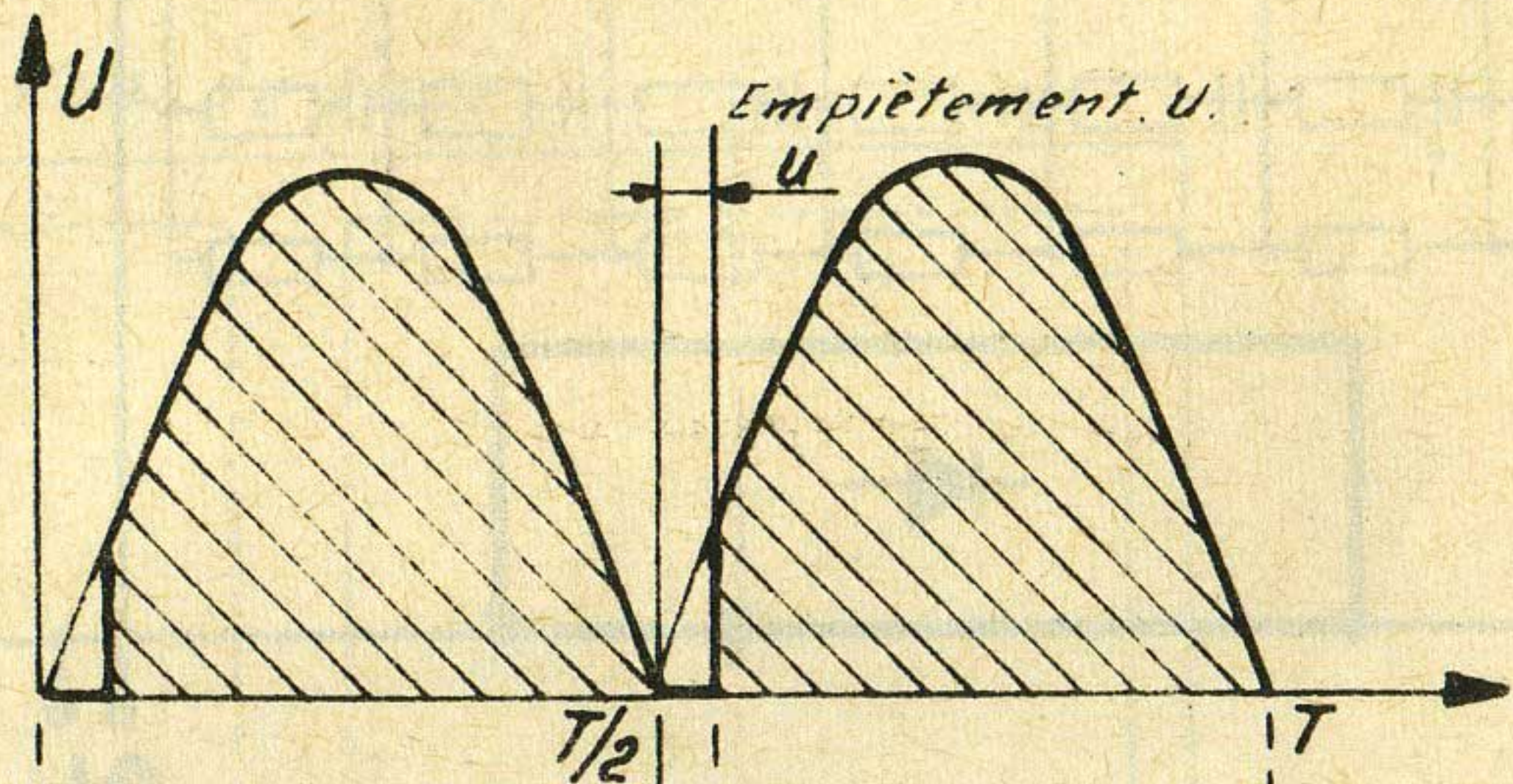
$I_{\text{moyen par branche du redresseur}} = \frac{I_{\text{moyen résist.}}}{2}$

Fig. 23a.

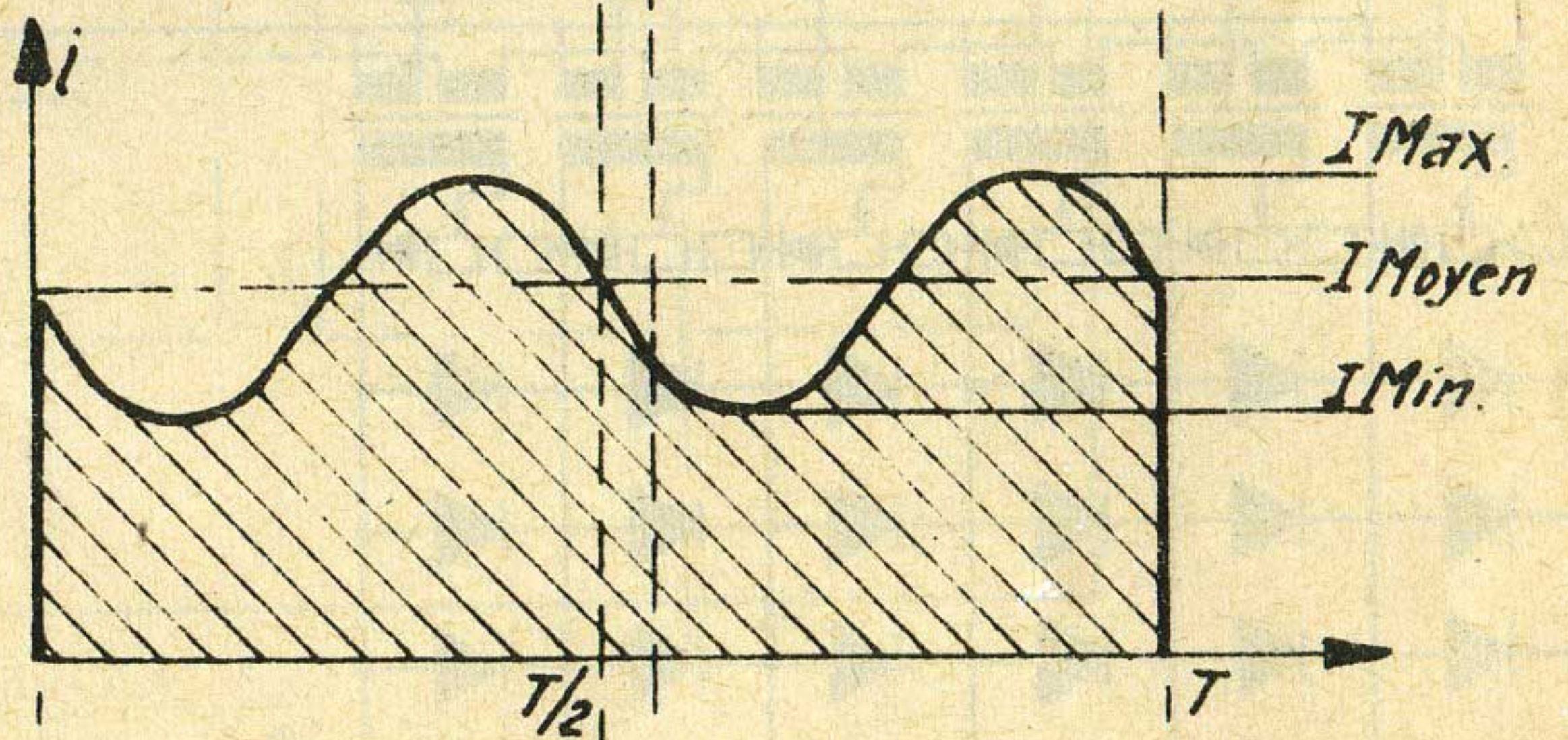
Redressement avec circuit
moteur (moteur), self de lissage



Tension aux bornes du
circuit self et moteurs.



Courant dans le moteur.
Ripple à 100Hz
Taux d'ondulation:
 $\alpha = \frac{I_{max} - I_{min}}{I_{max} + I_{min}} \times 100\%$



Courant dans une branche
du redresseur

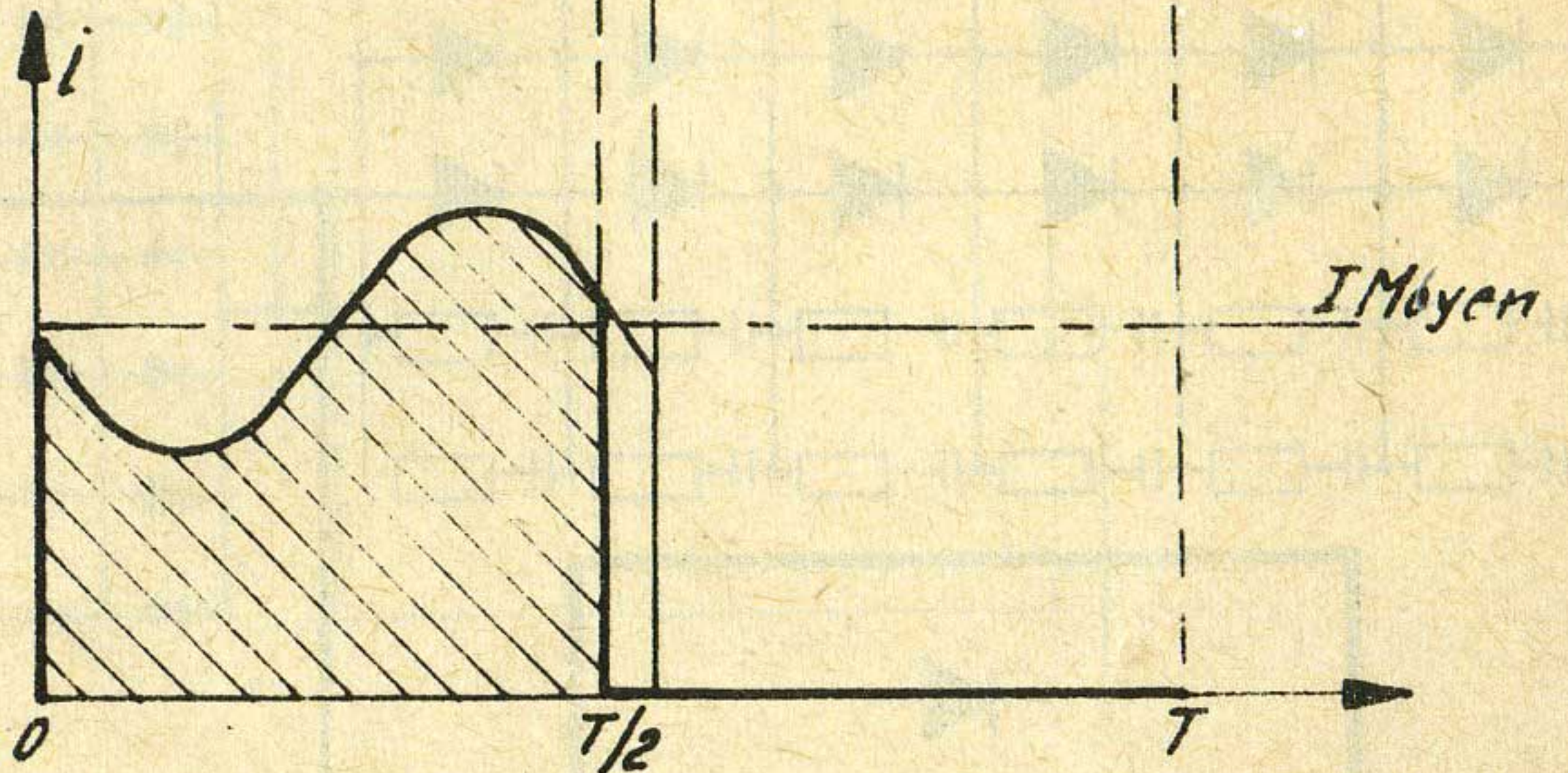
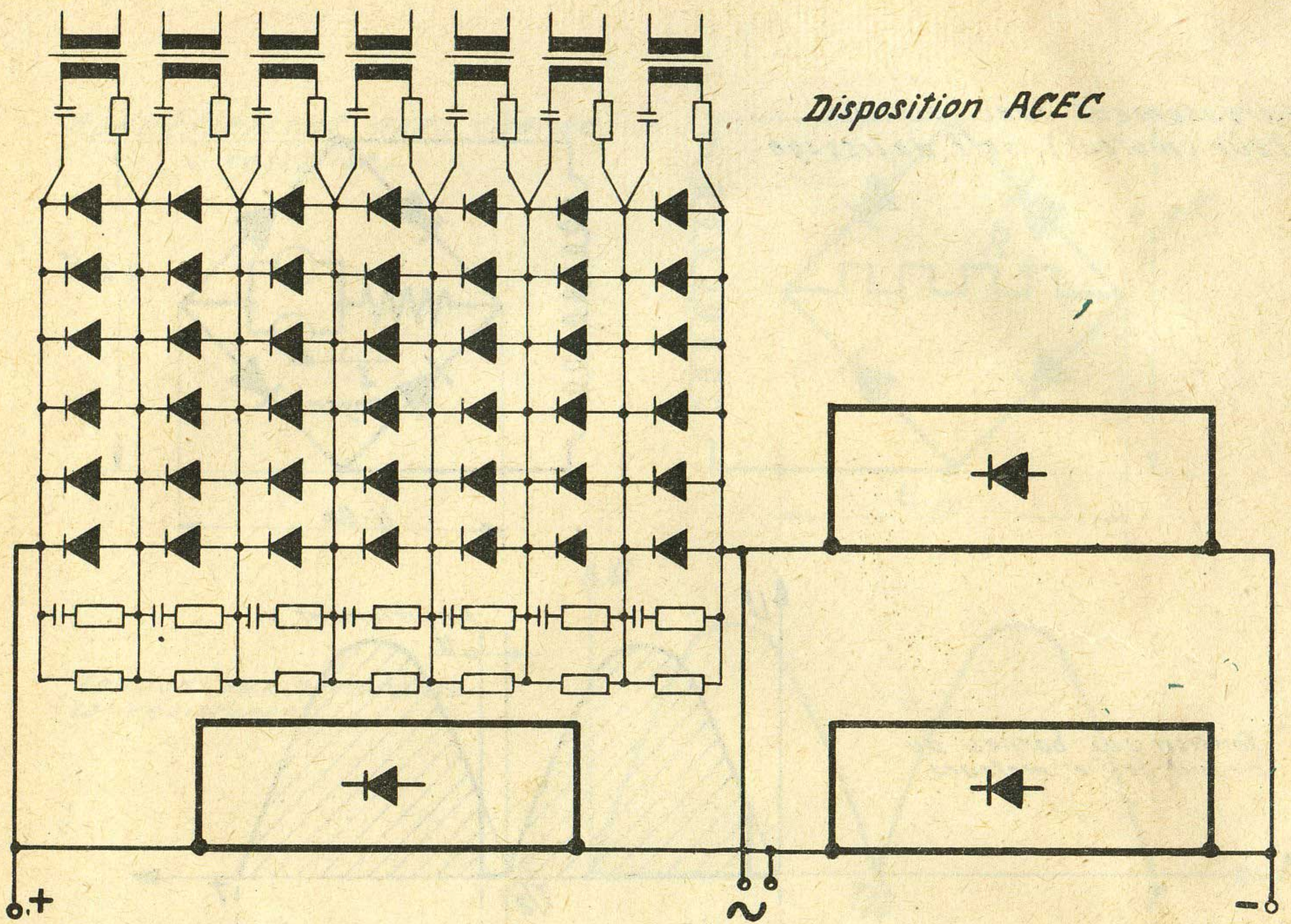


Fig. 23b.

Disposition ACEC



Disposition Siemens

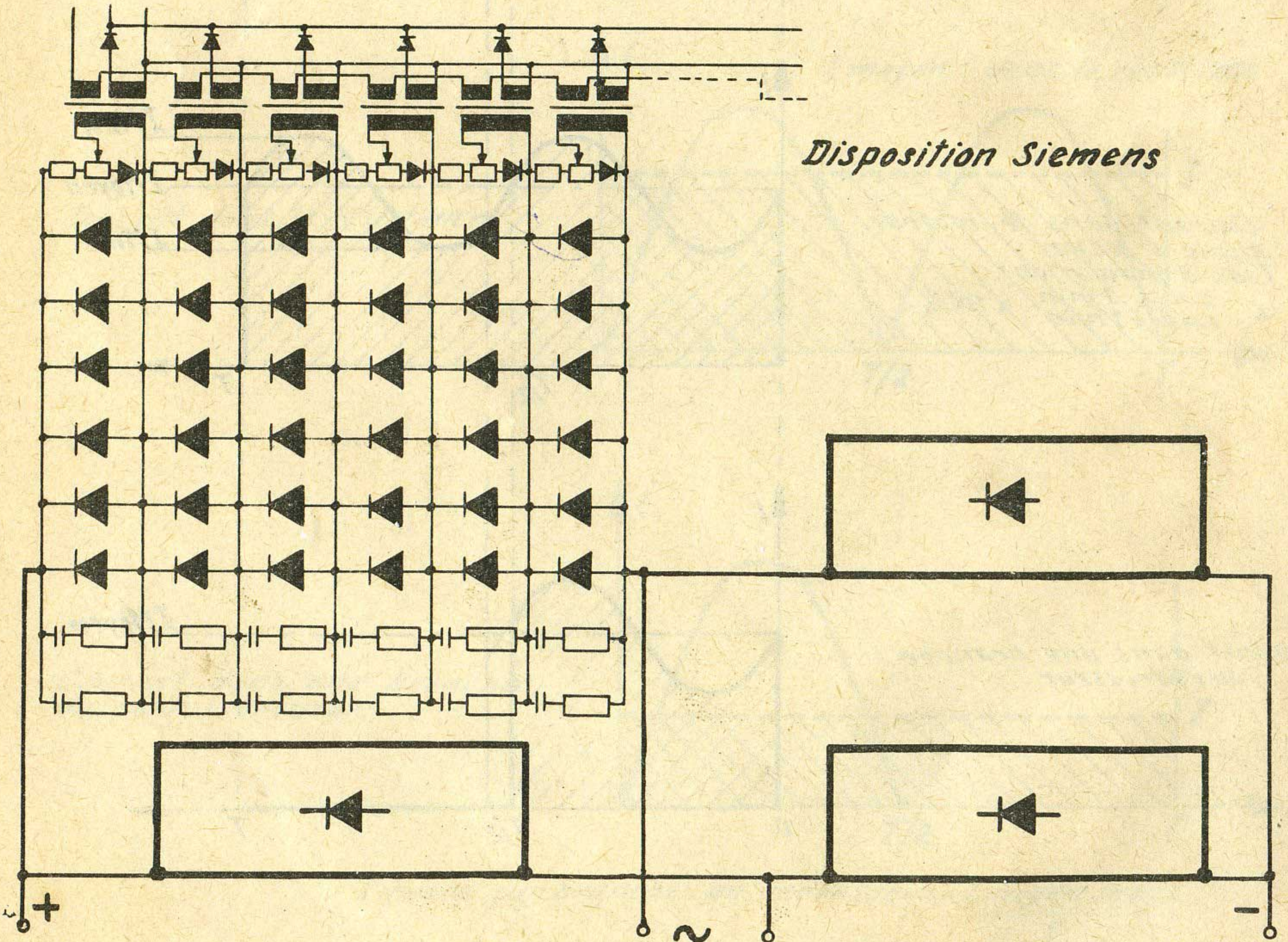
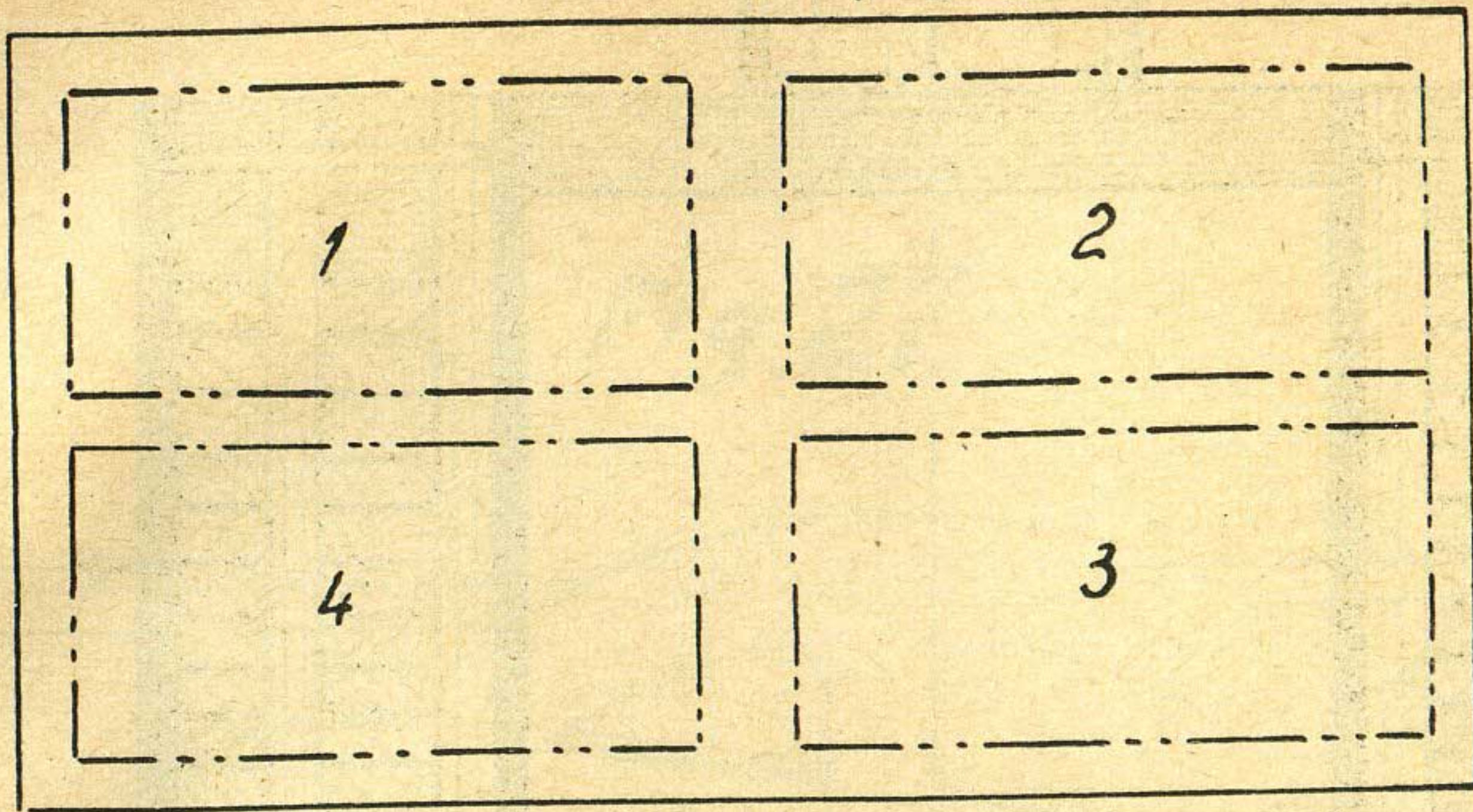


Fig. 24

Vue en coupe



Vue de face

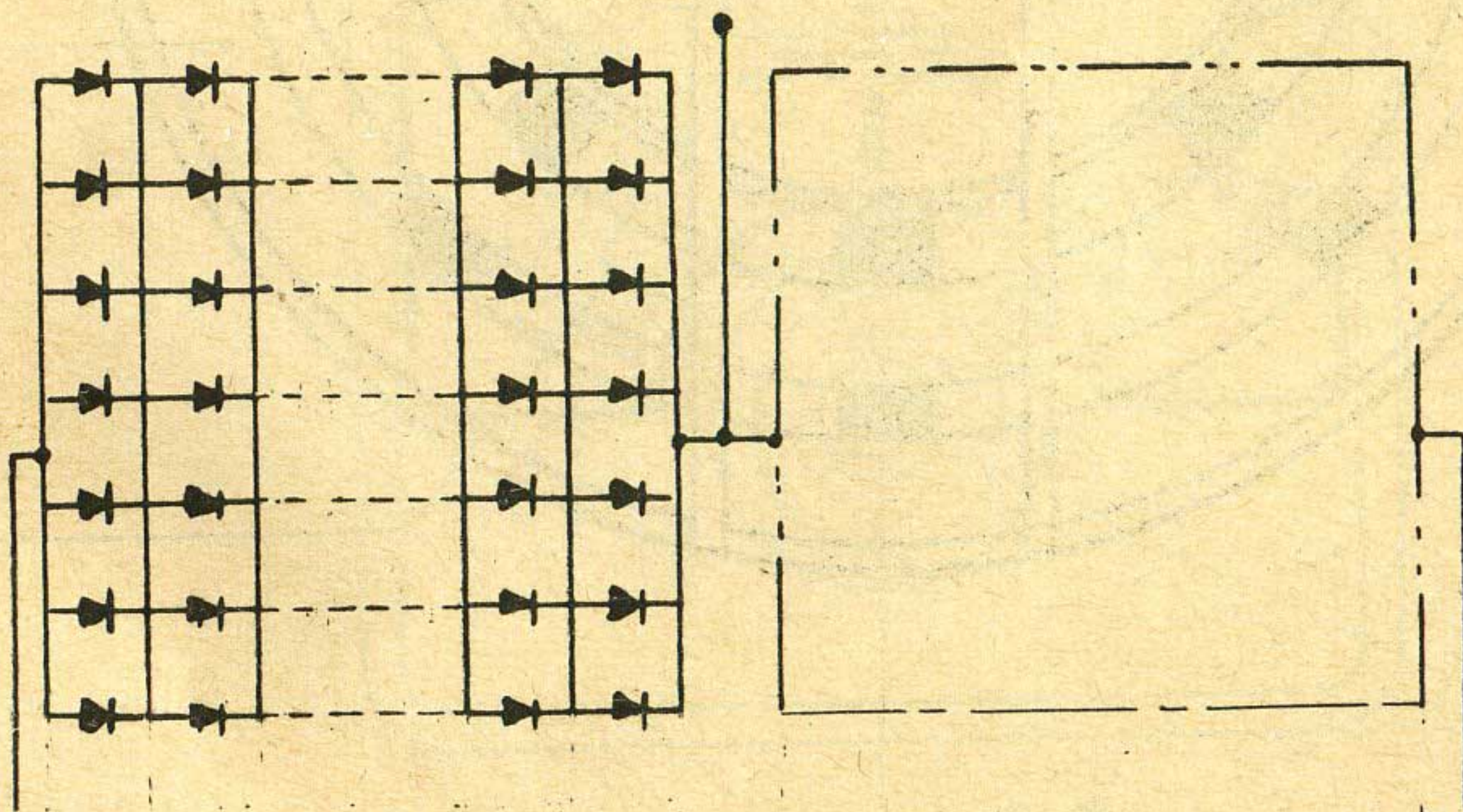
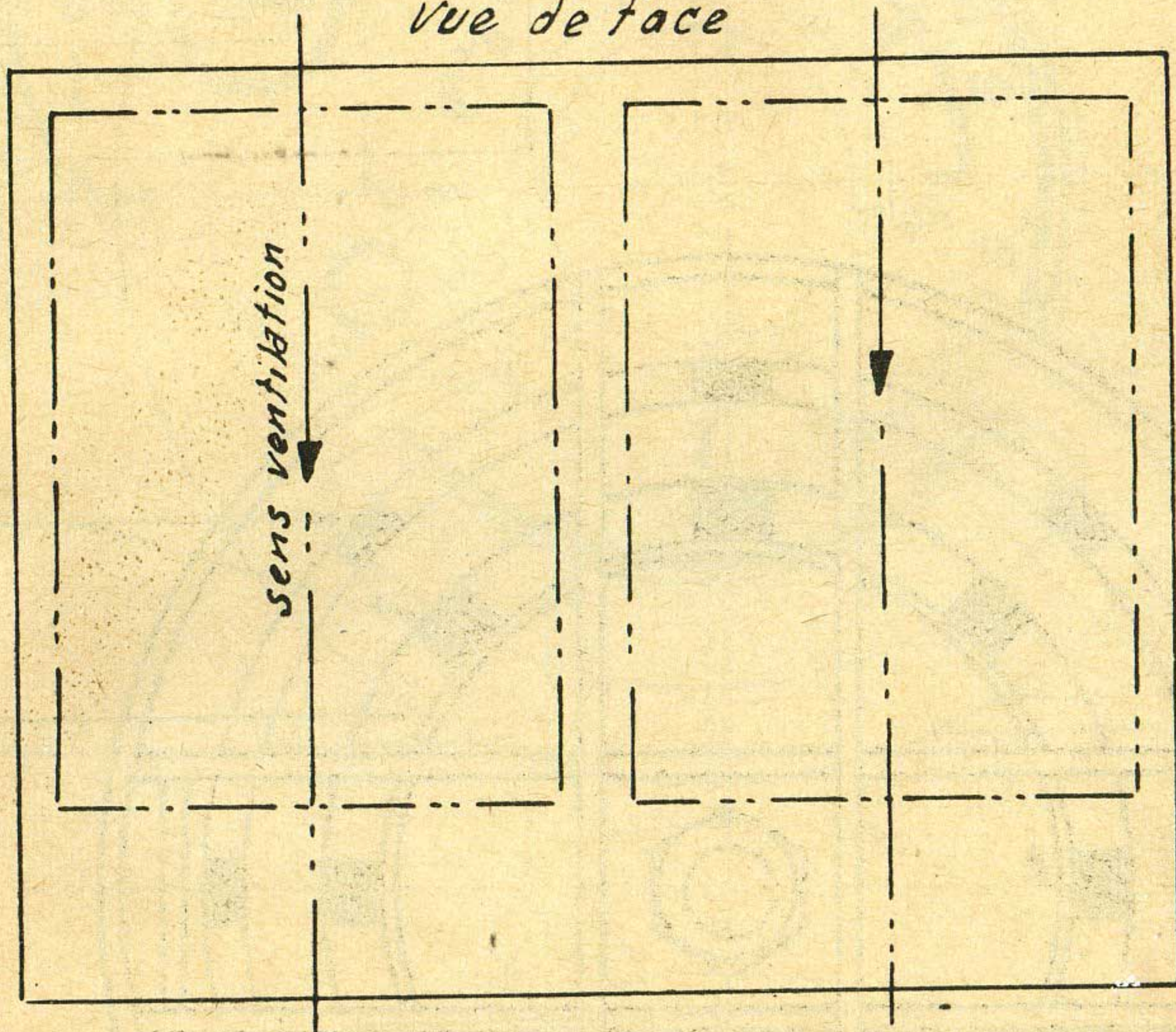


Fig. 25

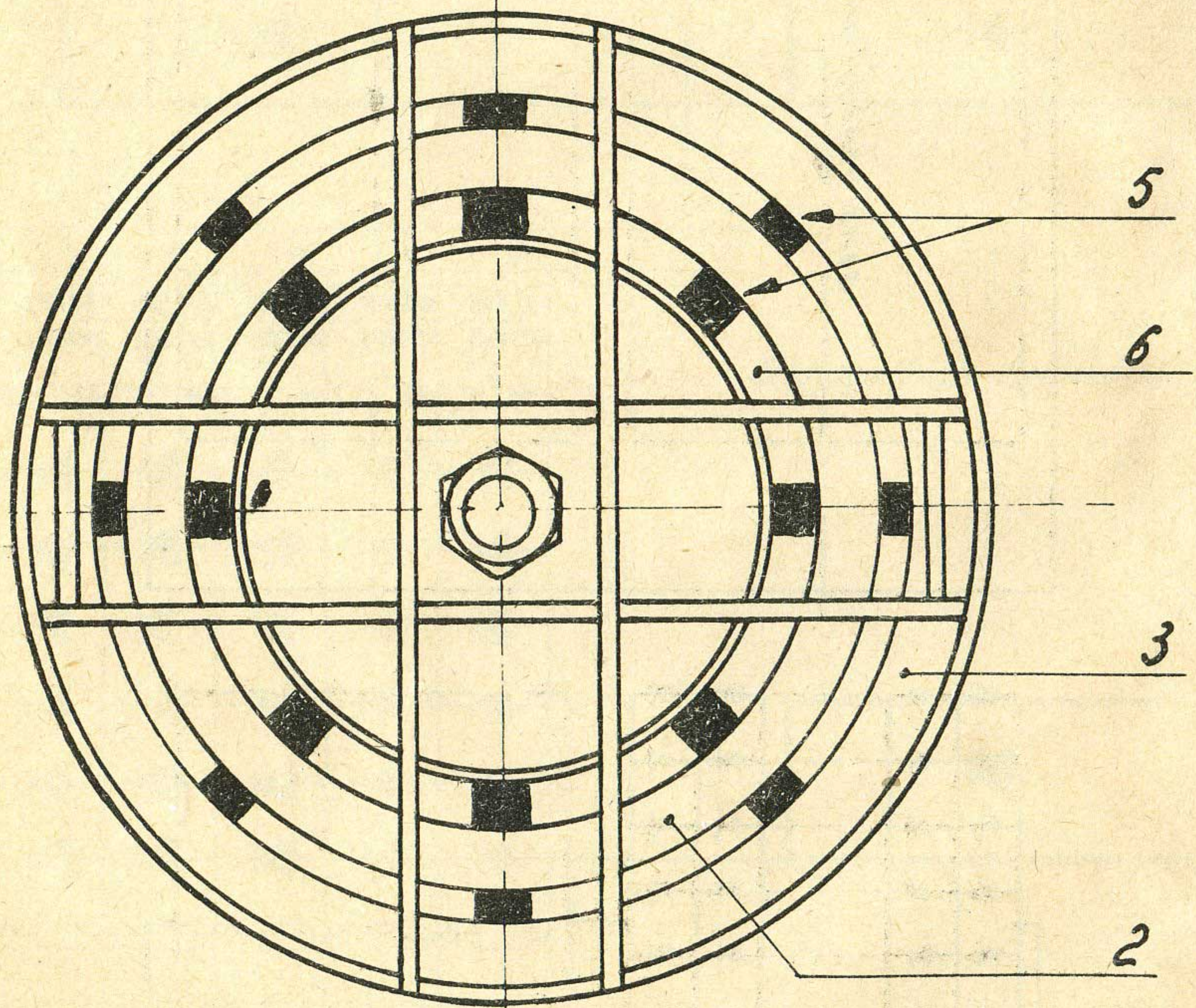
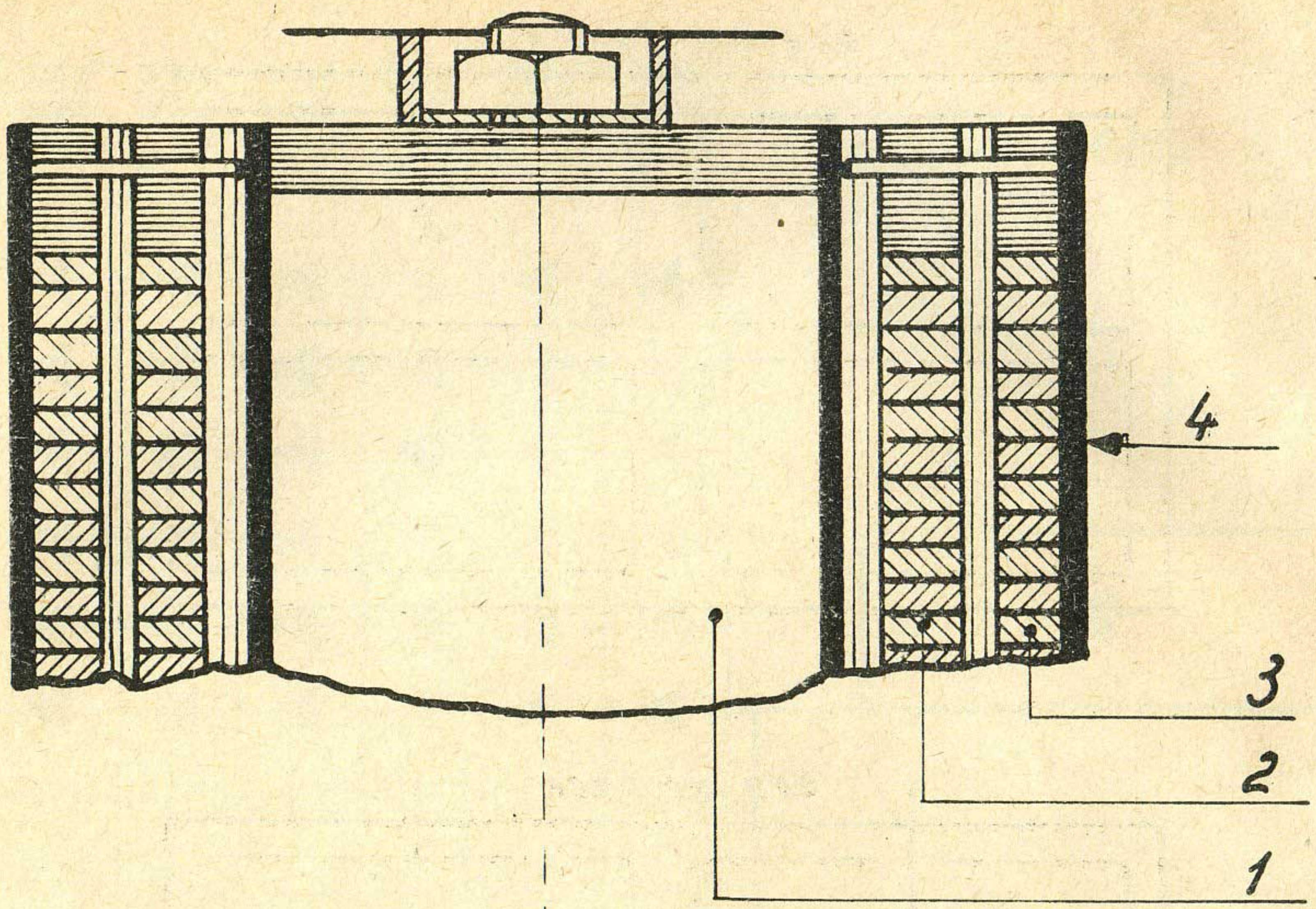


Fig. 26.

Fig. 27

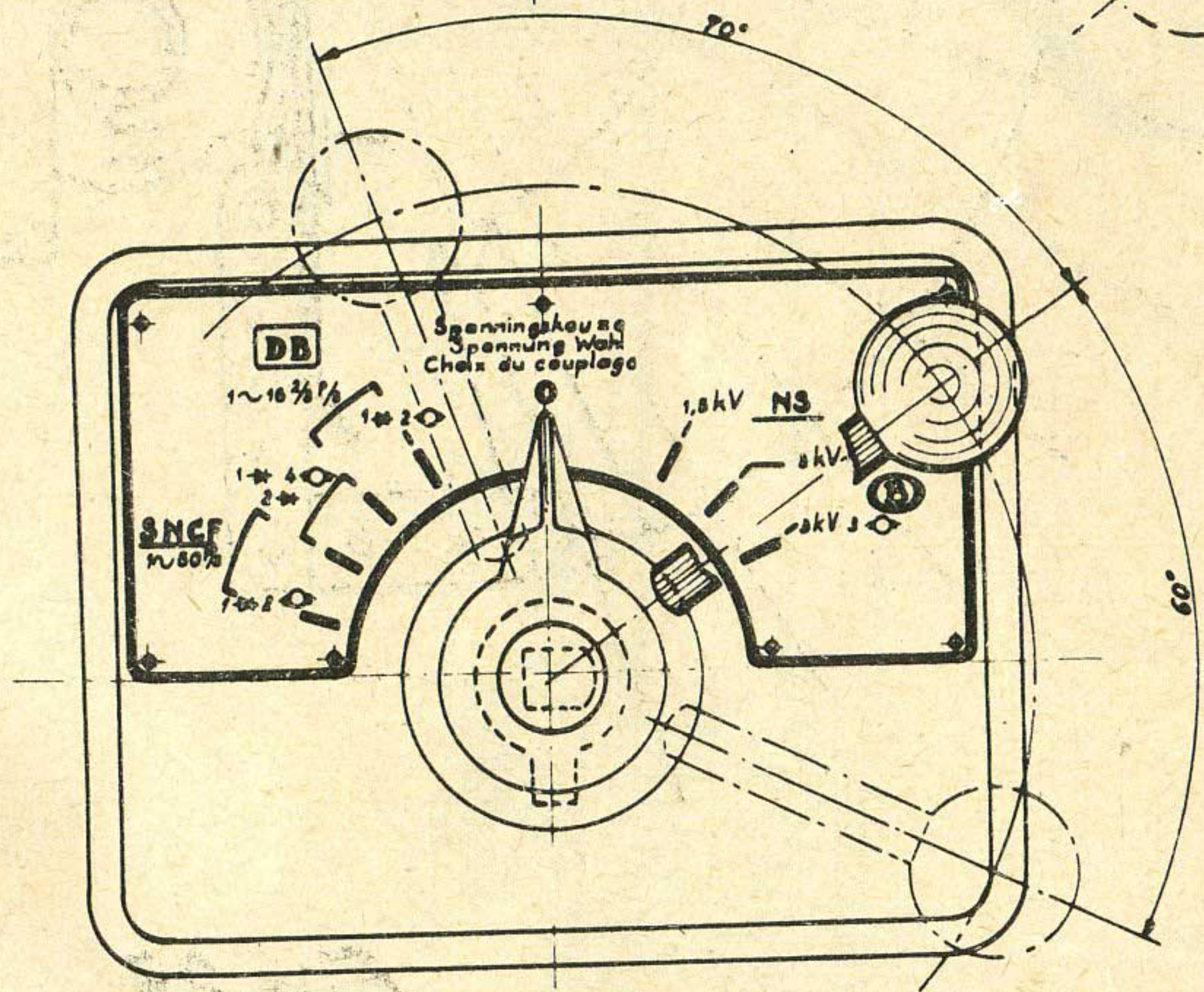
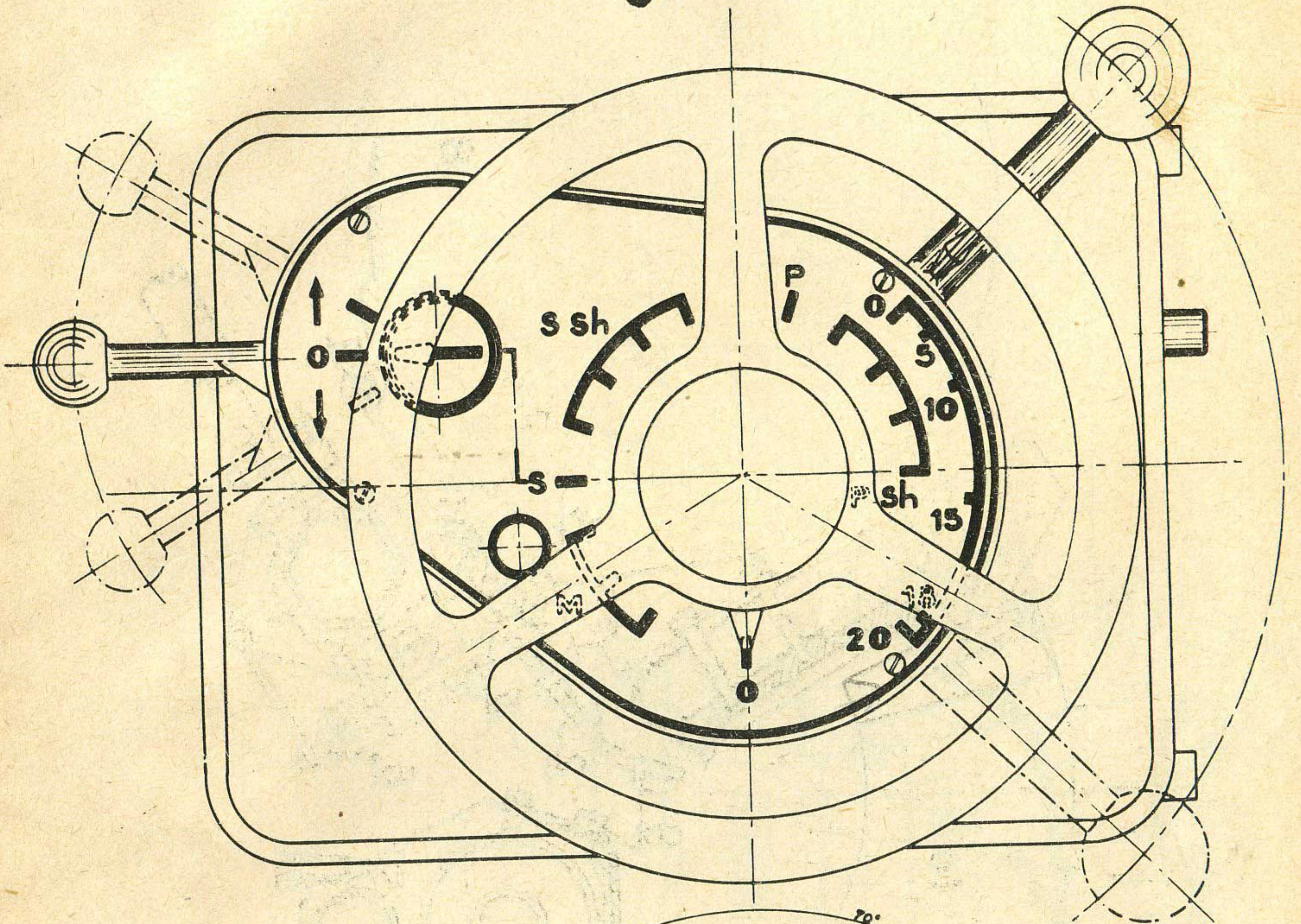


Fig. 28

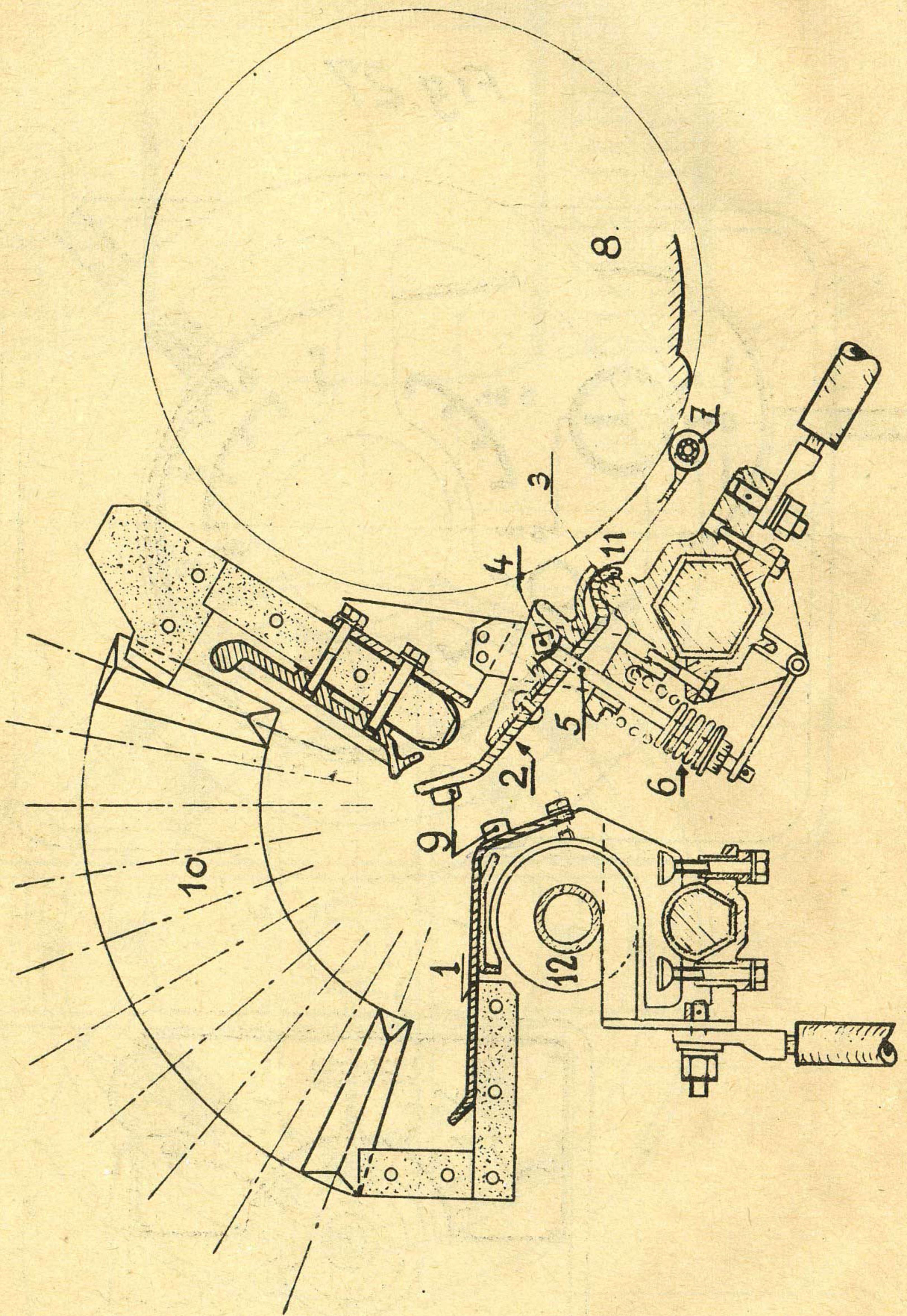


Fig. 29.

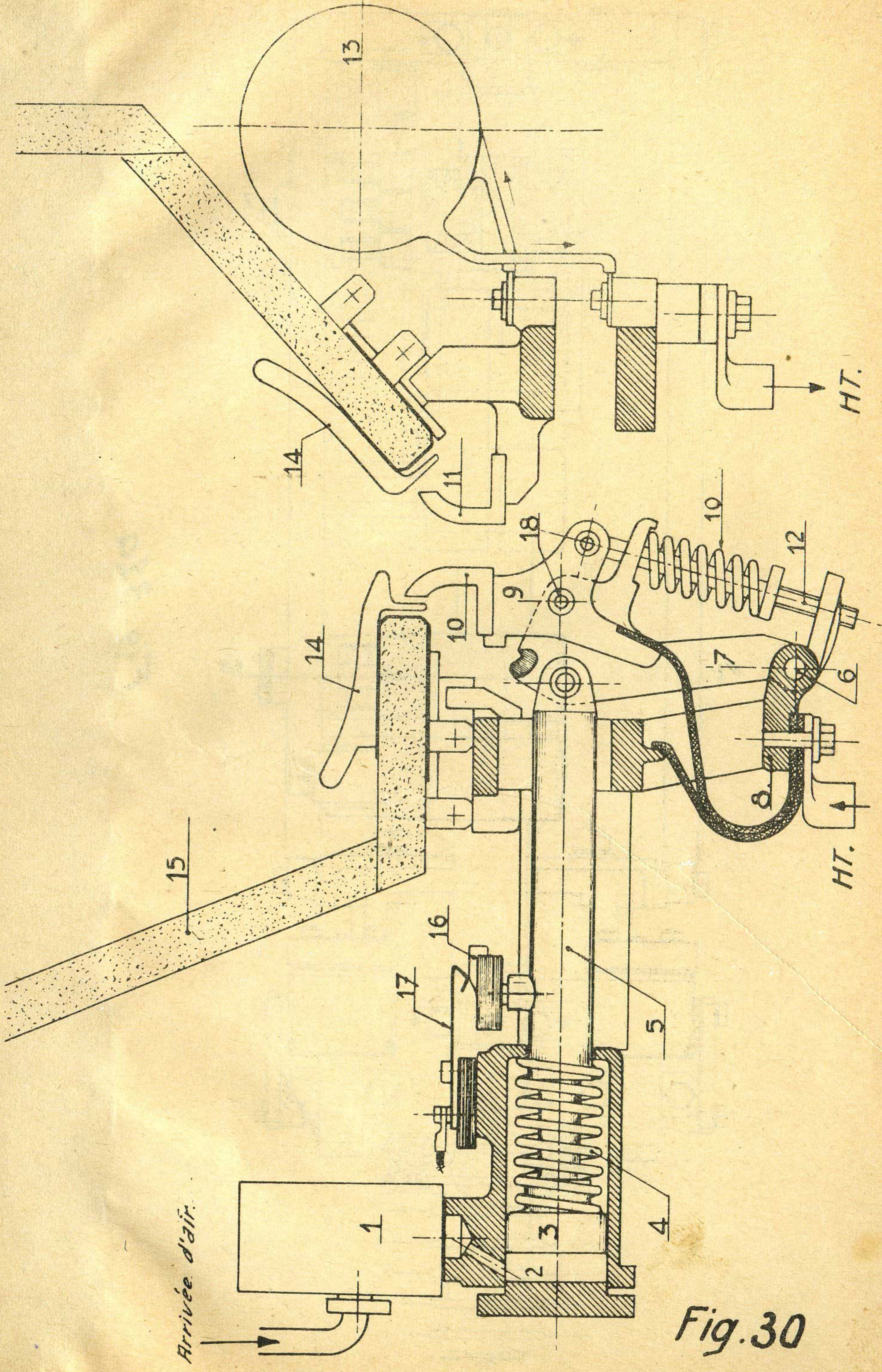


Fig. 30

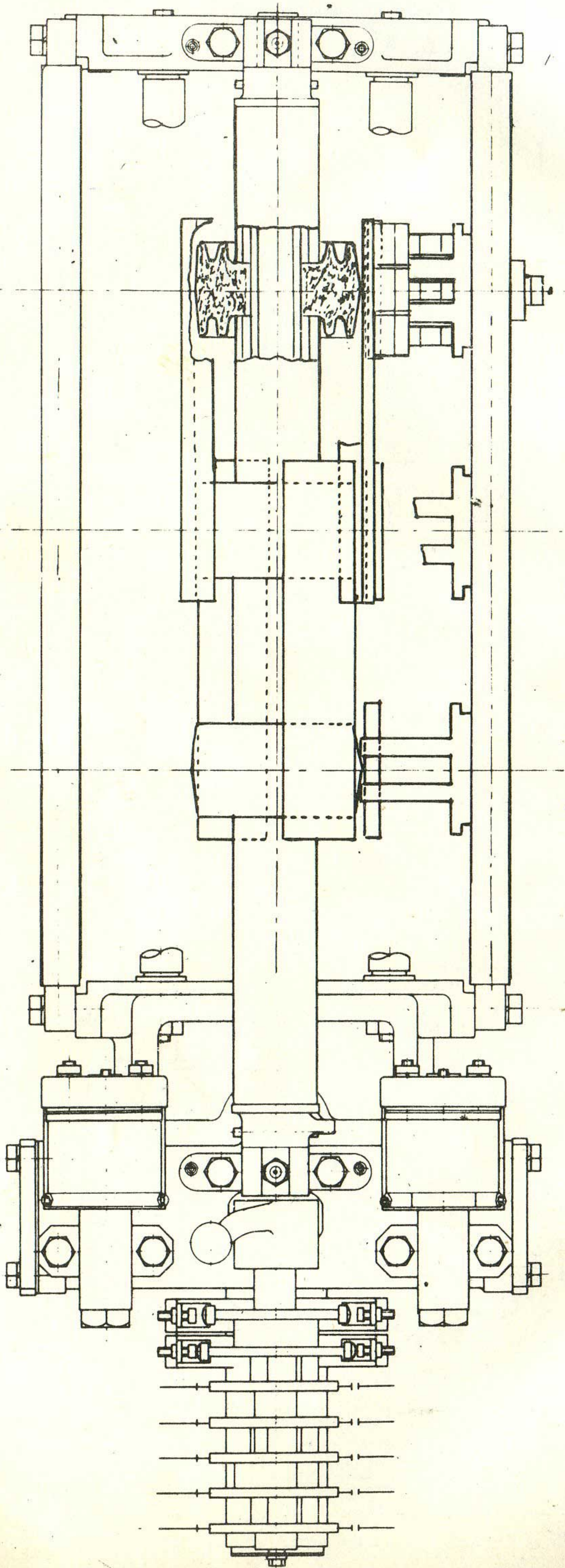


Fig. 31.a.

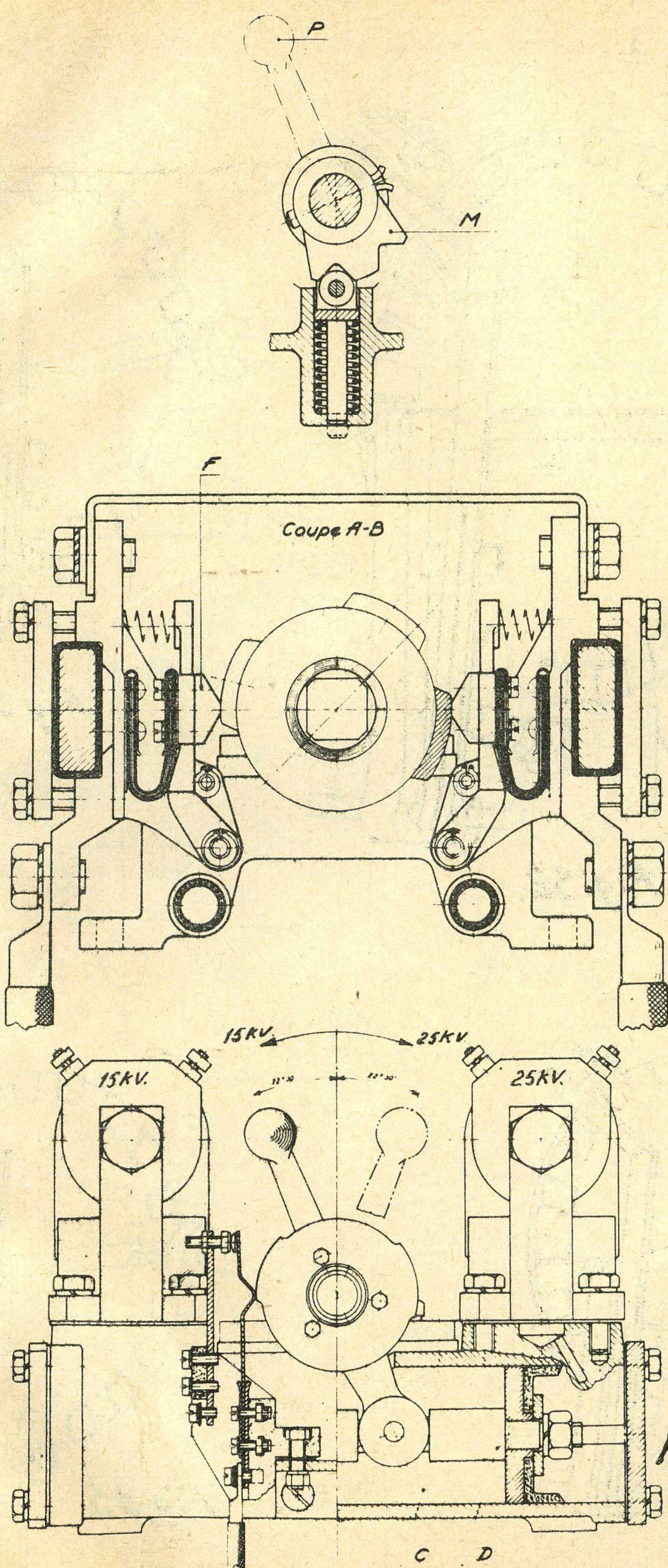


Fig. 31b

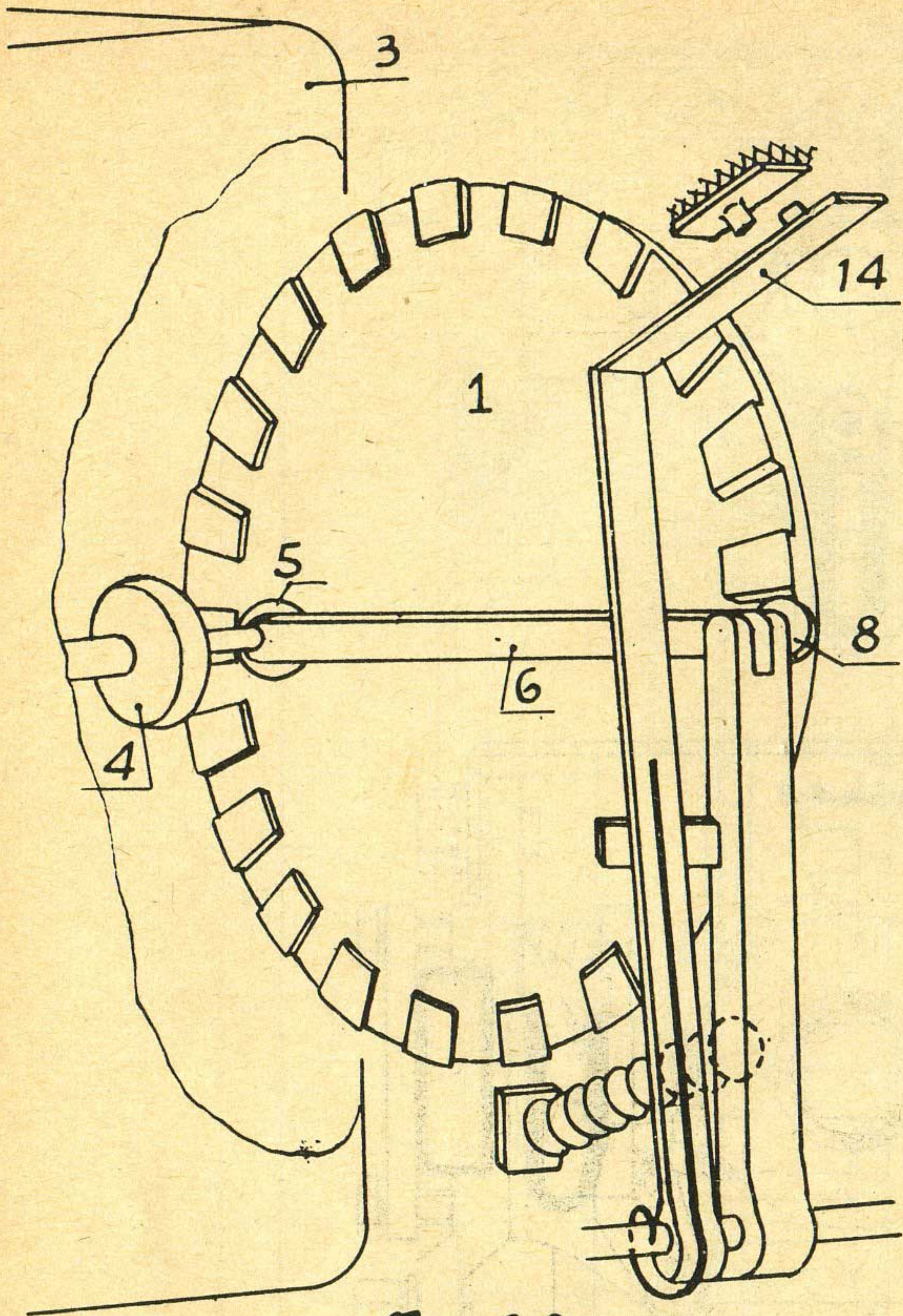


Fig. 32.

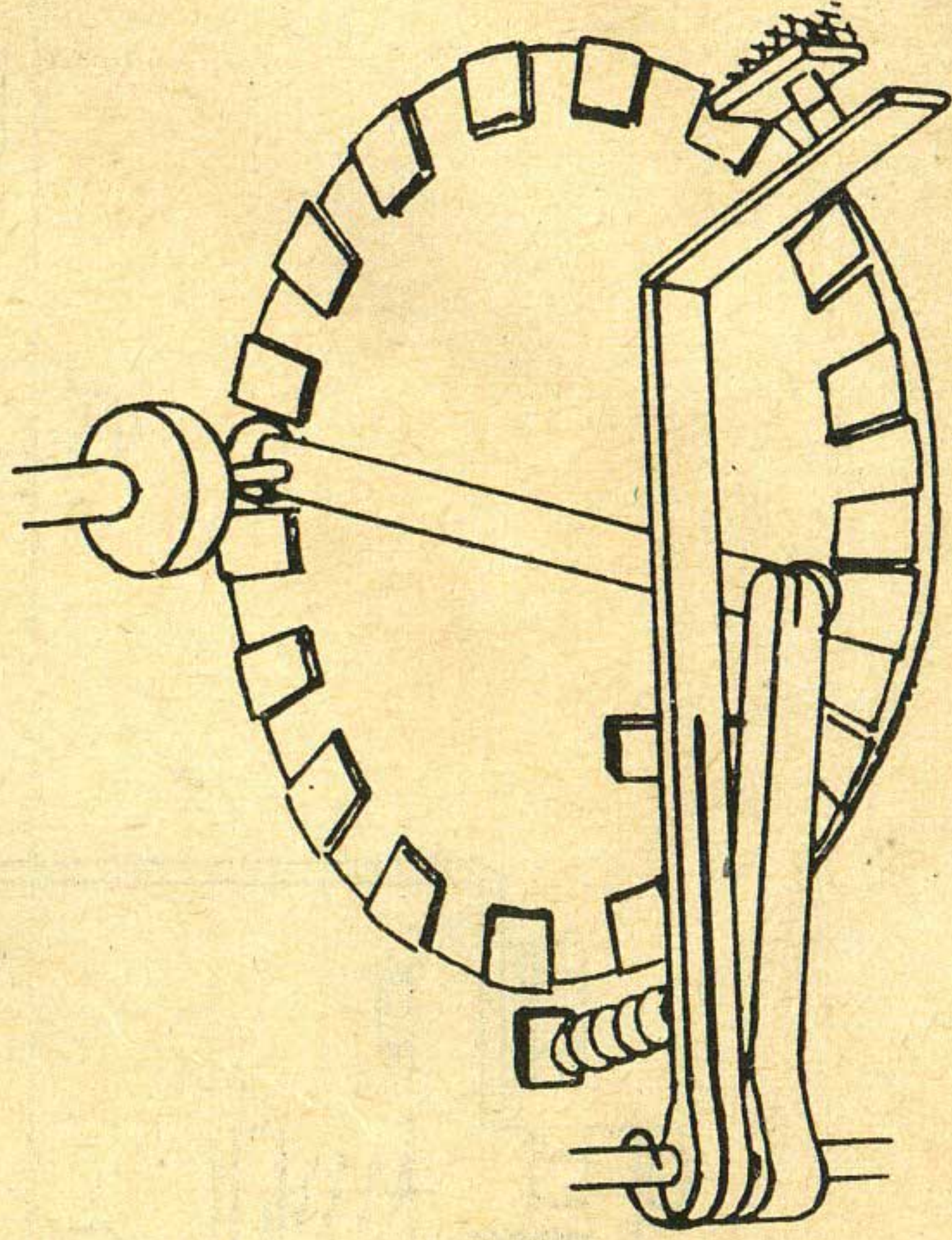


Fig. 33.

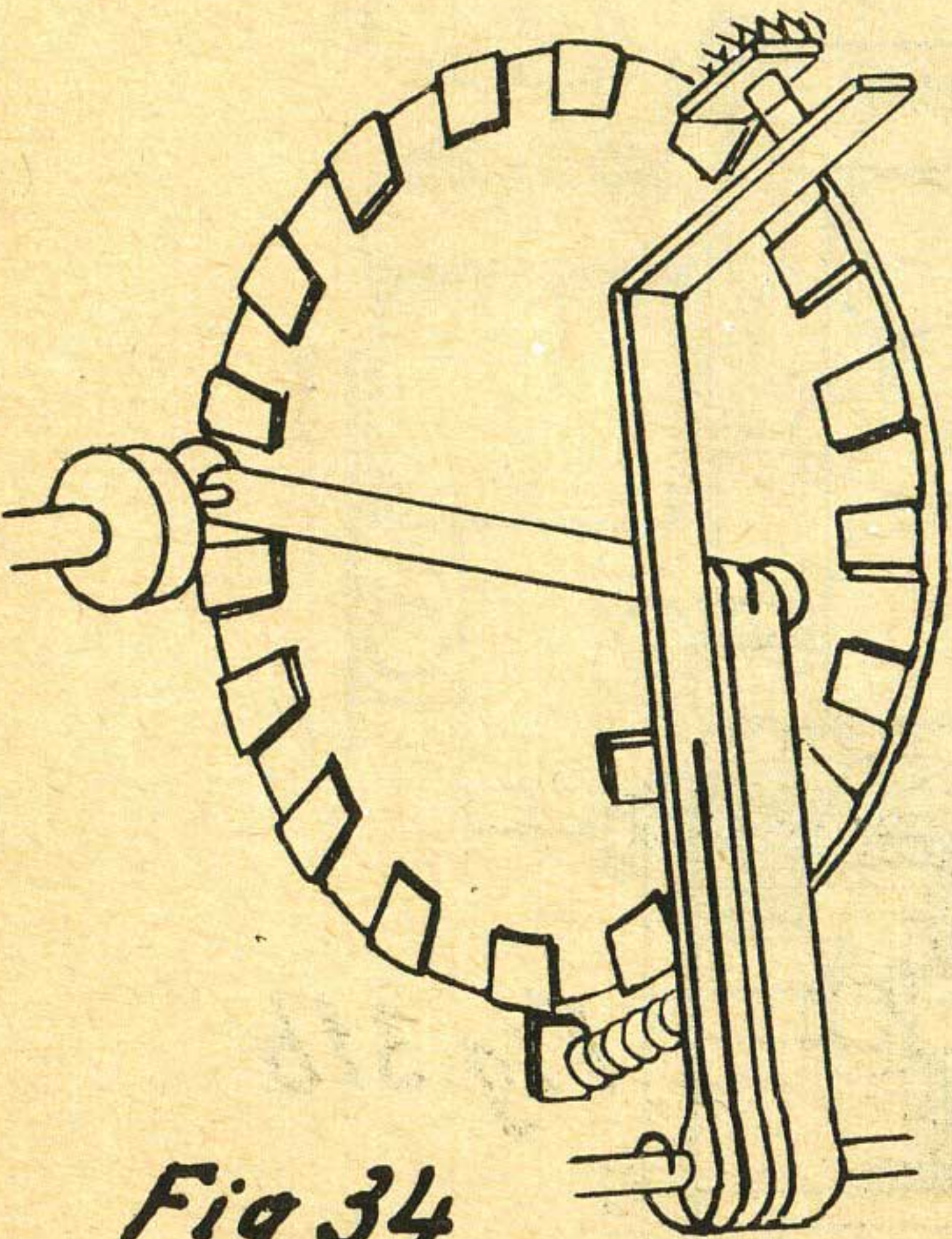


Fig. 34.

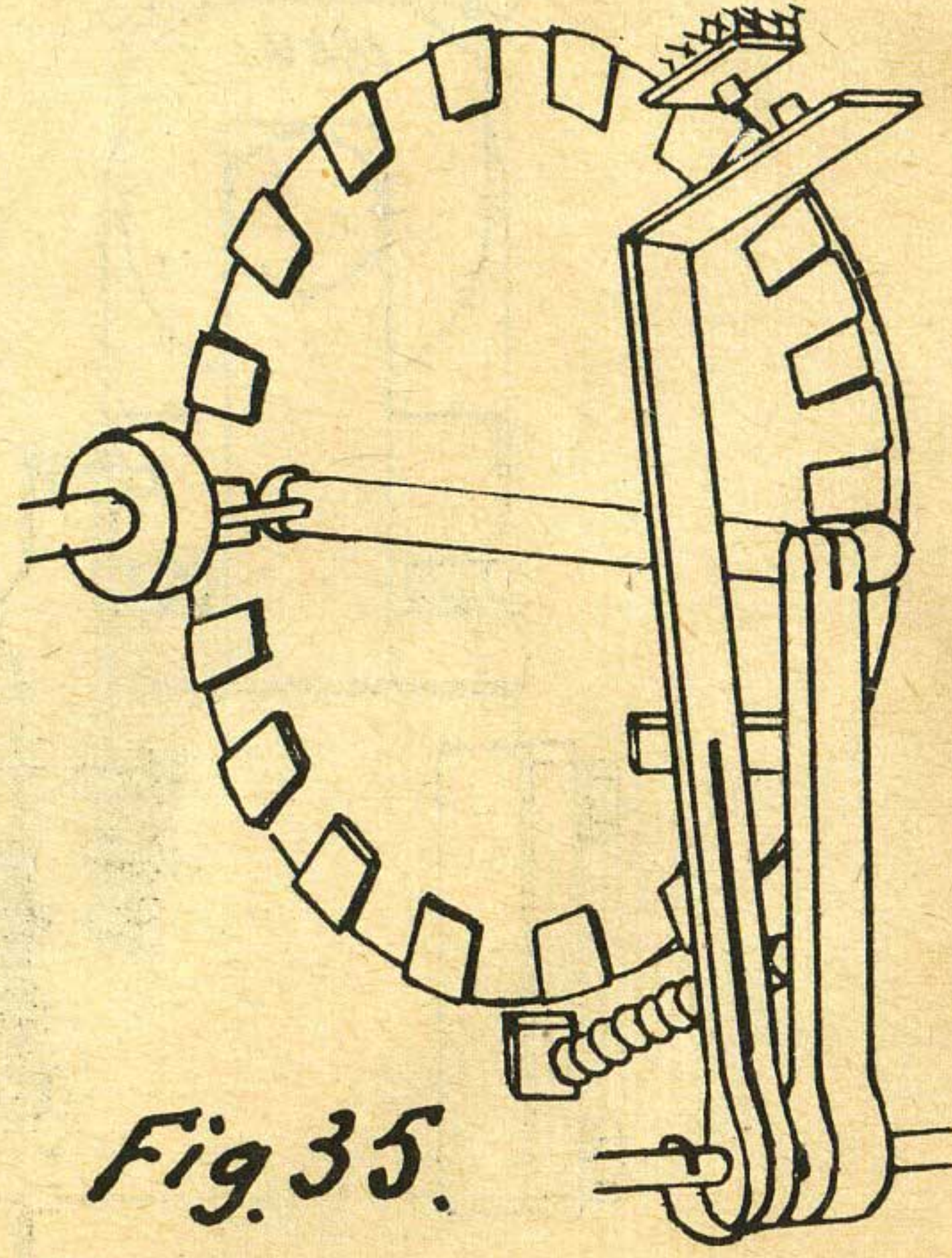
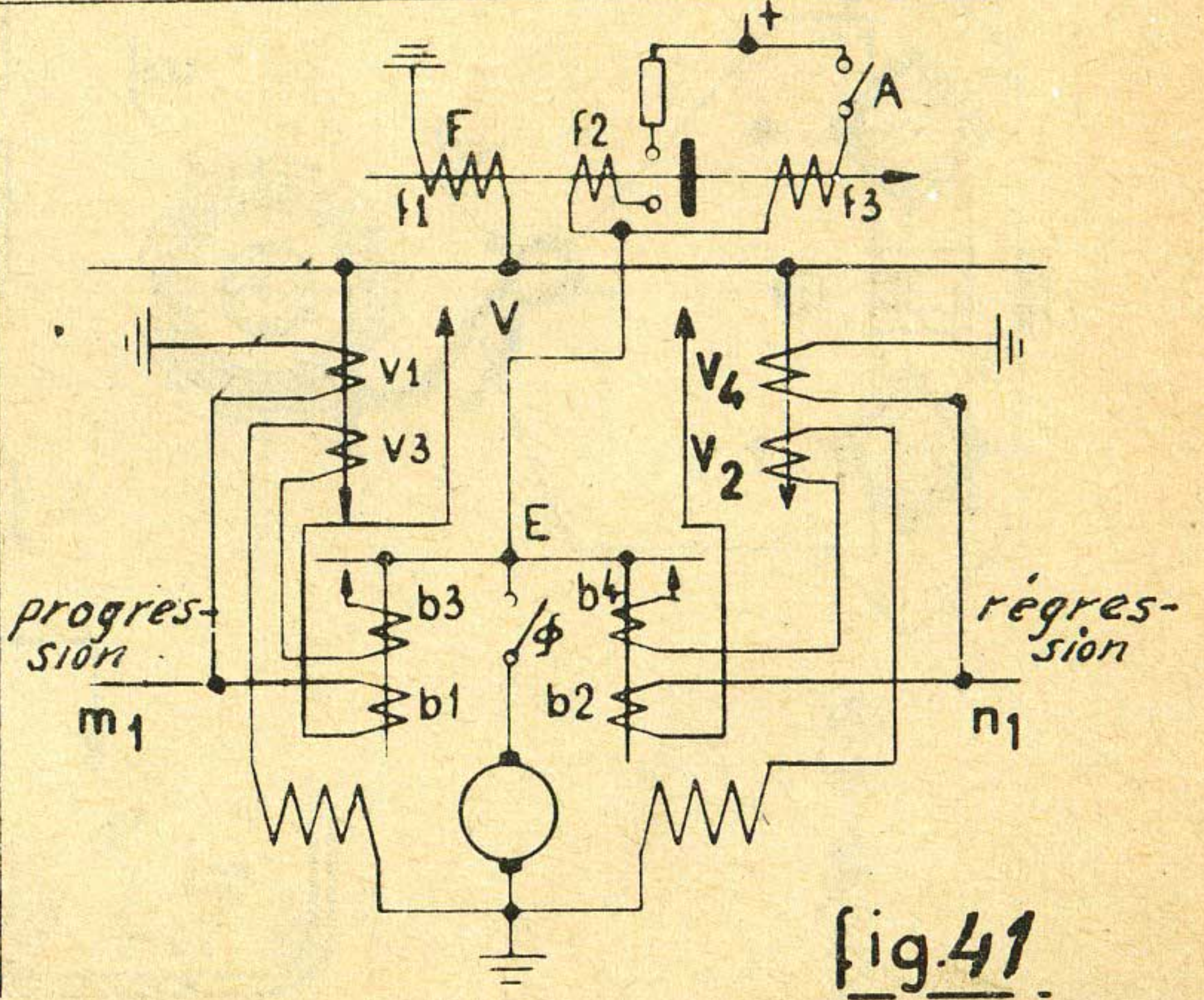
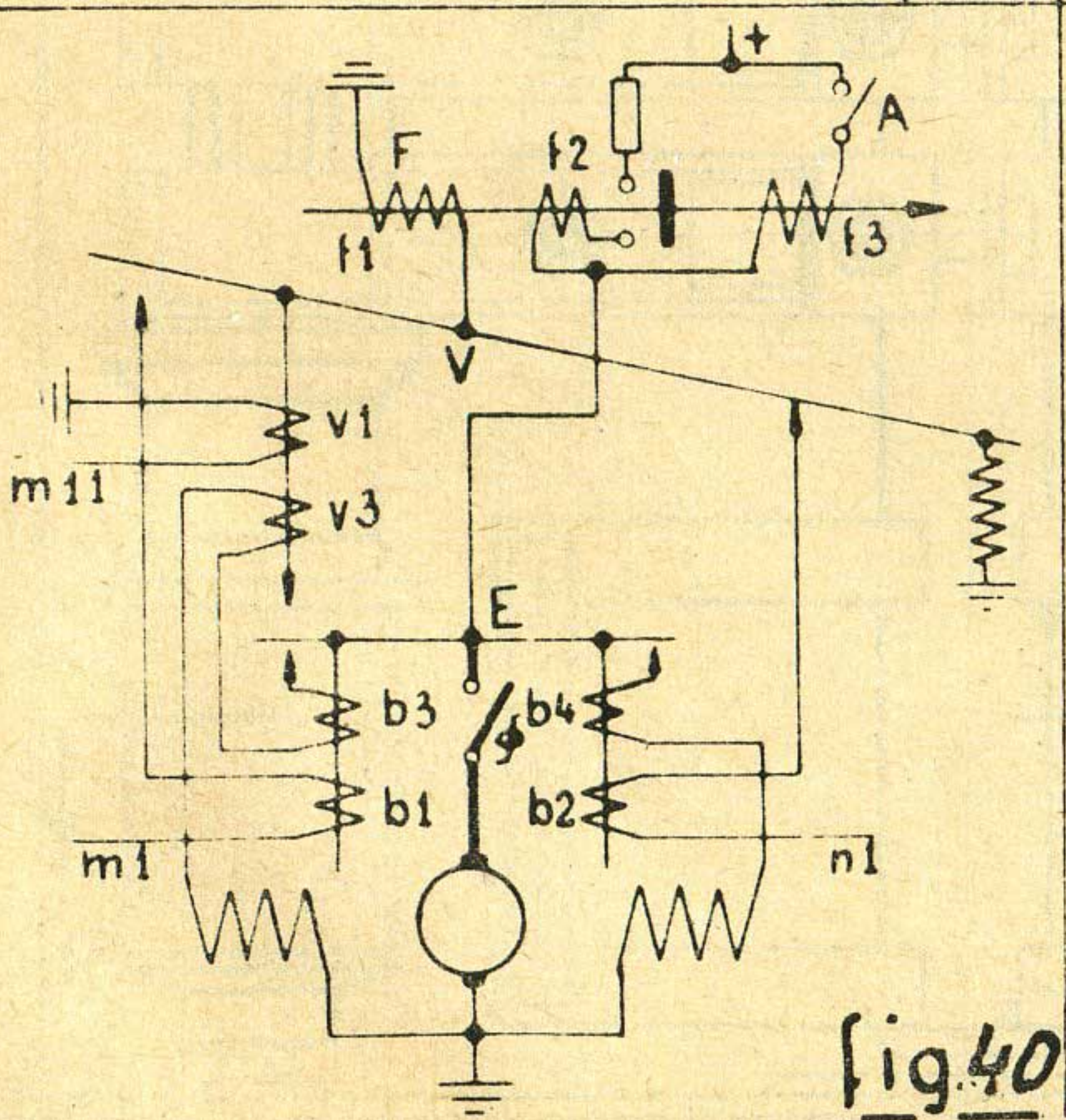
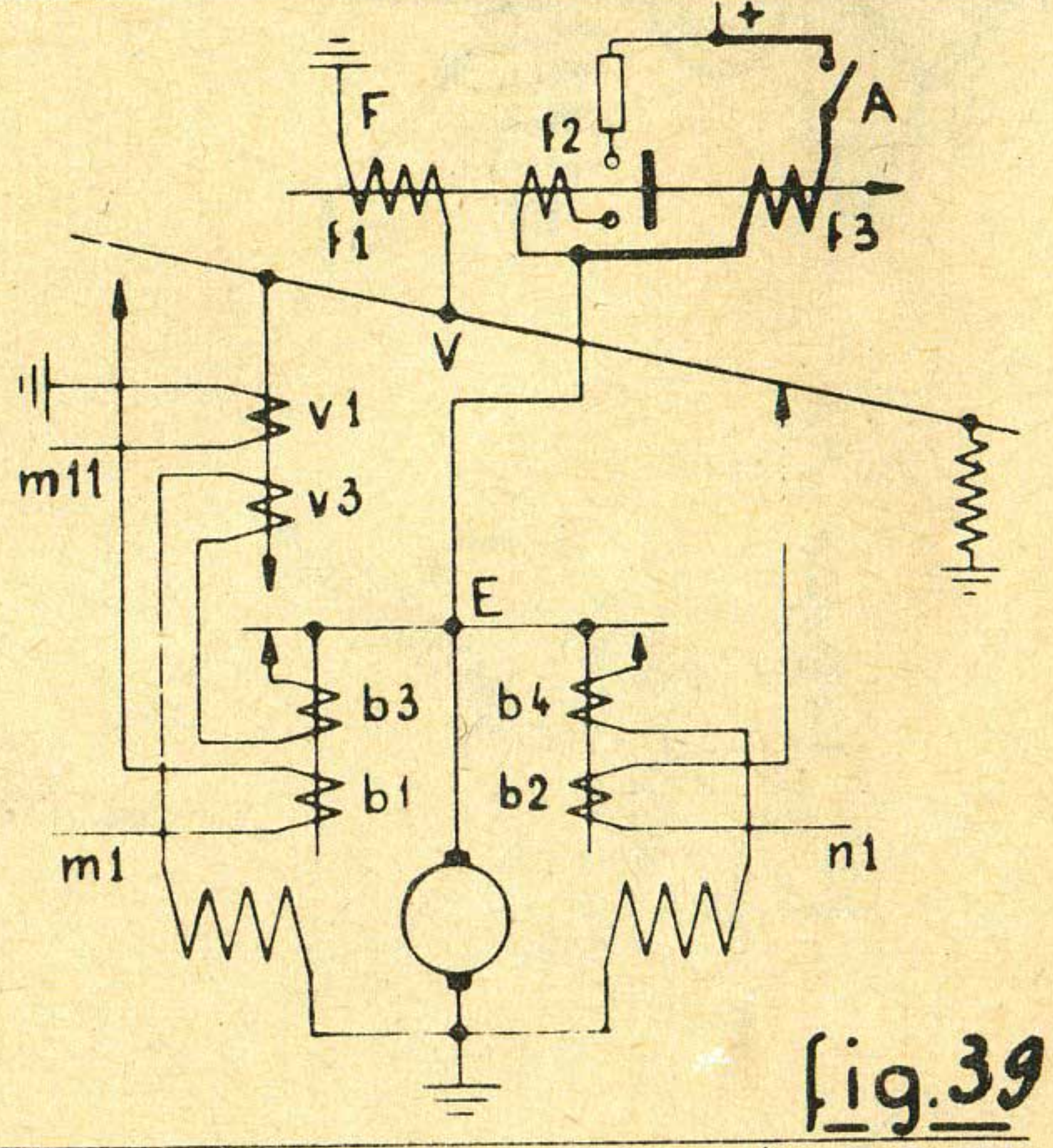
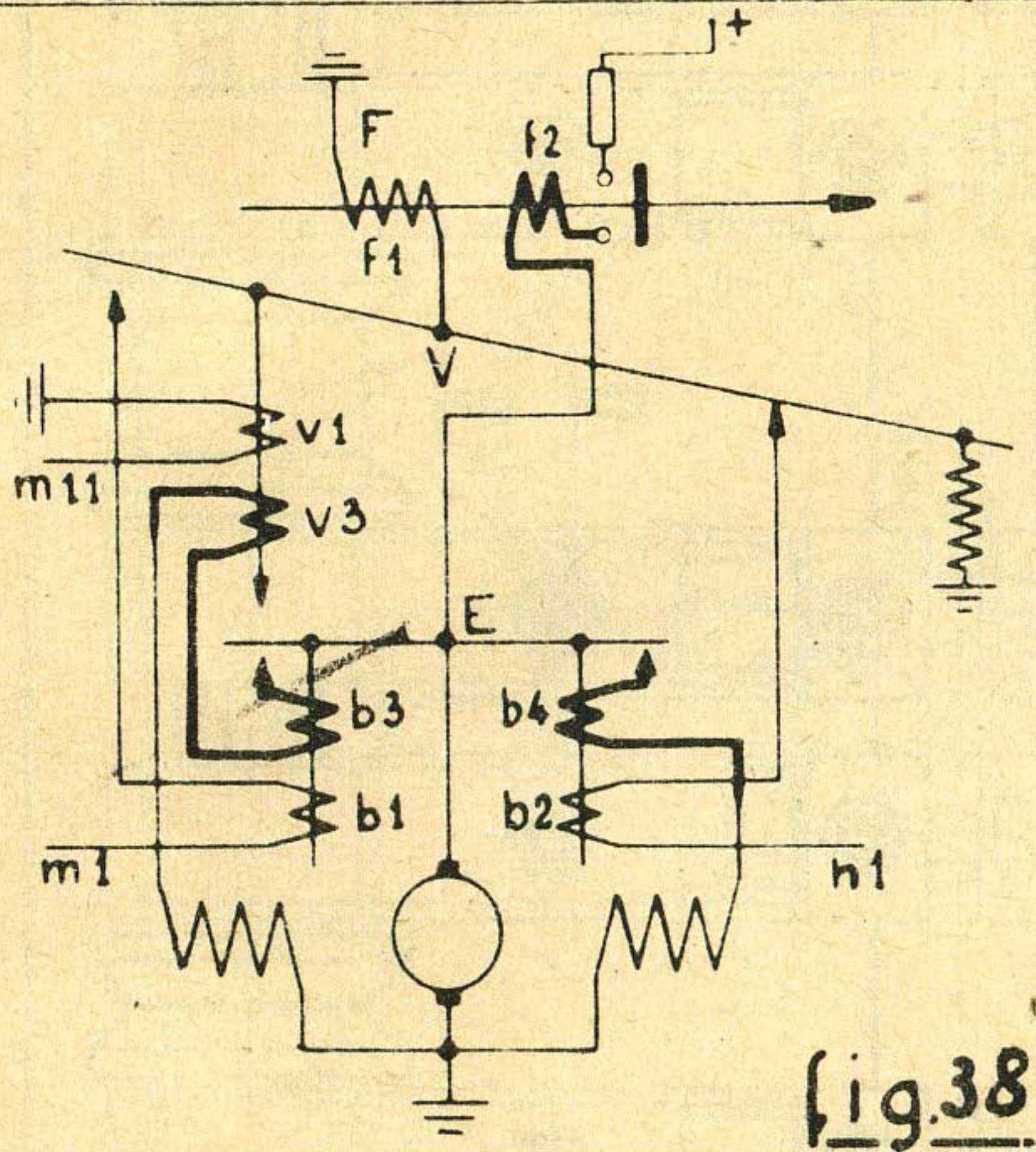
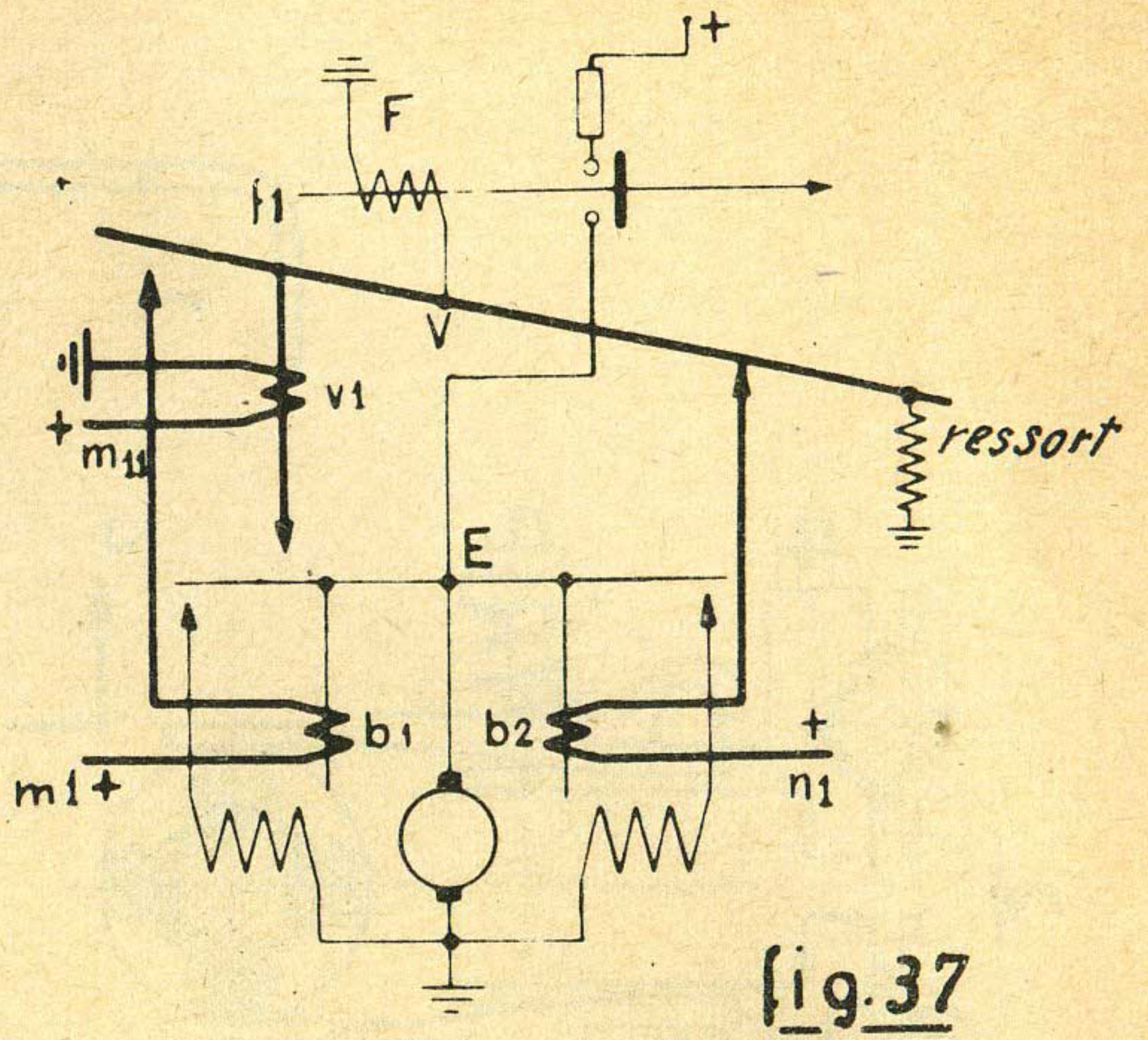
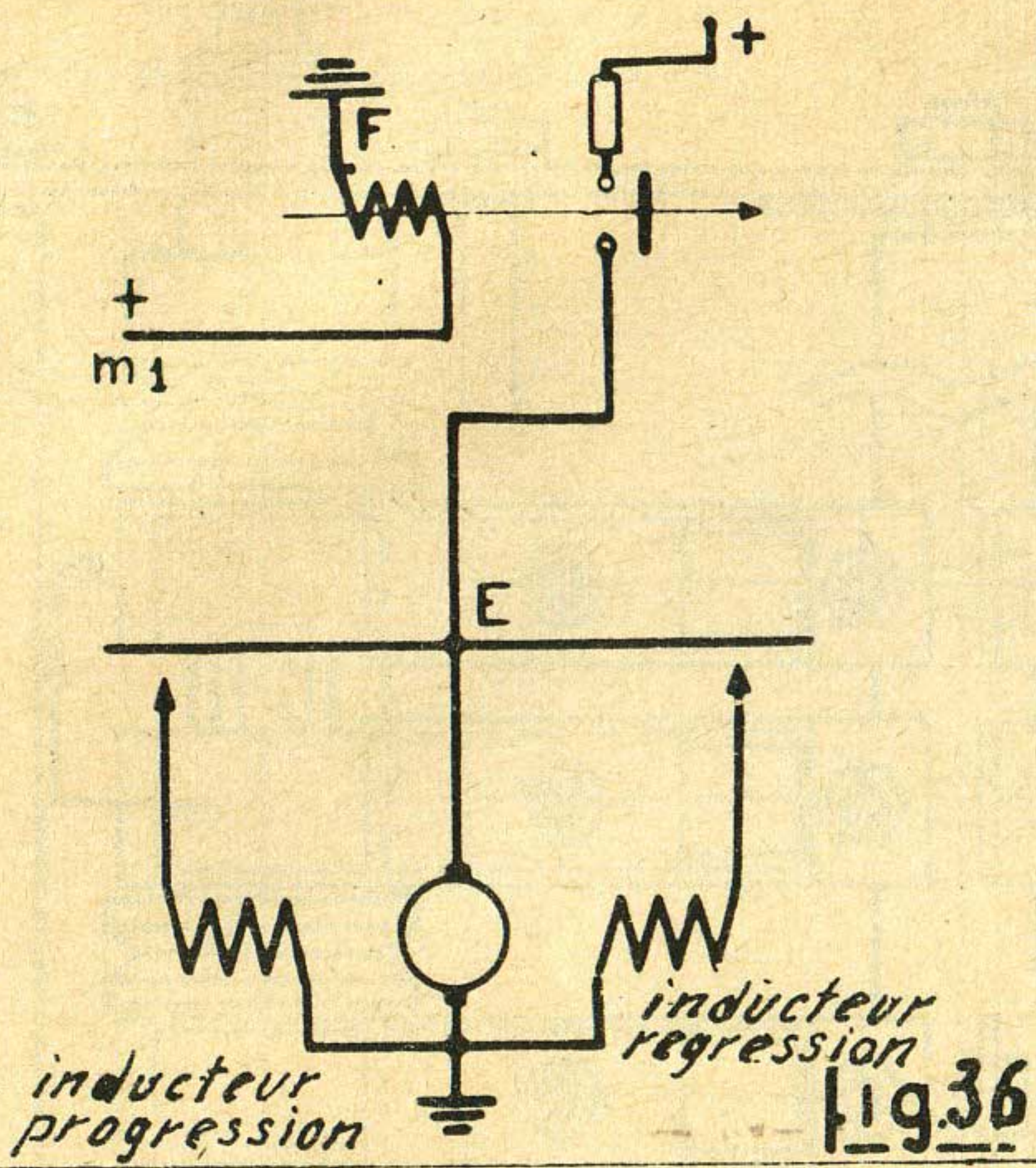


Fig. 35.



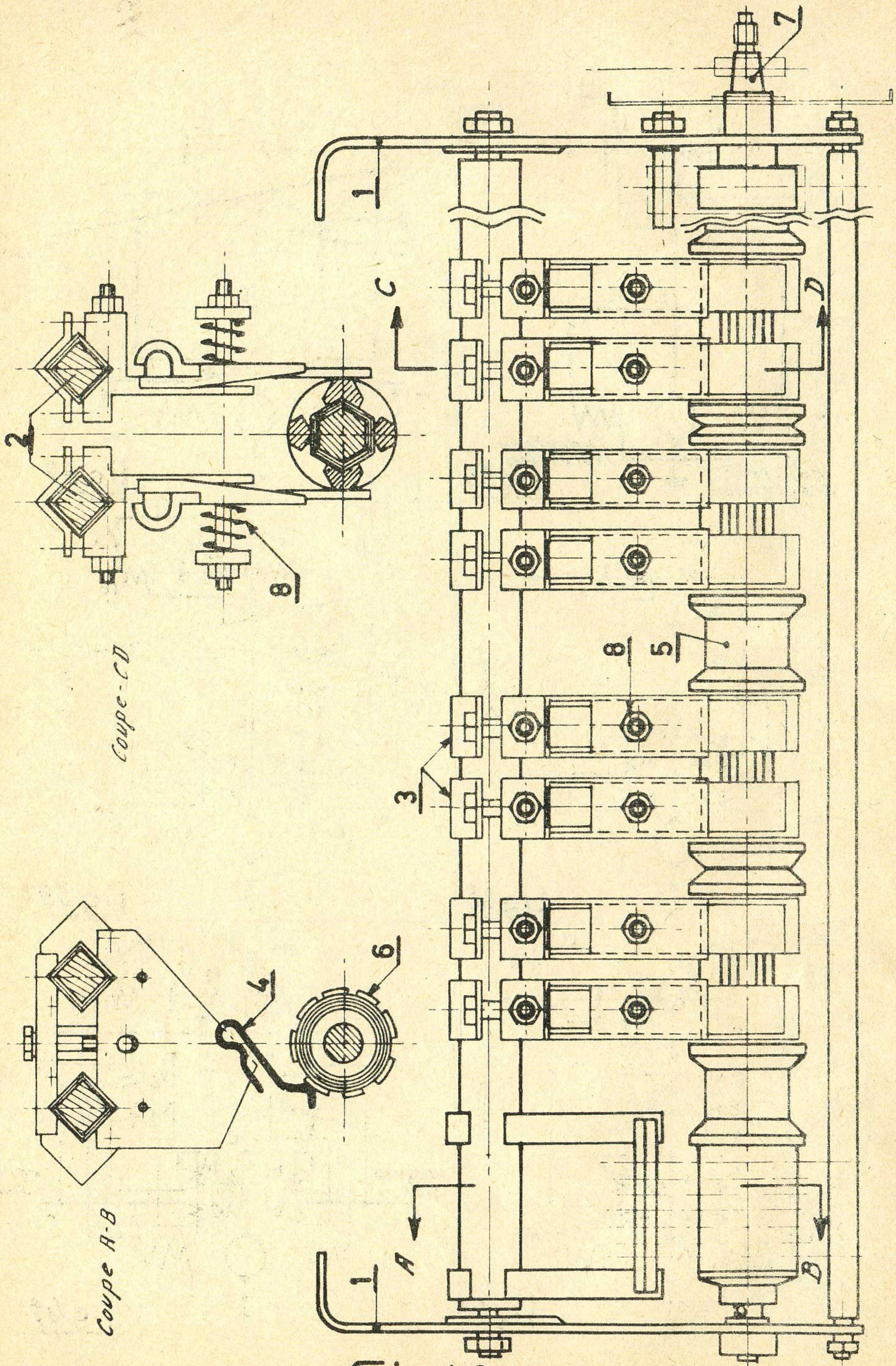


Fig.42.a.

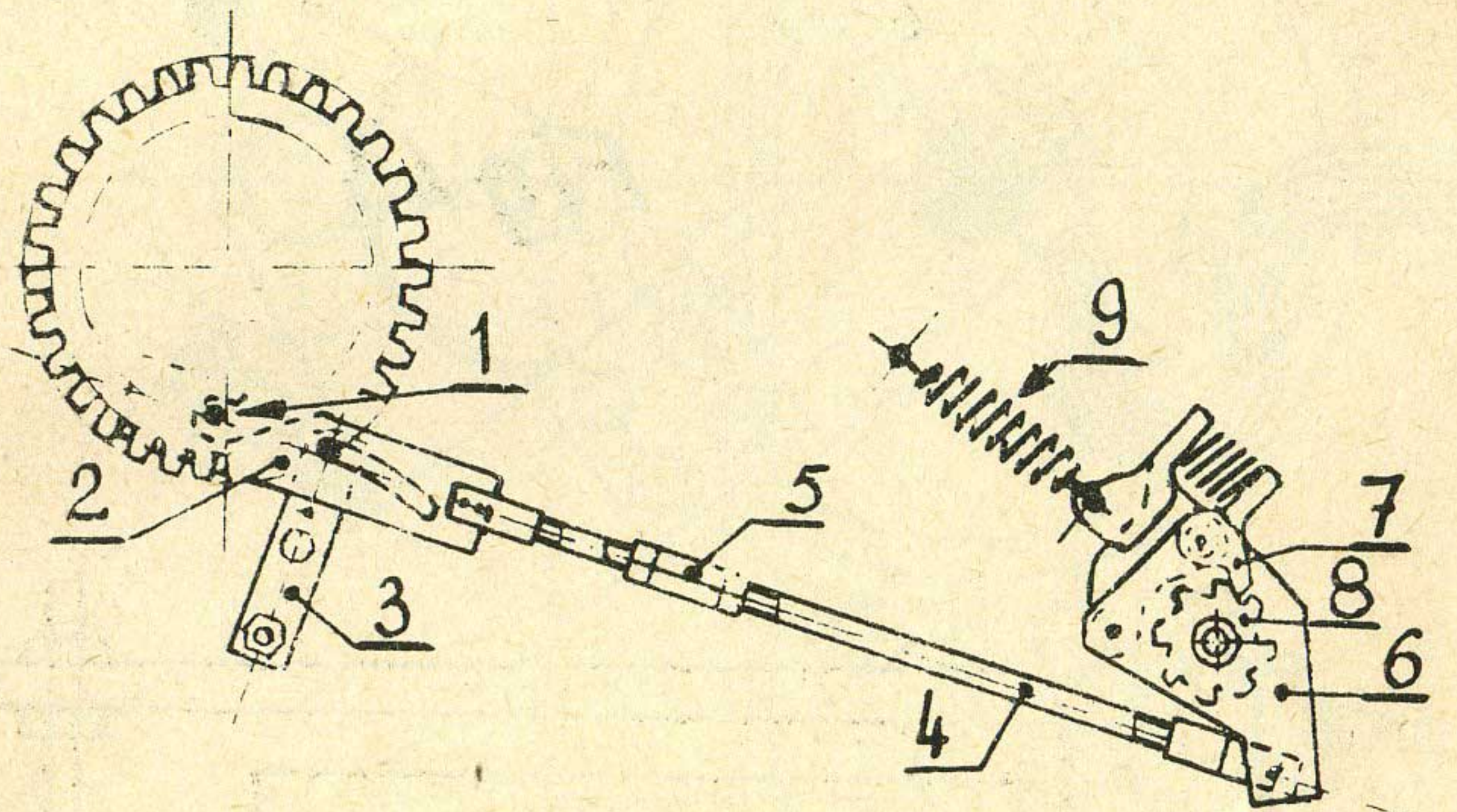


Fig. 42.b.

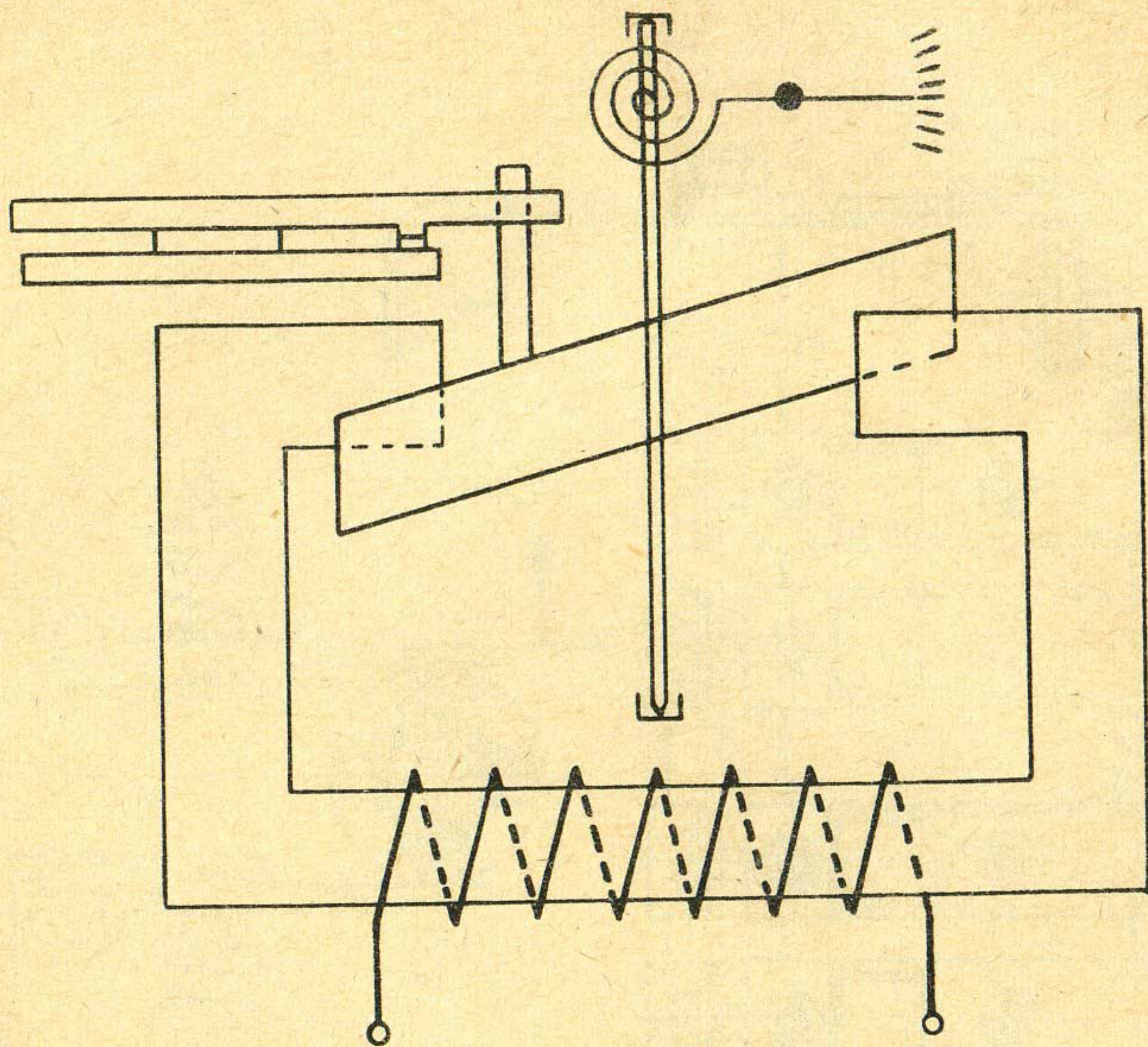


Fig. 43

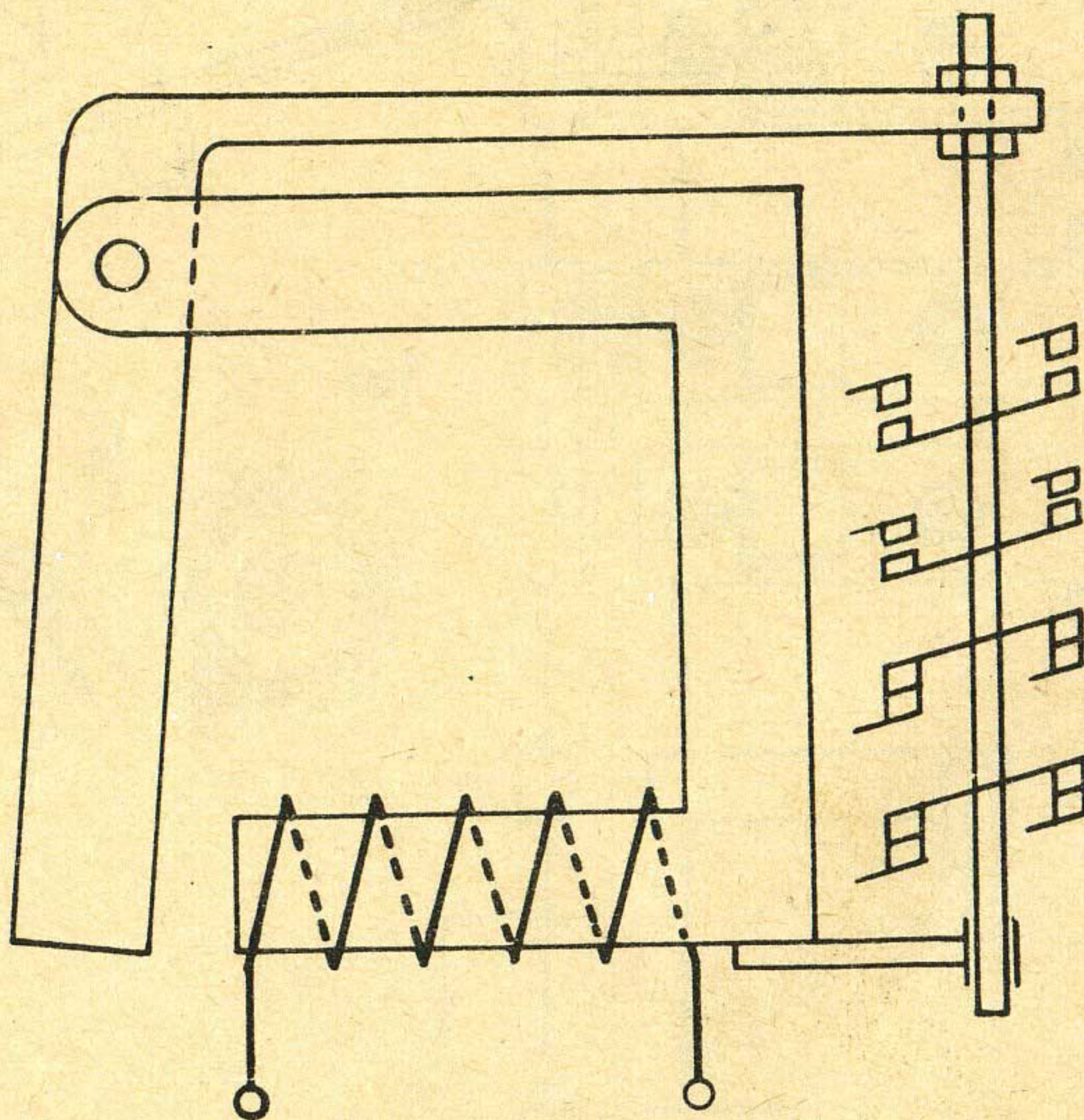


Fig. 44.

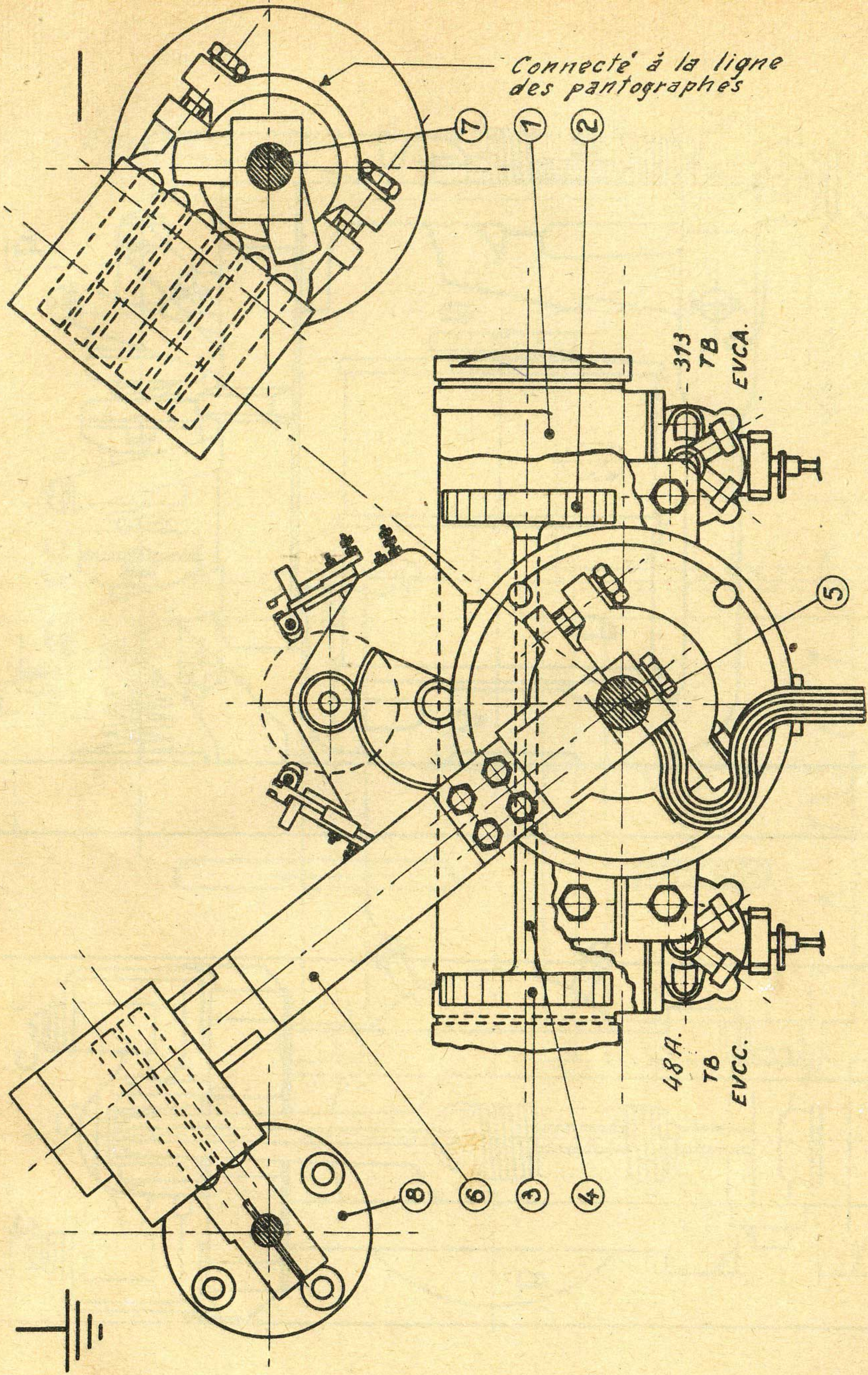


Fig. 45

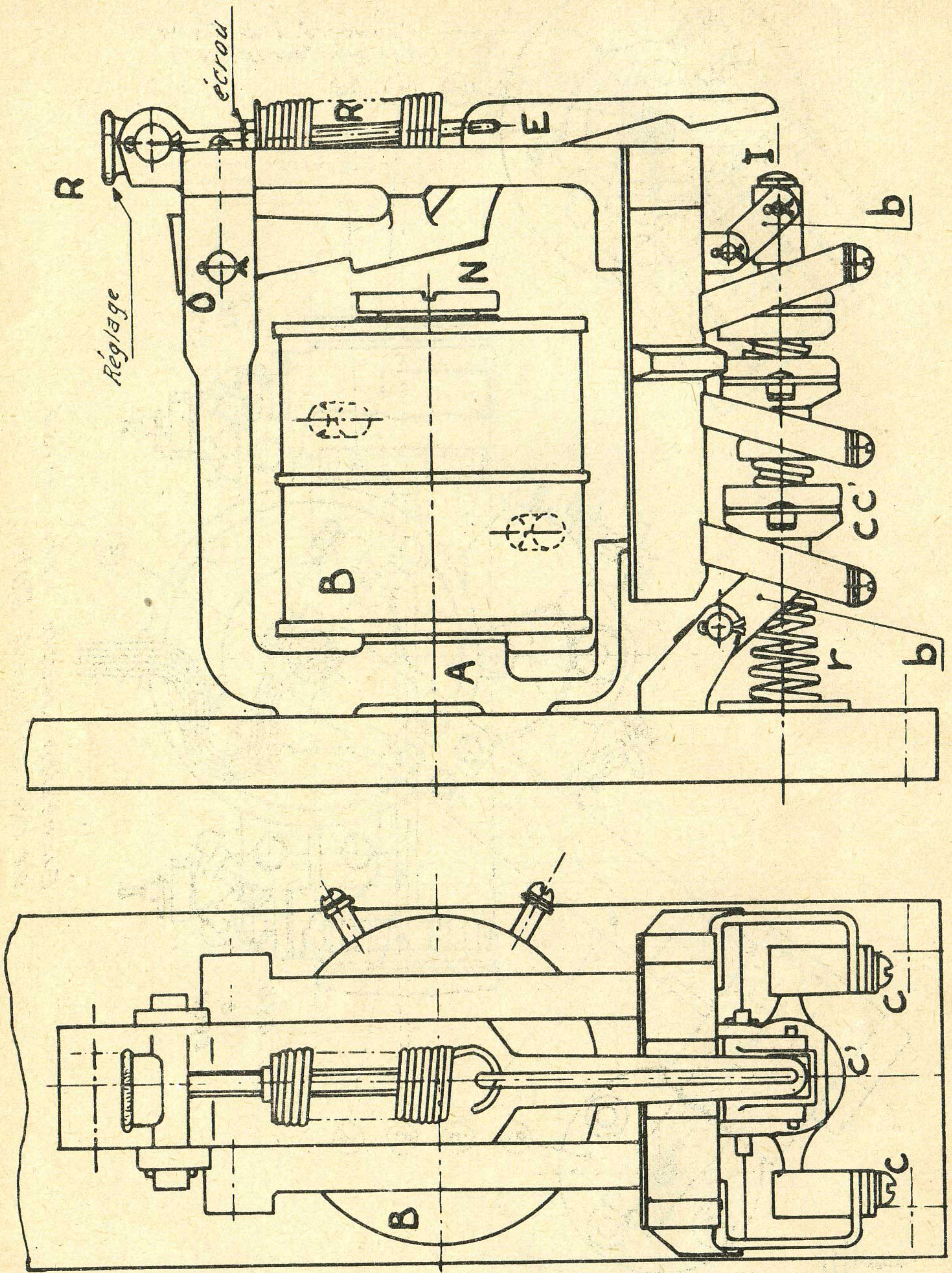


Fig. 46.

Equipem. suiv. fig 47a. ou 47b. ou 47c.

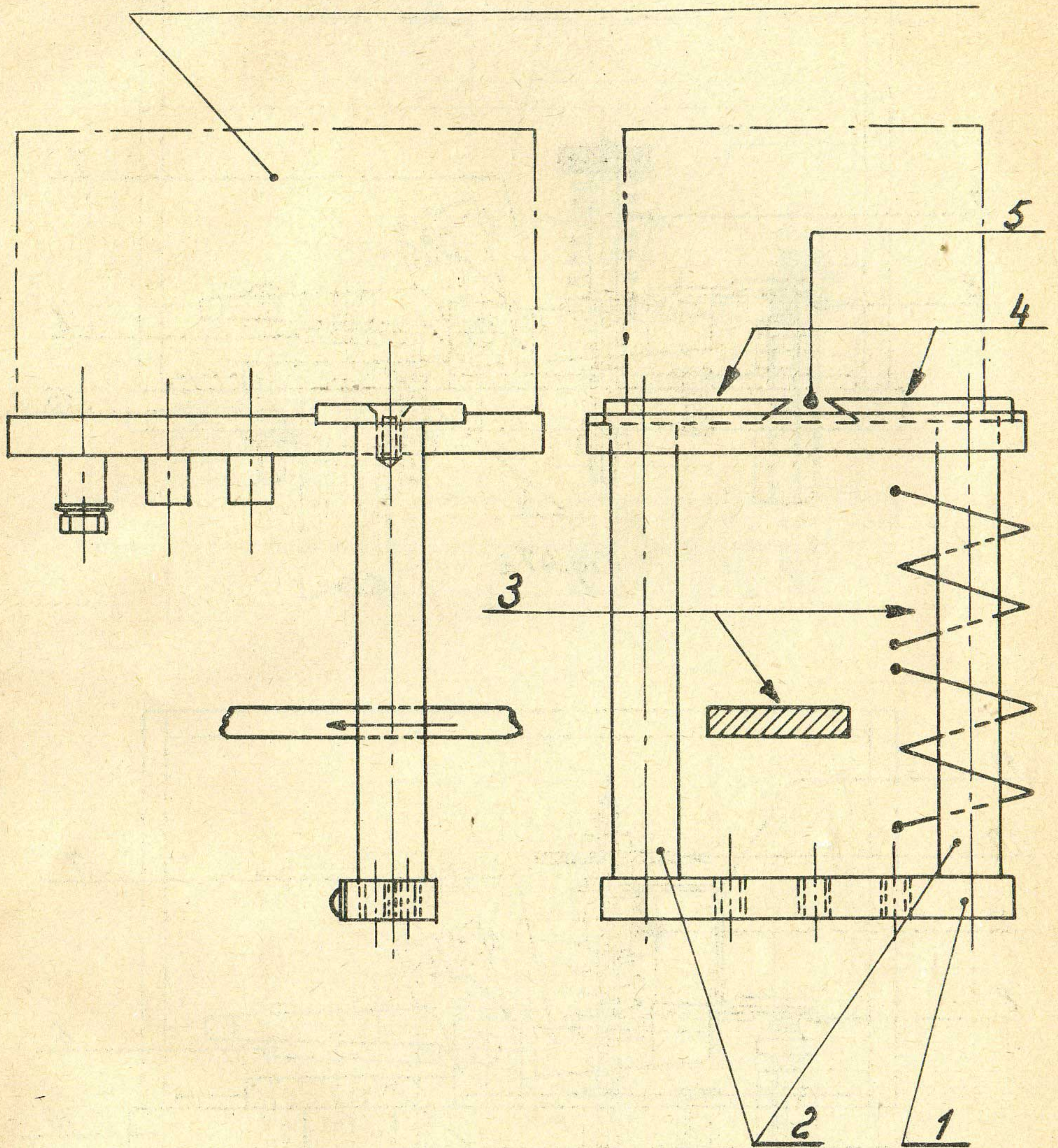
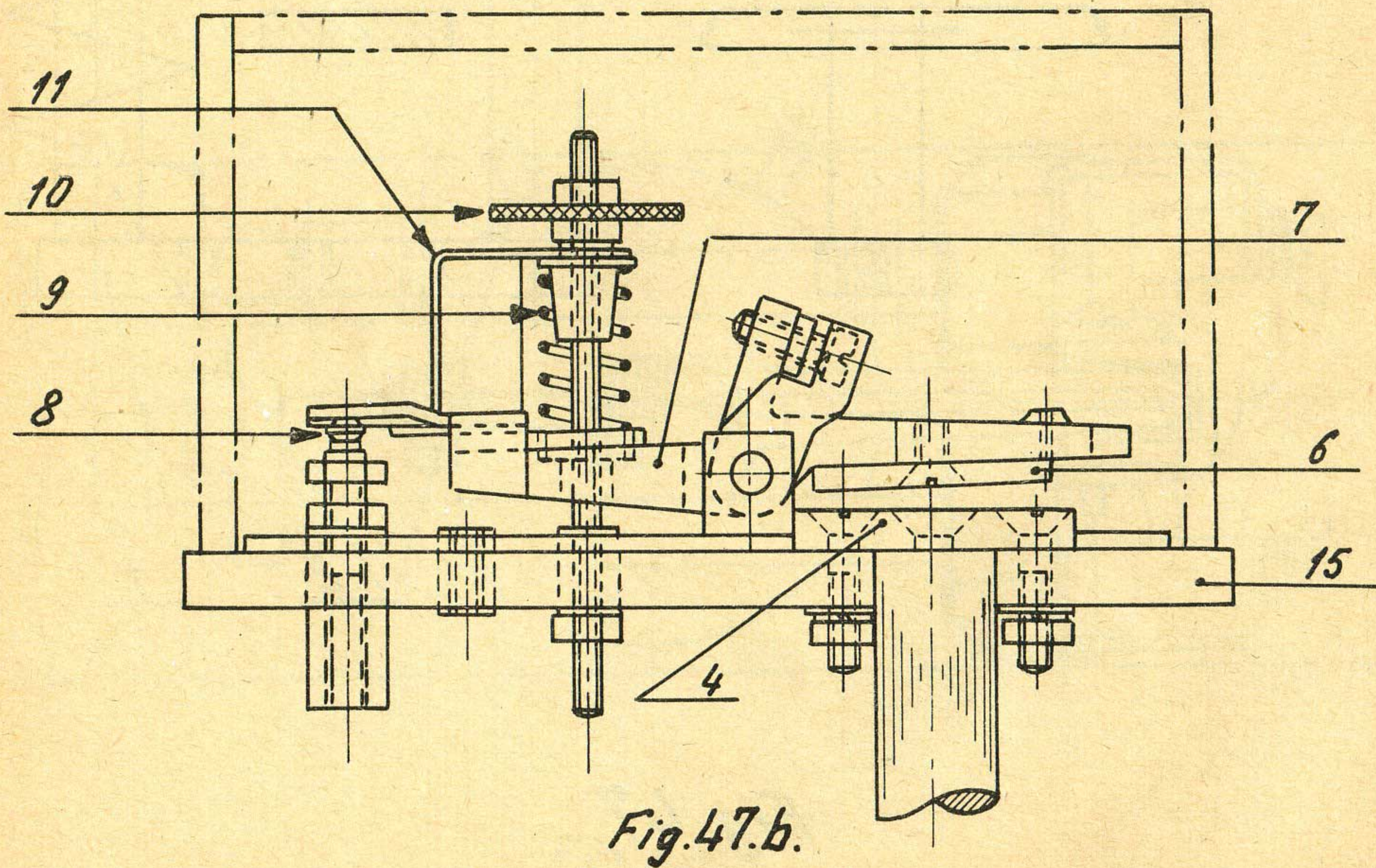
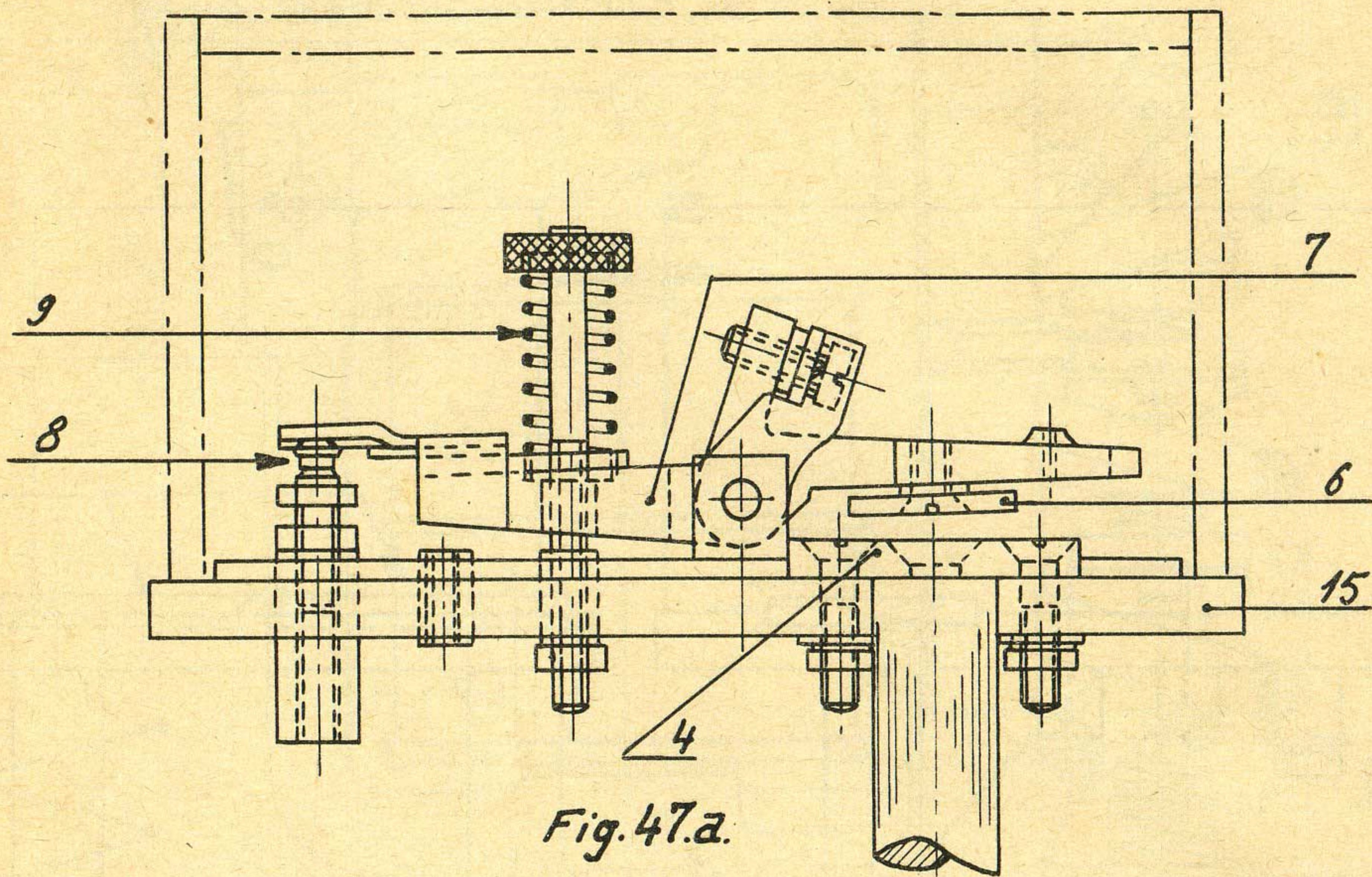


Fig. 47.



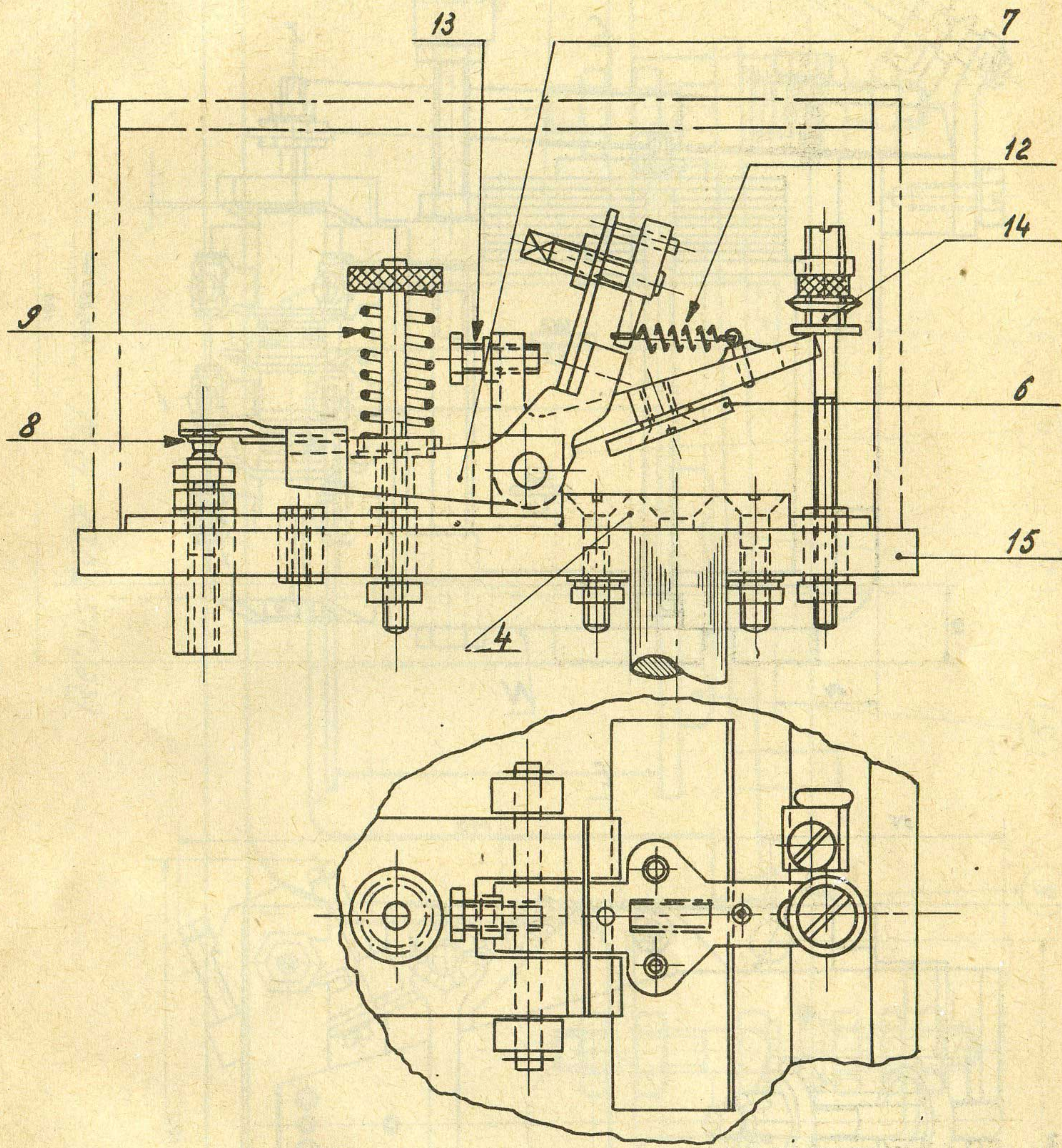


Fig. 47.C.

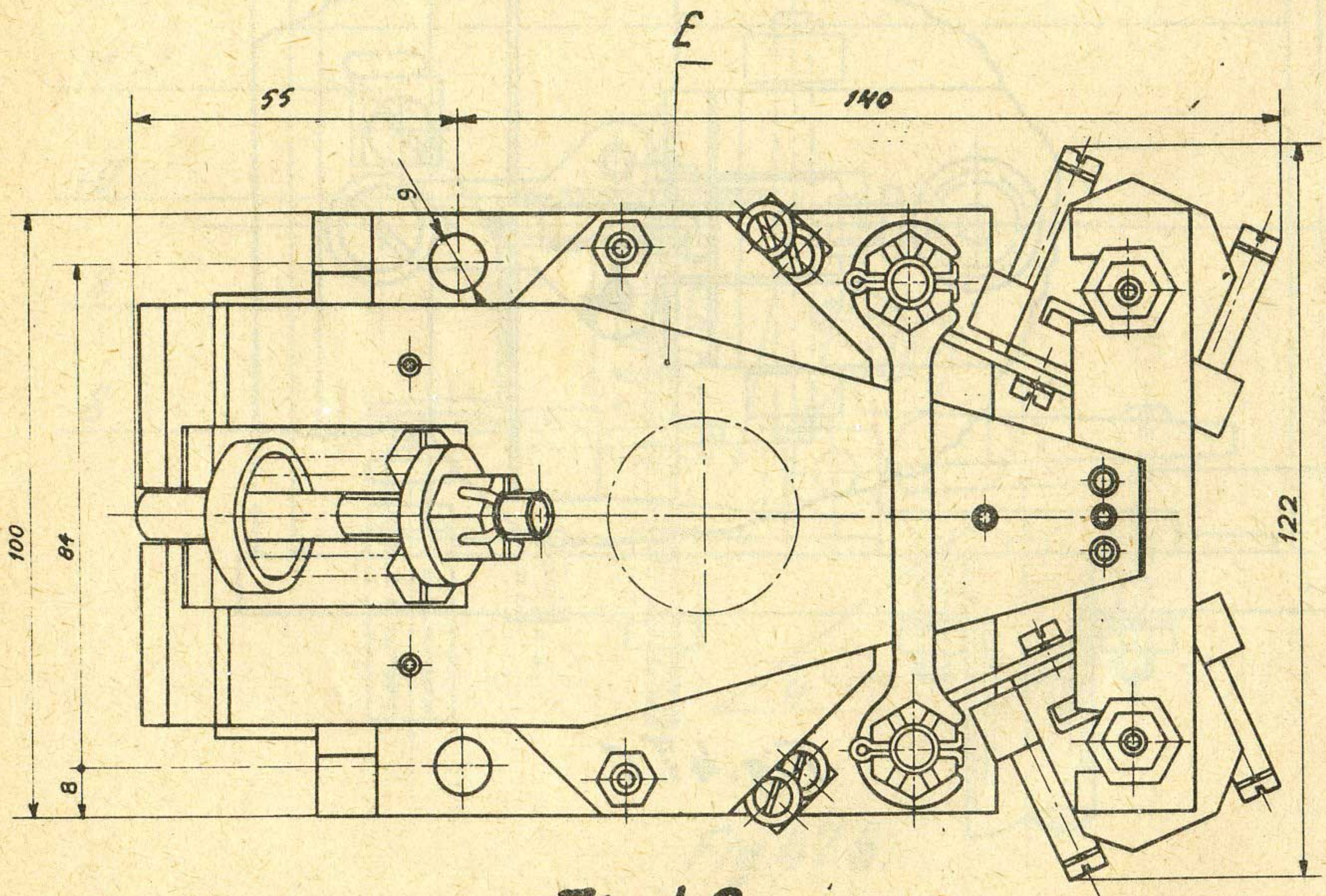
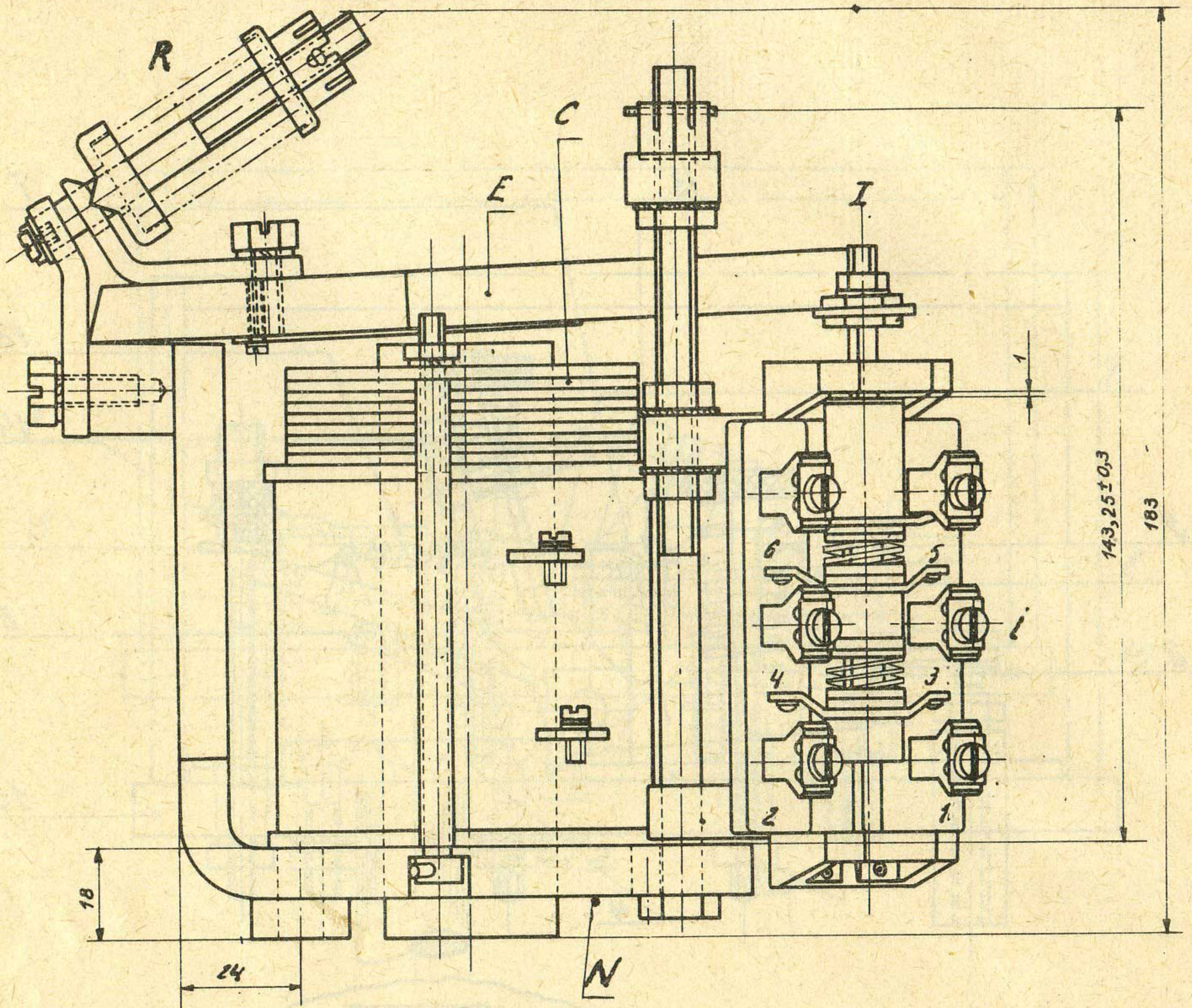


Fig. 48.

Relais type RW.

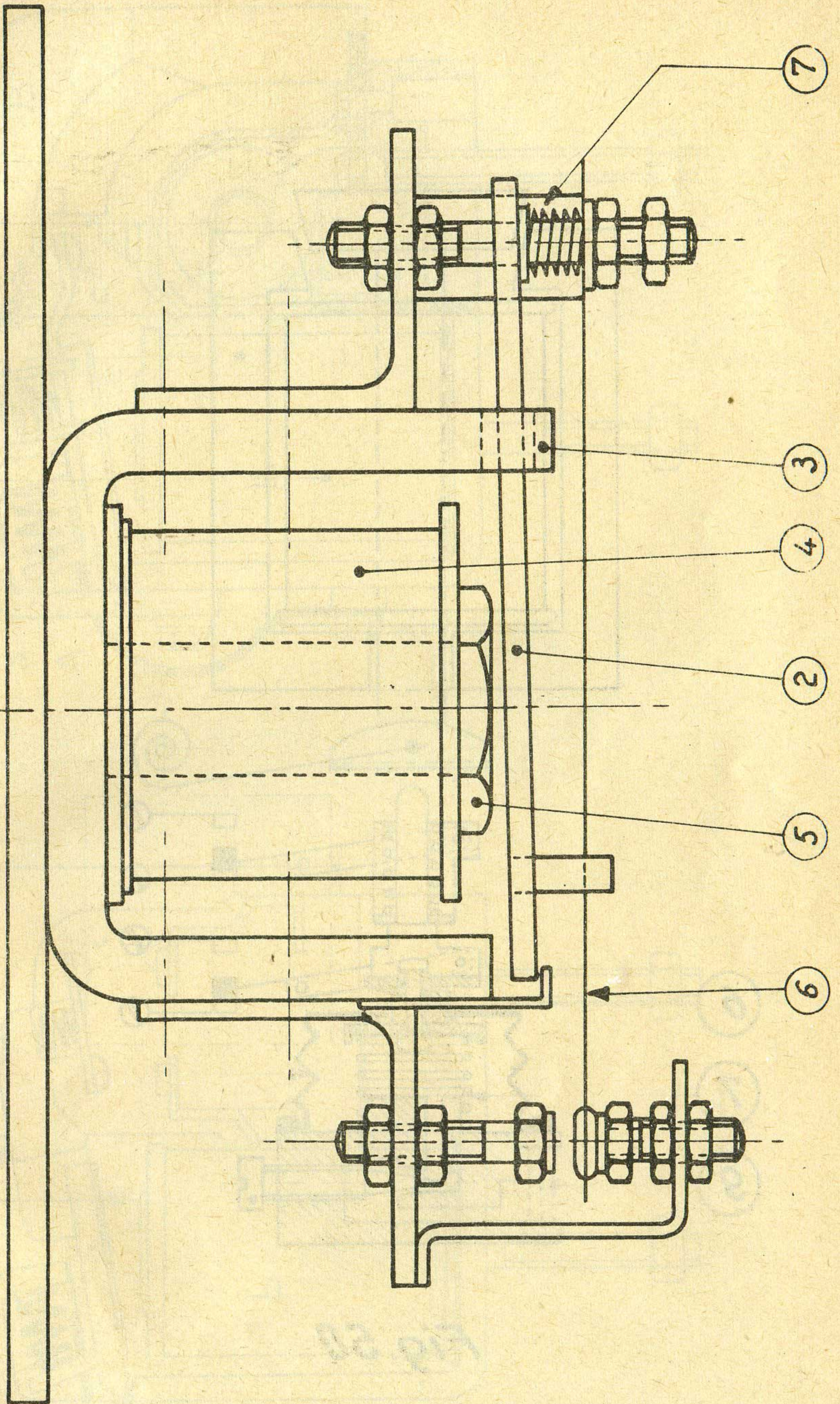


Fig. 49.

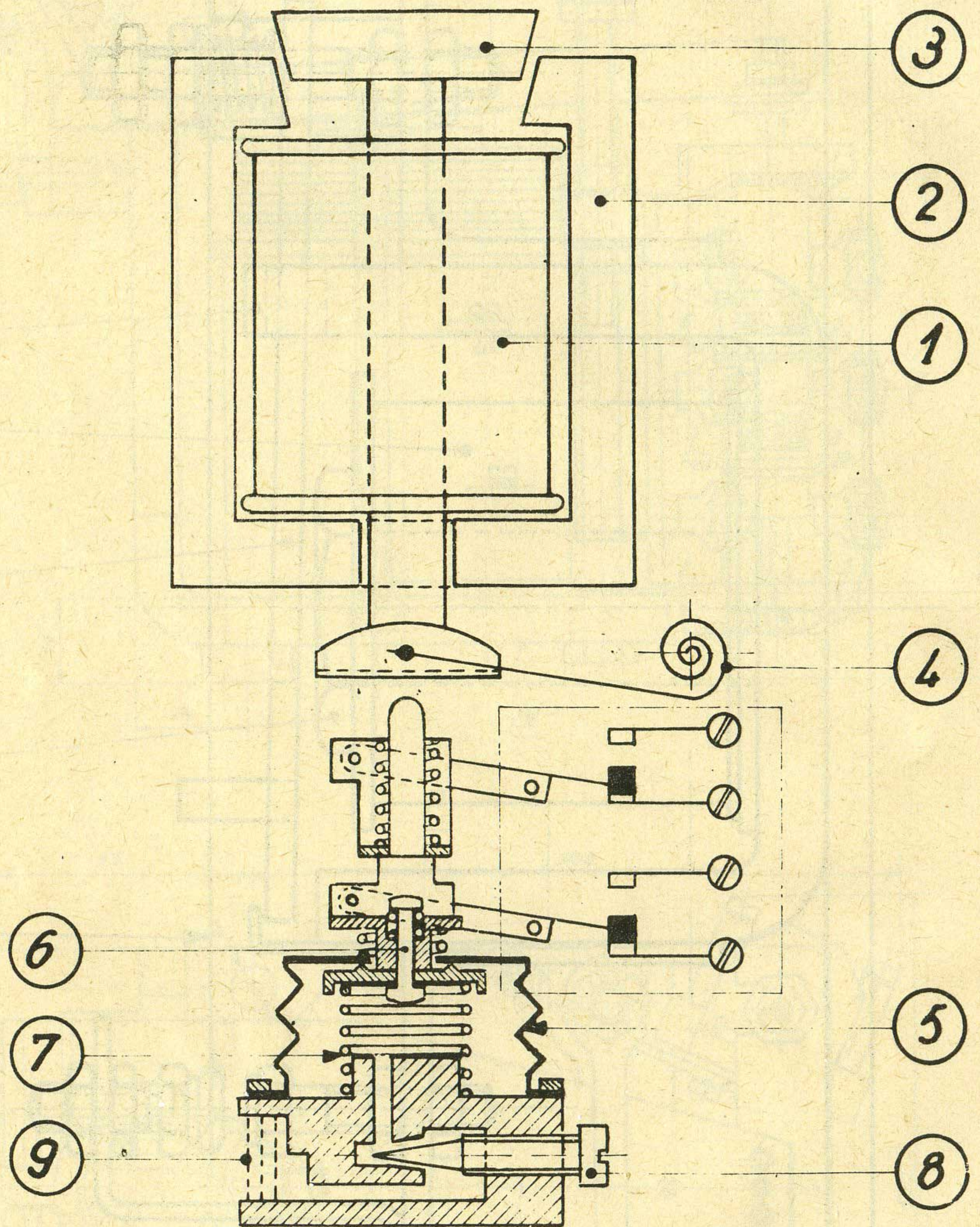


Fig. 50

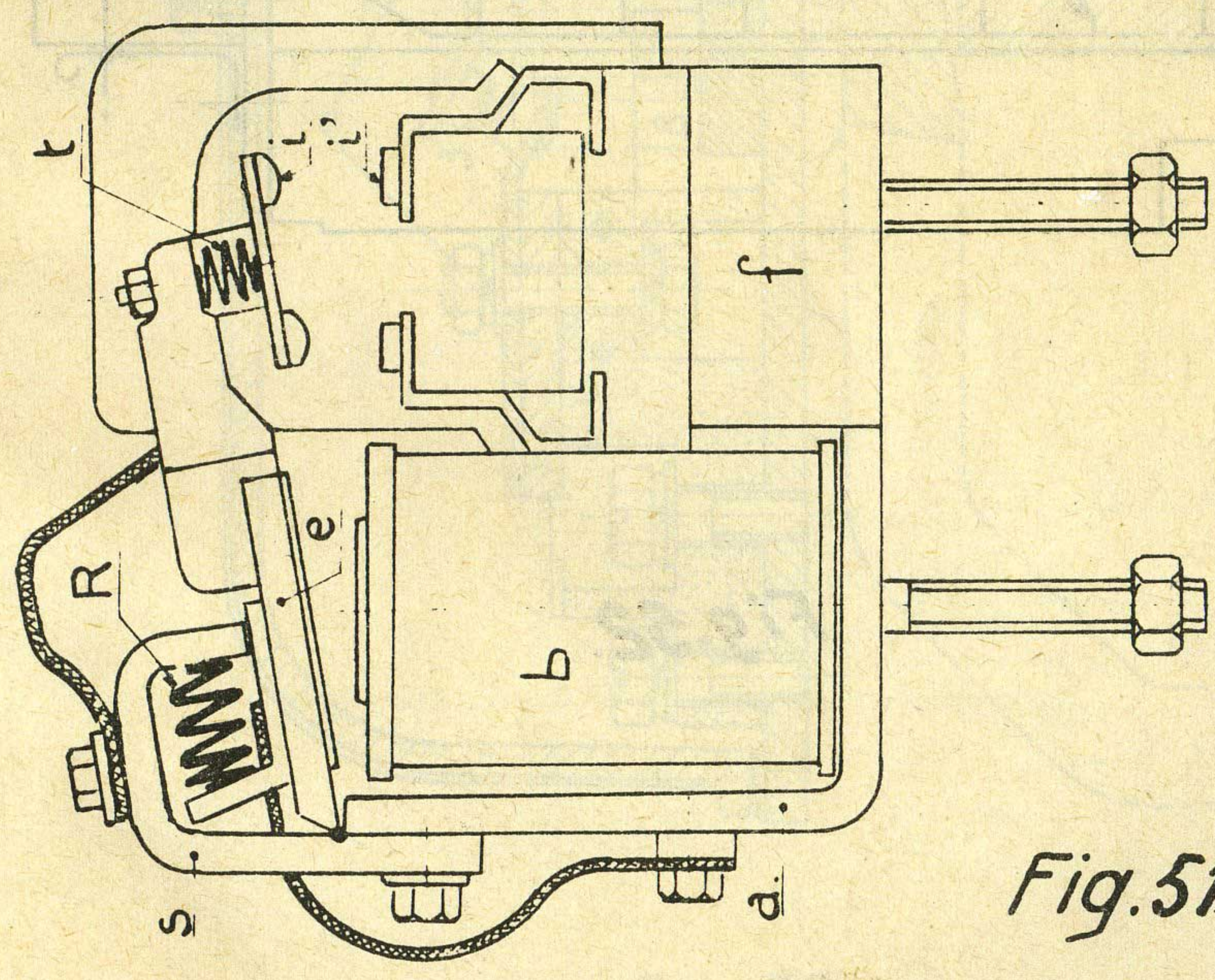
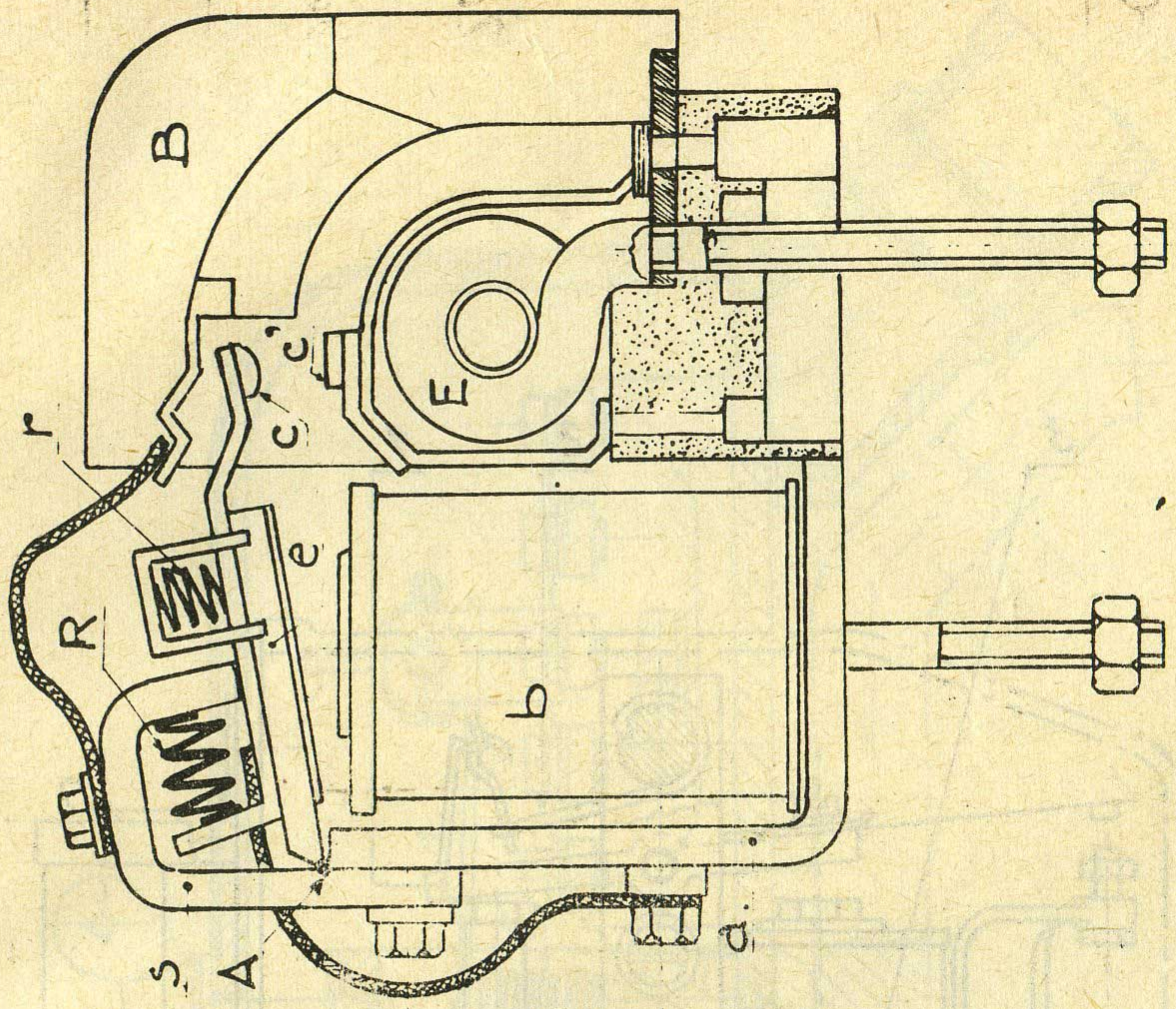


Fig. 51.

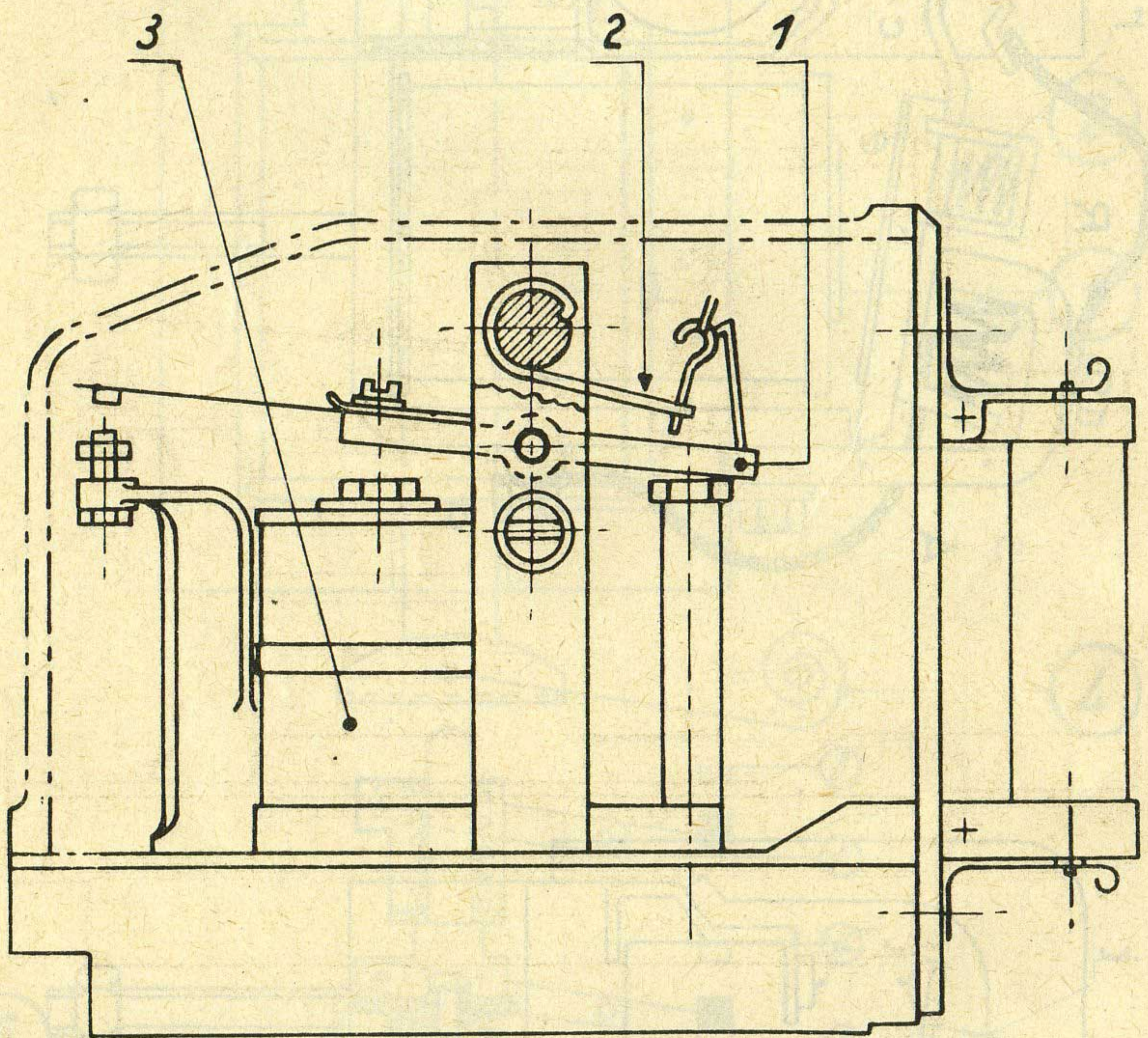
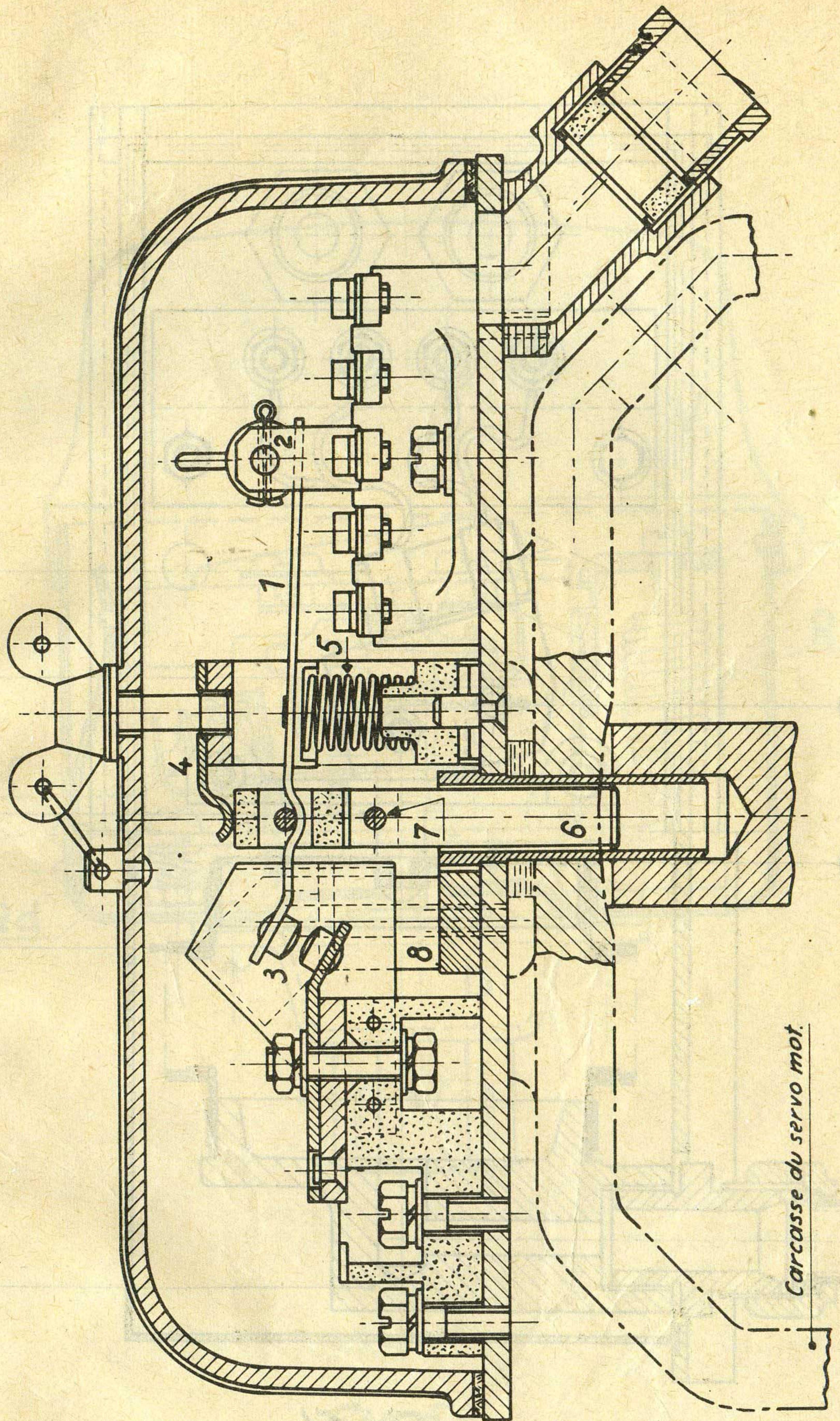


Fig. 52.



Carcasse du servo mot.

Fig. 53.

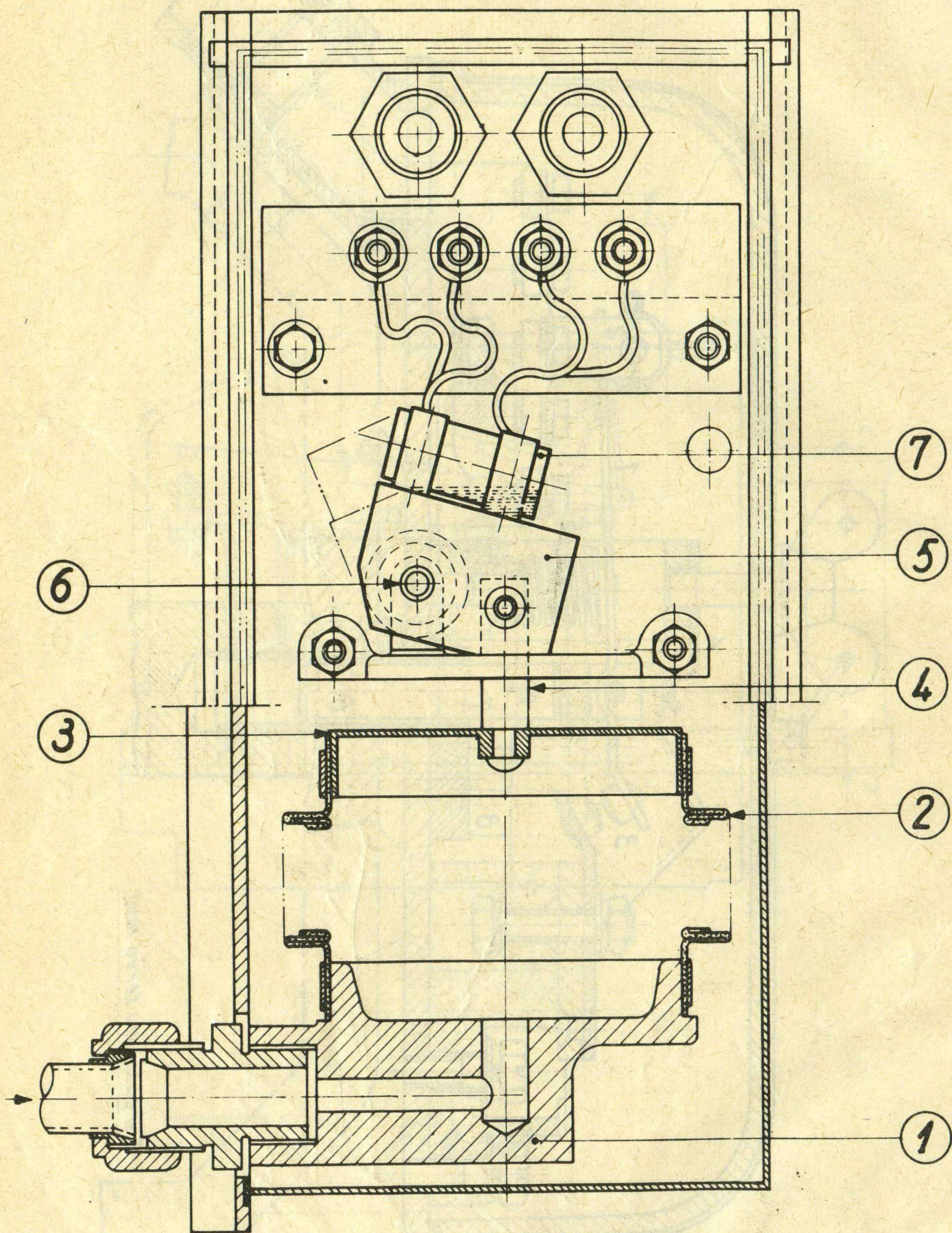


Fig. 54

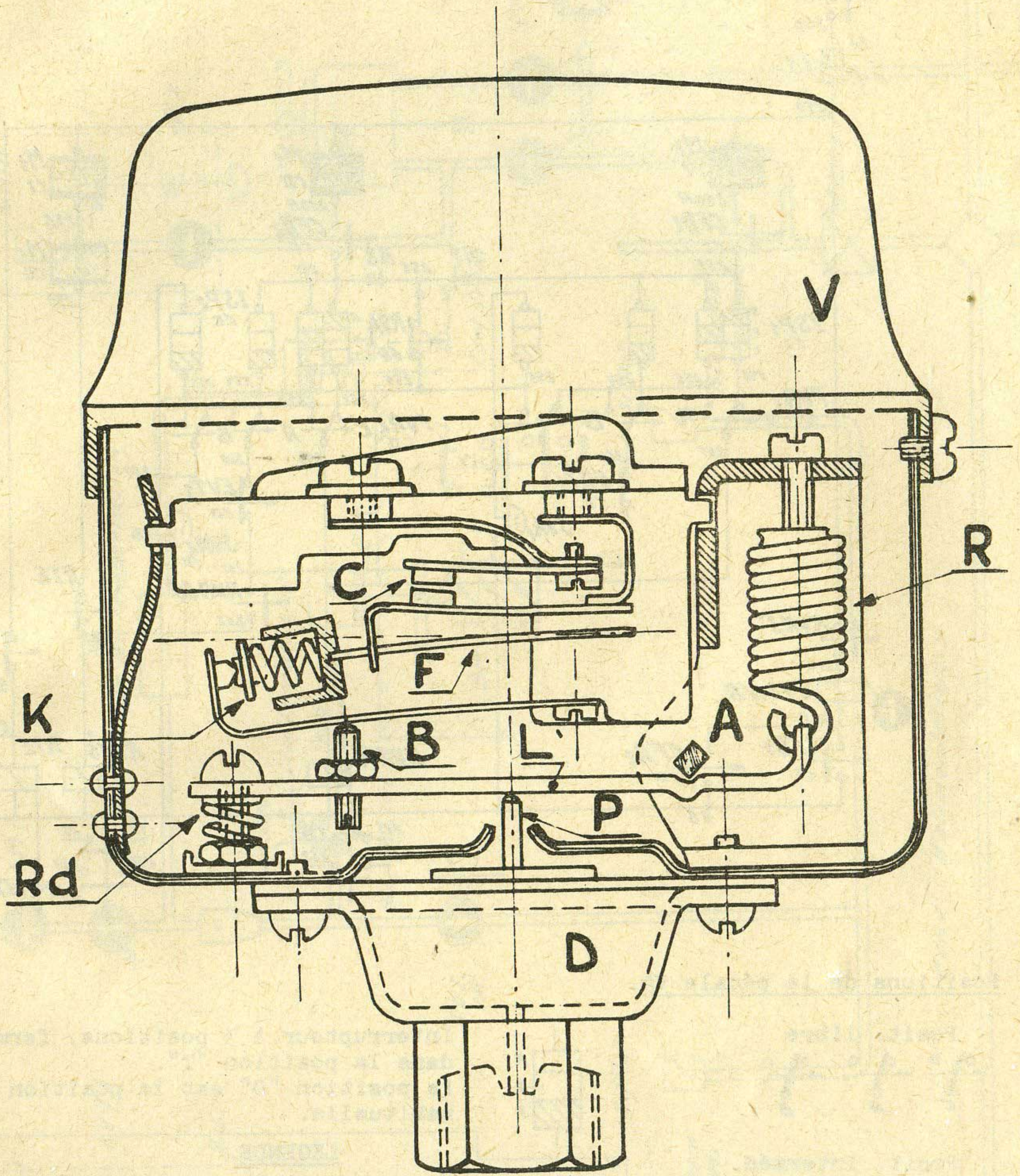
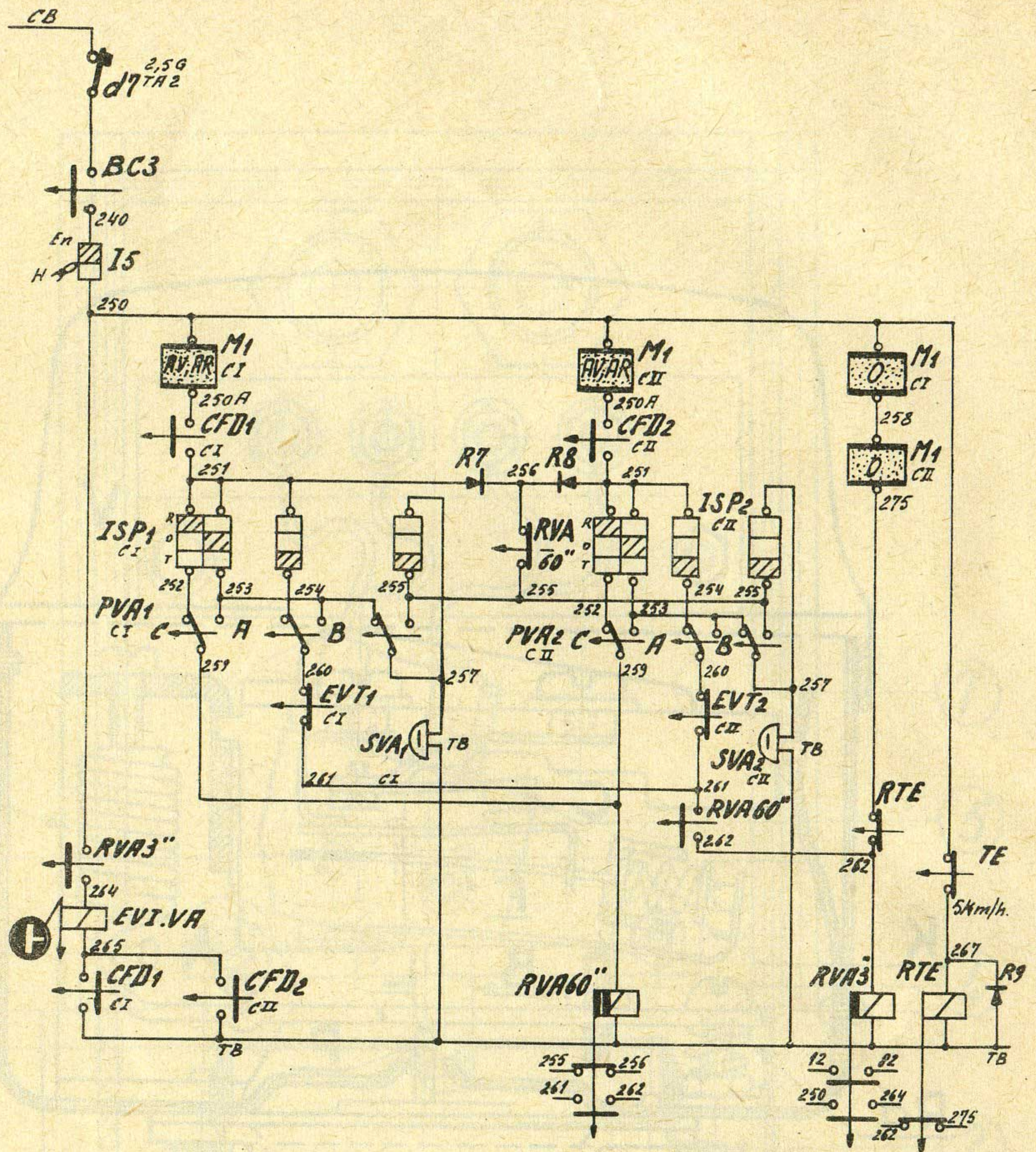
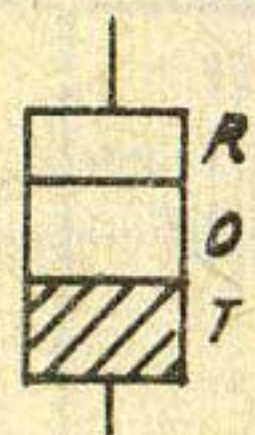
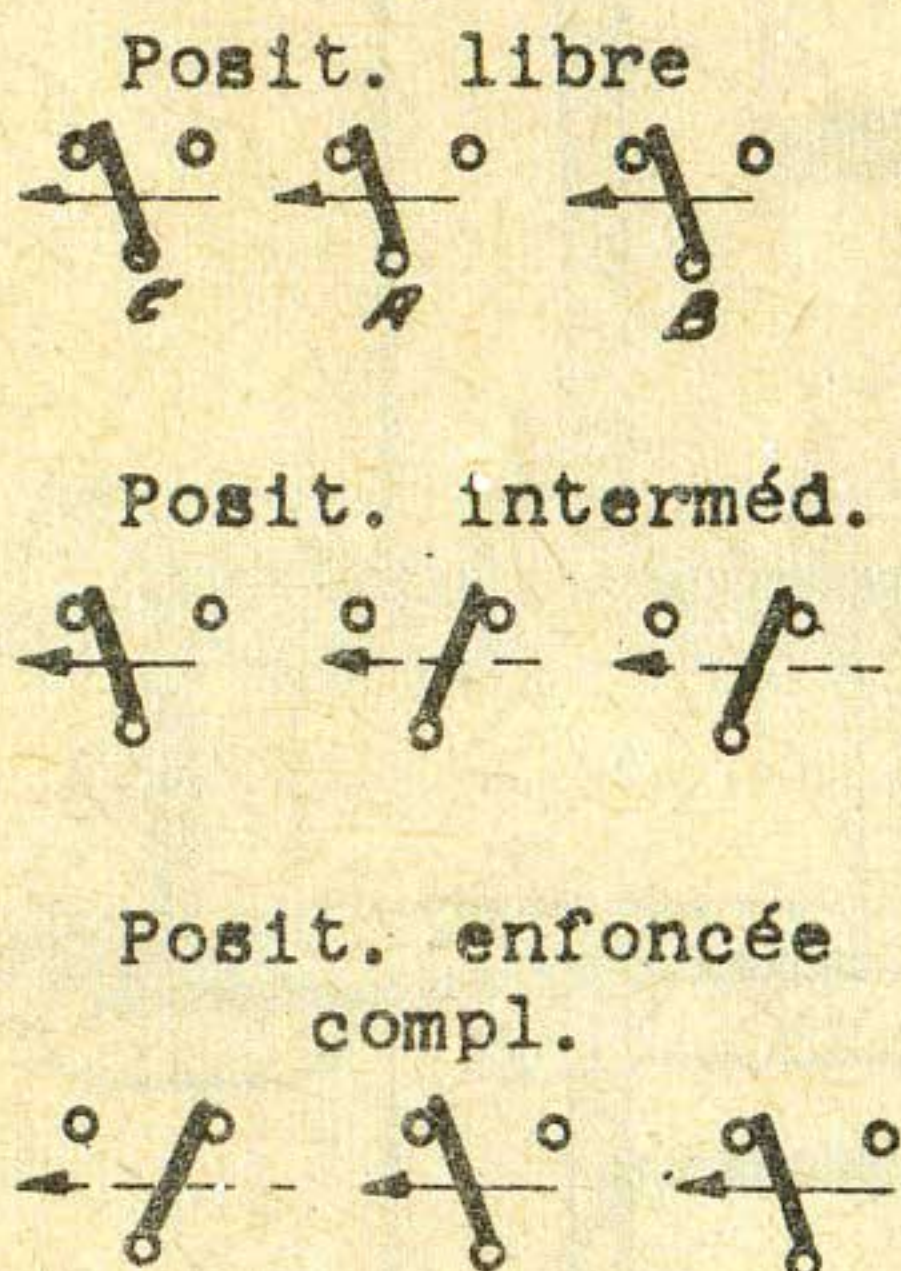


Fig. 55.



Positions de la pédale VA.

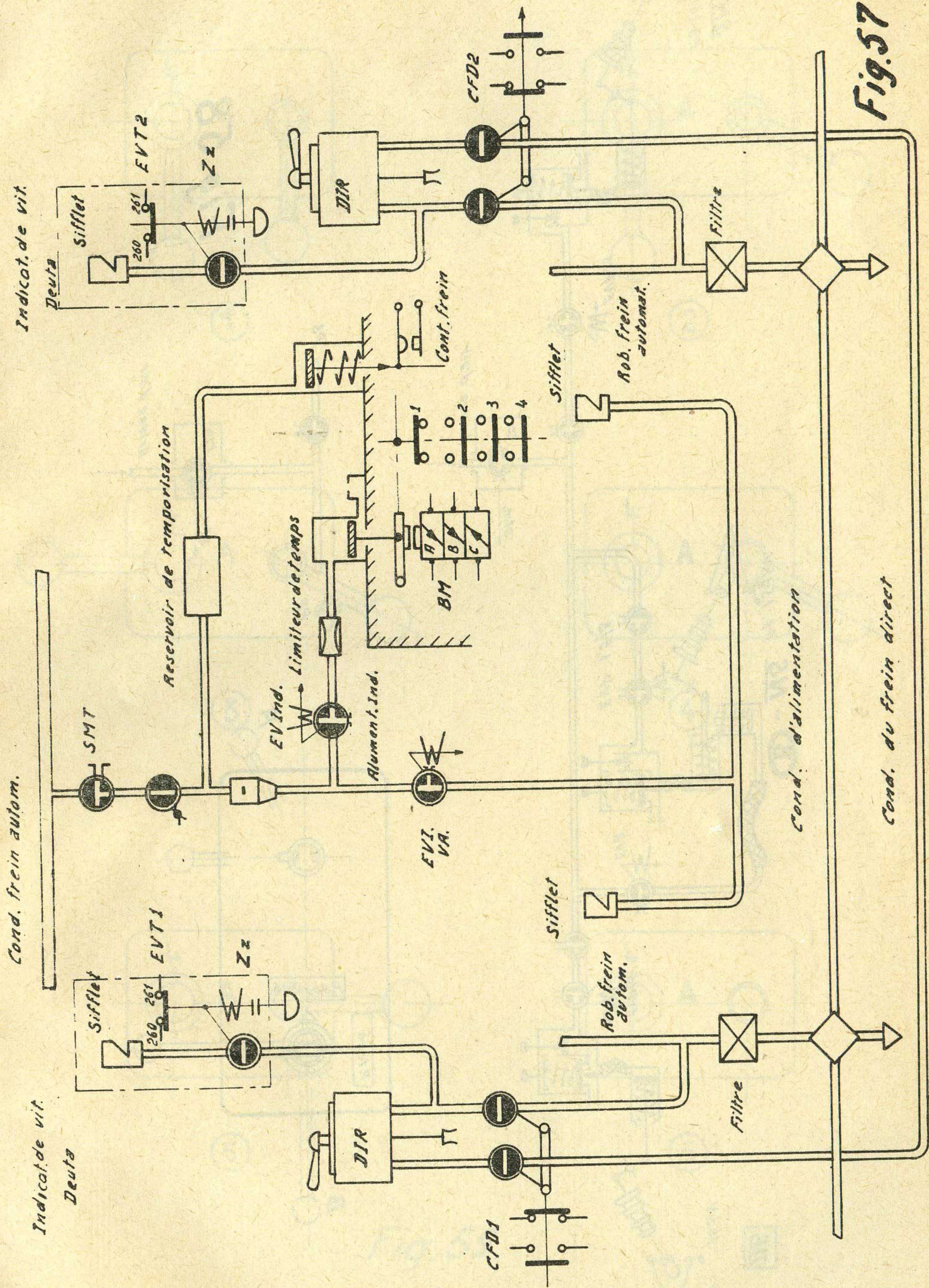


Interrupteur à 3 positions, fermé dans la position "T". La position "0" est la position habituelle.

LEGENDE.

| | |
|----------|---|
| CFD 1/2 | Contact sur robinet d'isolement frein direct. |
| EVI VA | Electro-valve inverse du veille aut. |
| EVT 1/2 | Electro-valve du sifflet Deuta. |
| I 5 | Int. d'isolement VA. |
| ISP 1/2 | Int. de substitution de PVA 1/2. |
| M 1 | Manette d'inversion. |
| PVA 1/2 | Pédale veille aut. |
| RVA 3'' | Relais temporisé au déclench. de 3 sec. |
| RVA 60'' | Relais temporisé au déclench. de 60 sec. |
| RTE | Relais auxil. TE |
| SVA 1/2 | Sonnerie VA. |
| Te | Contrôle de vitesse (Téloc). |

Fig. 56



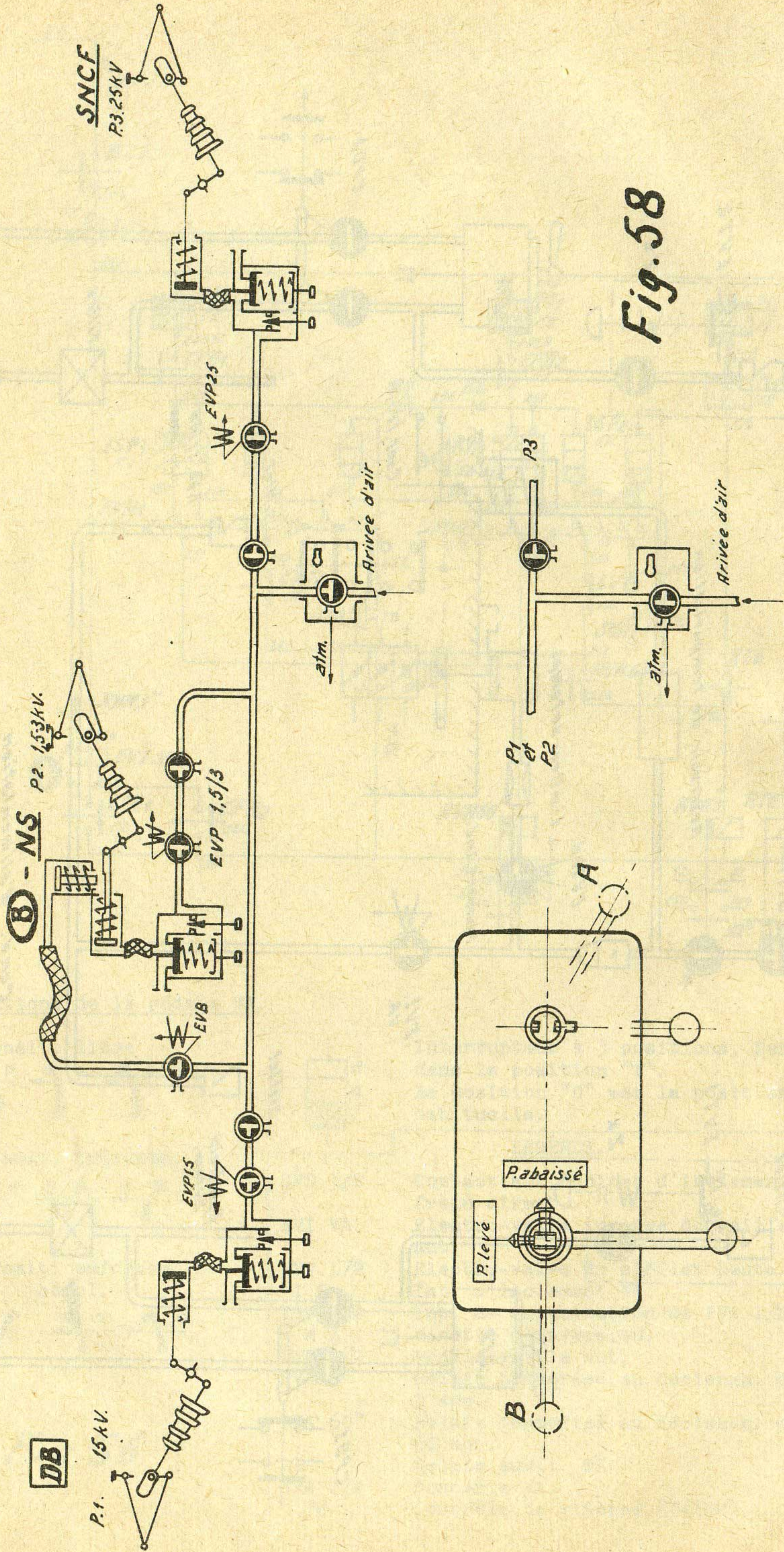
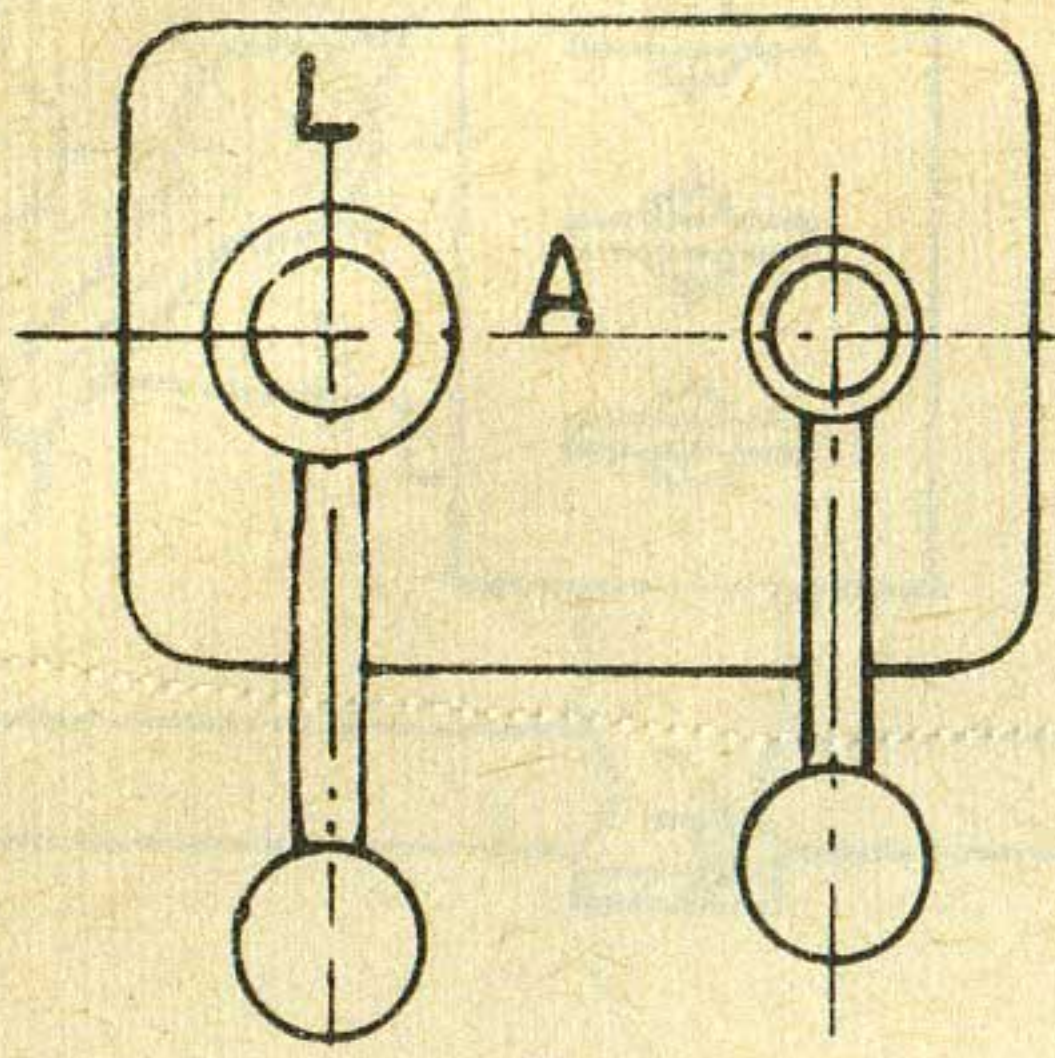
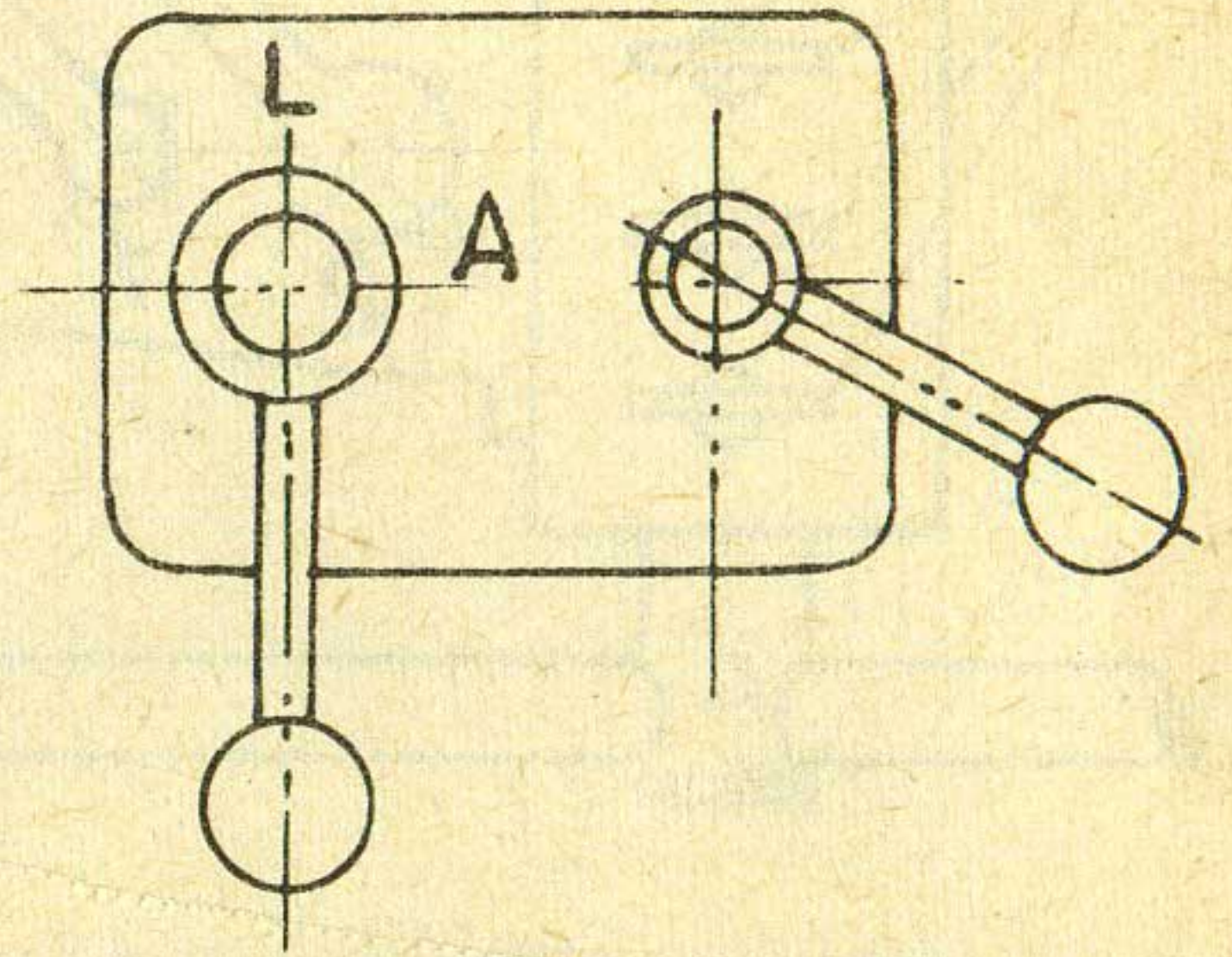


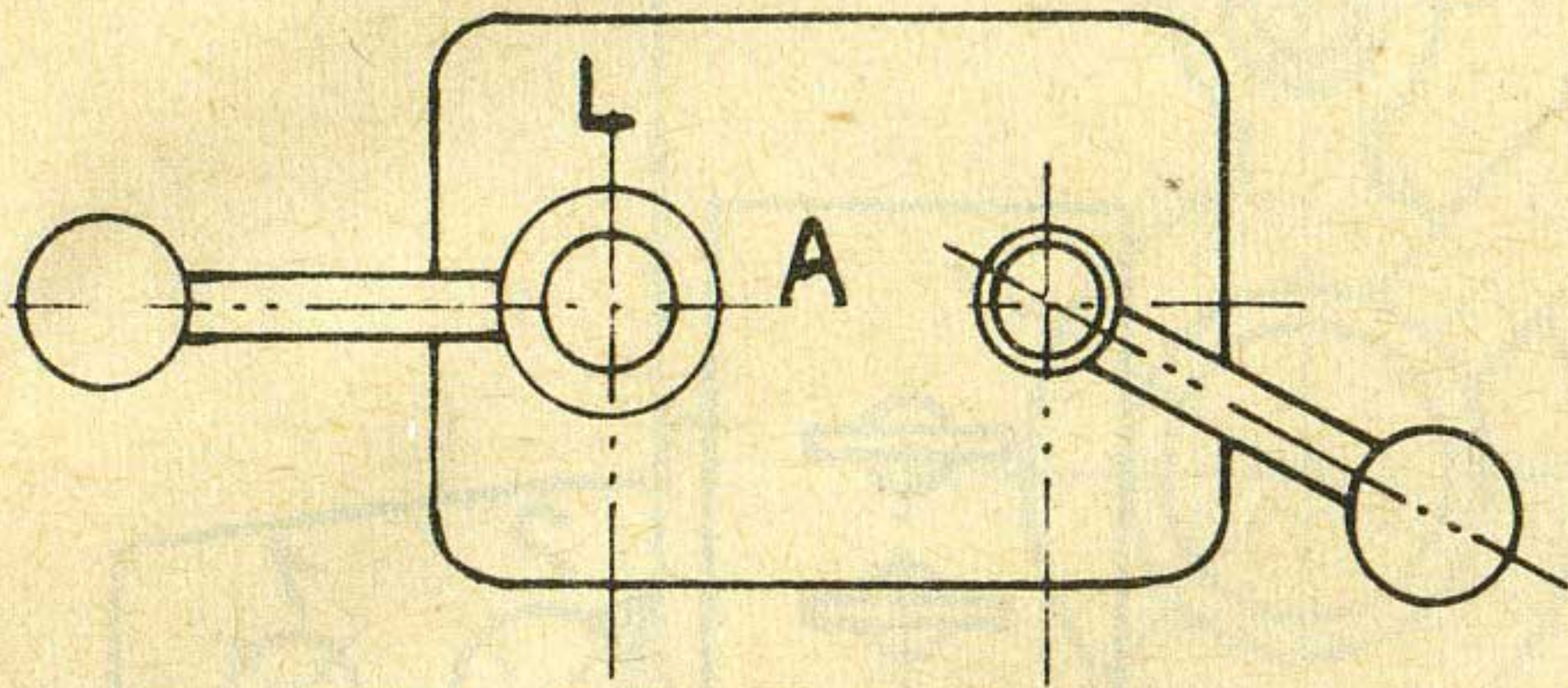
Fig. 58



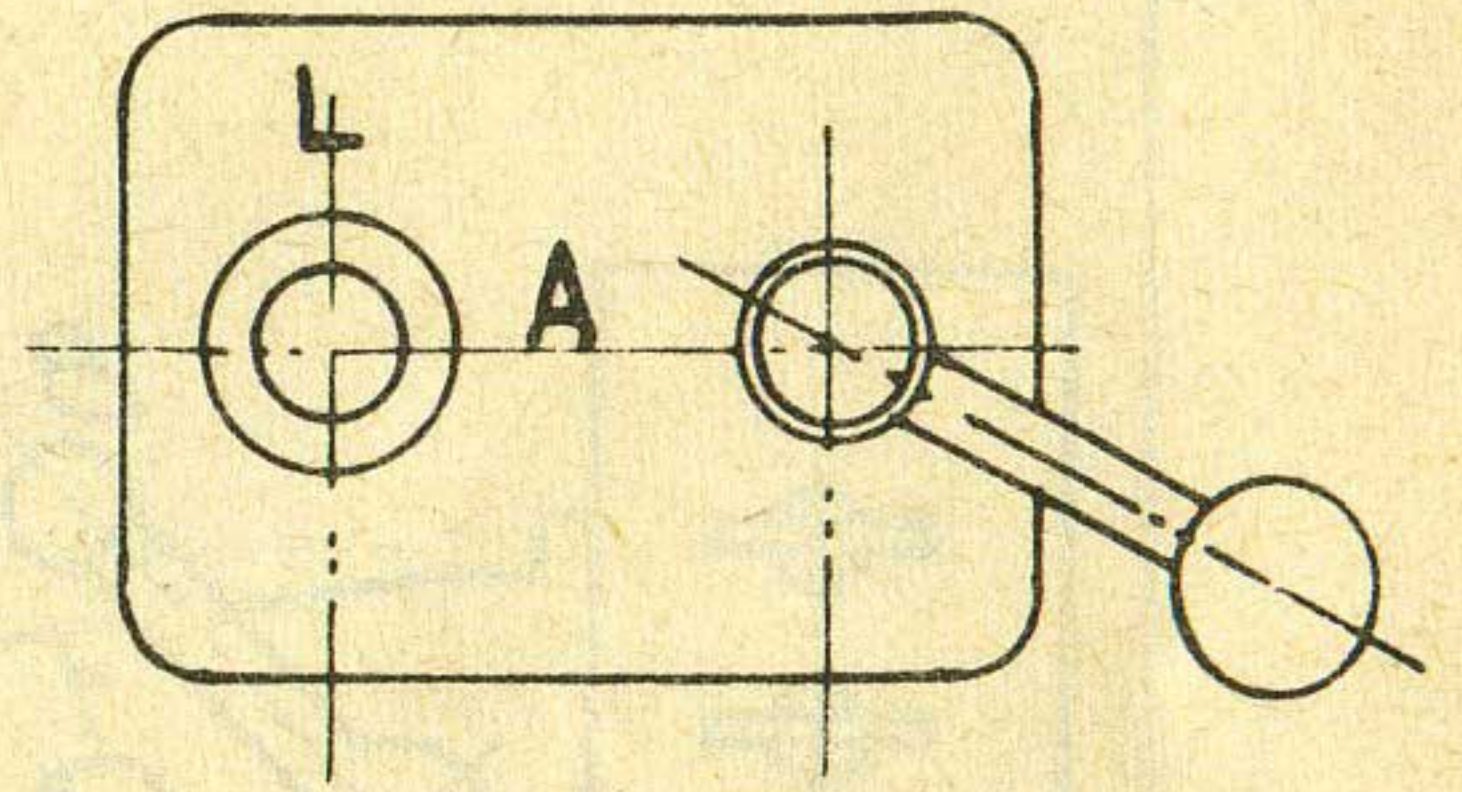
①



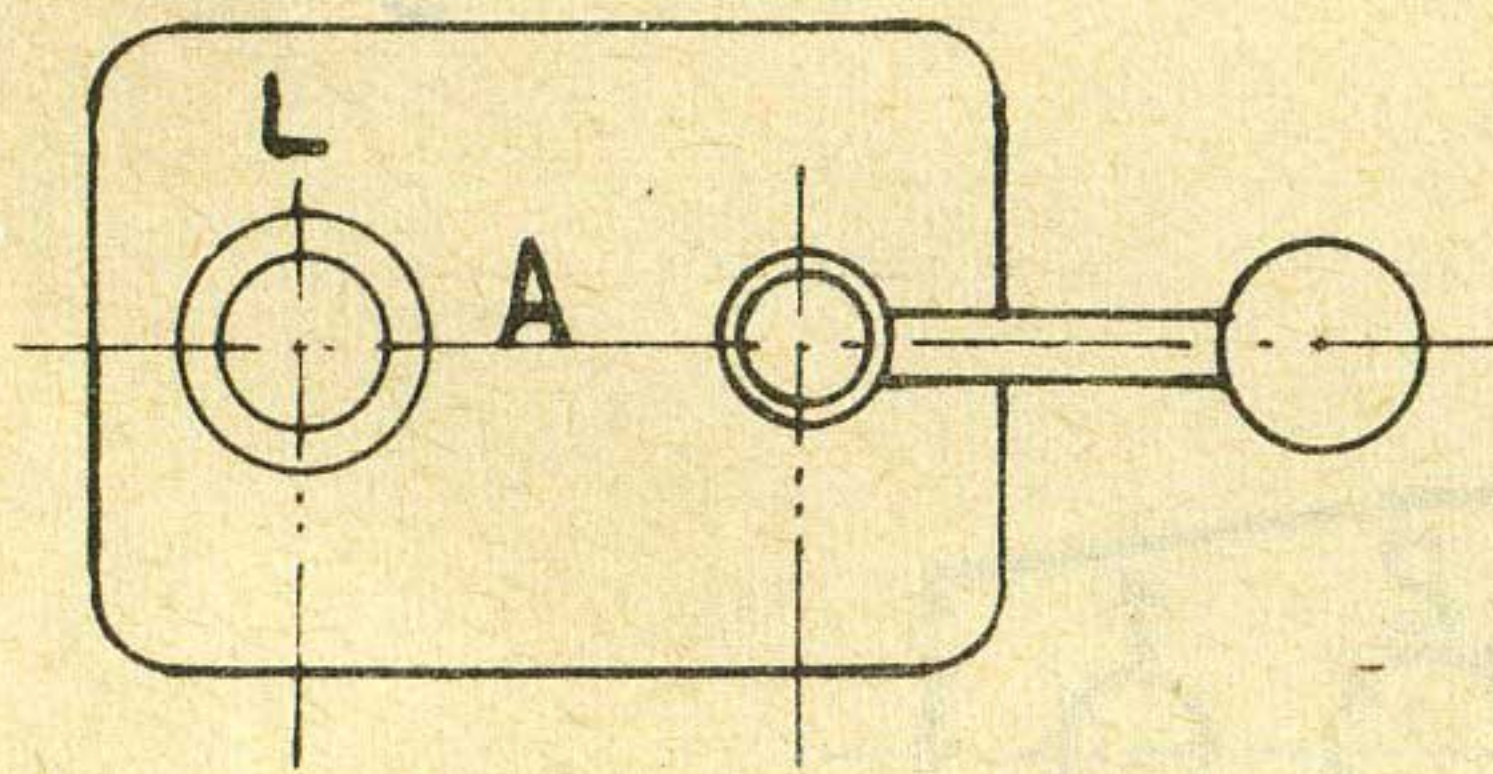
②



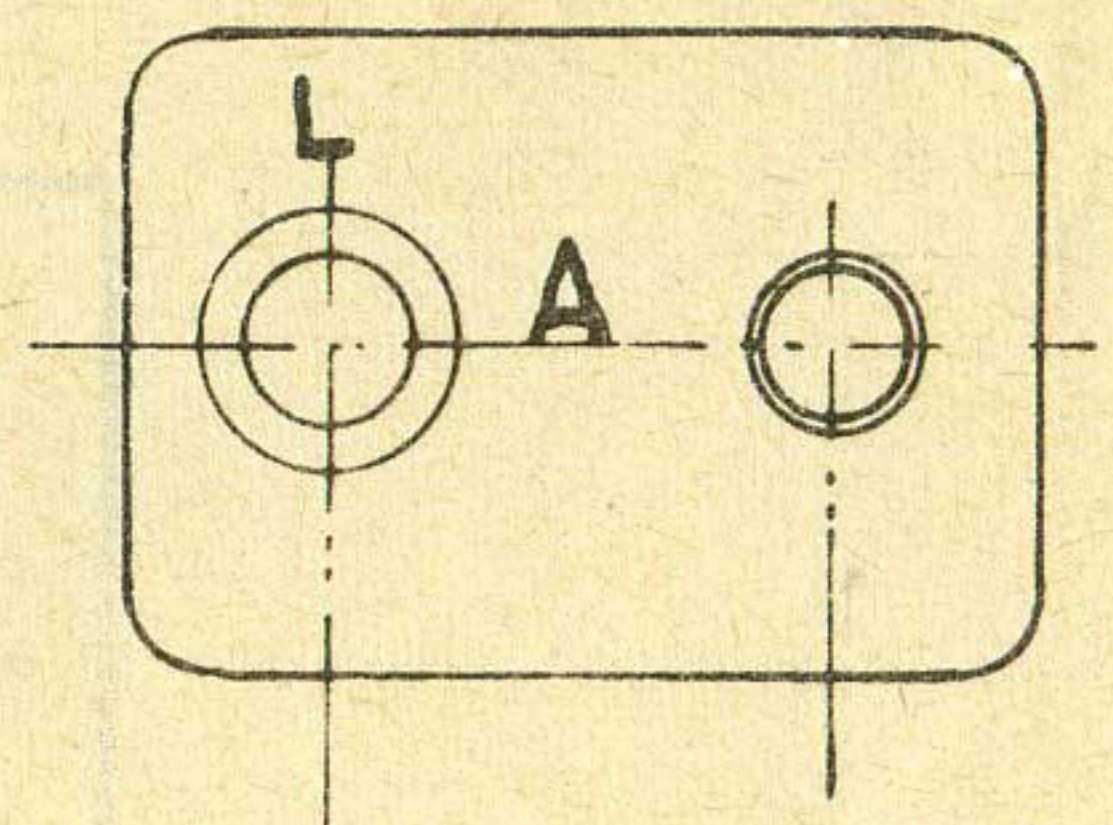
③



④



⑤



⑥

Fig. 59.

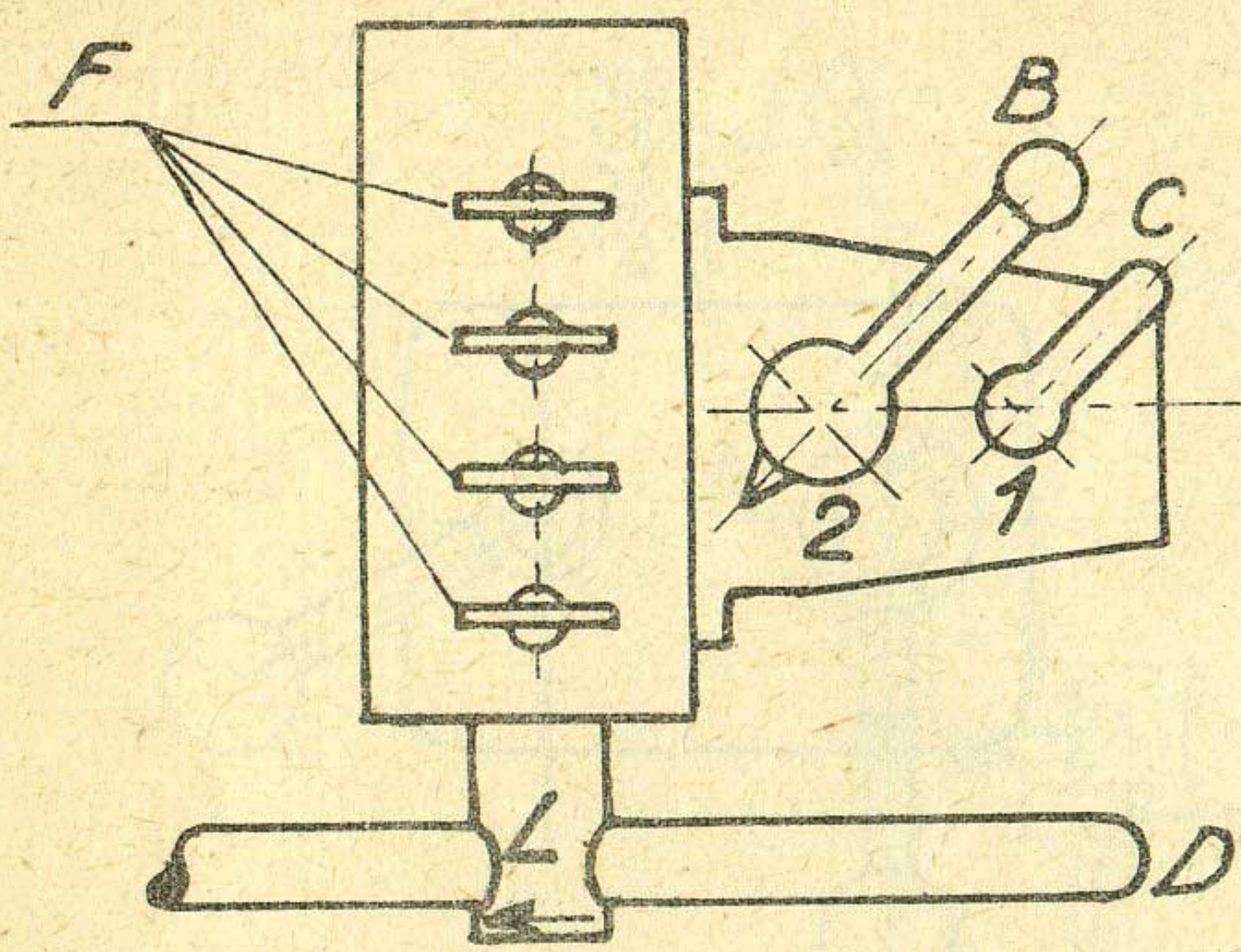


Fig. 60

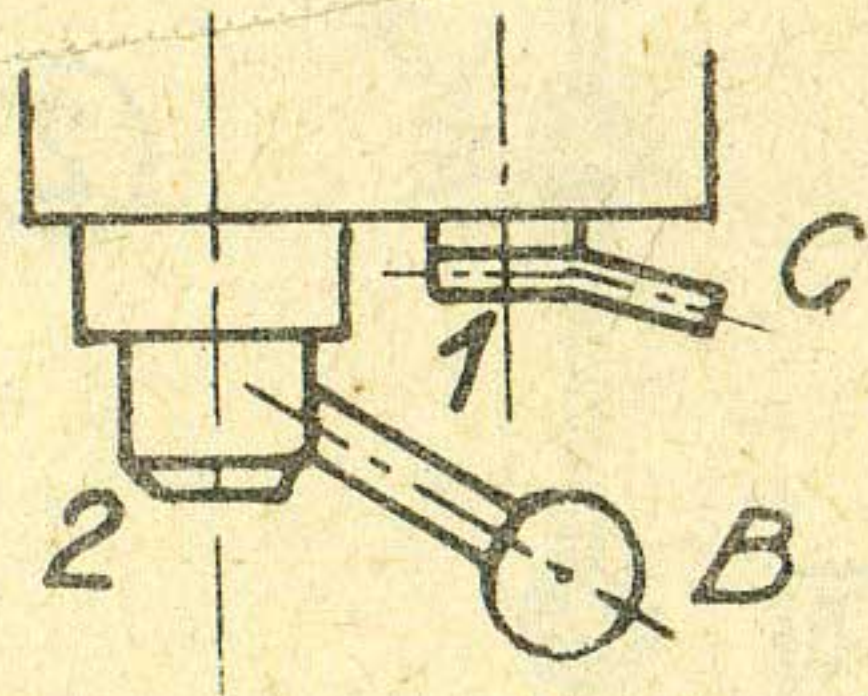


Fig. 62.

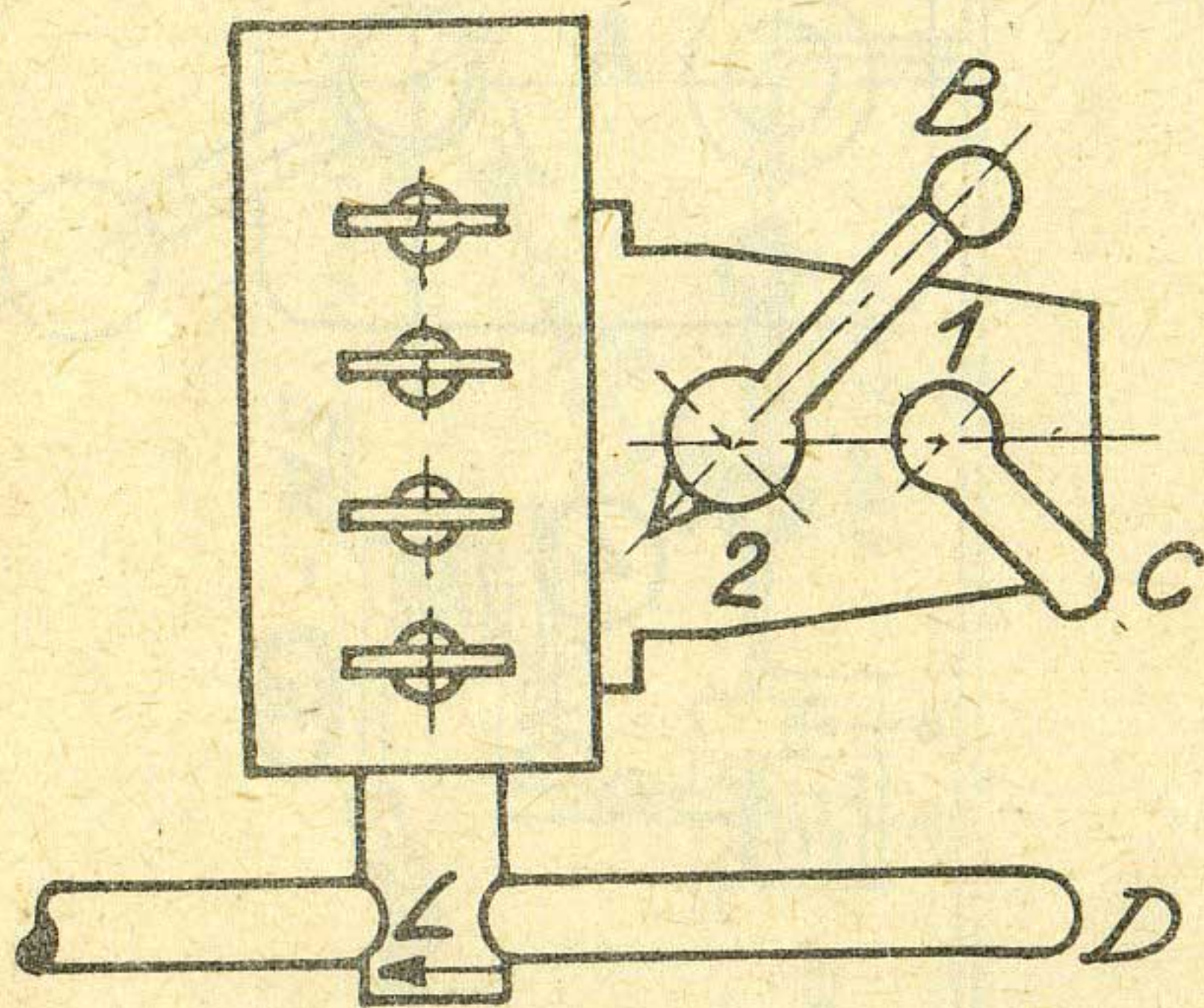


Fig. 61

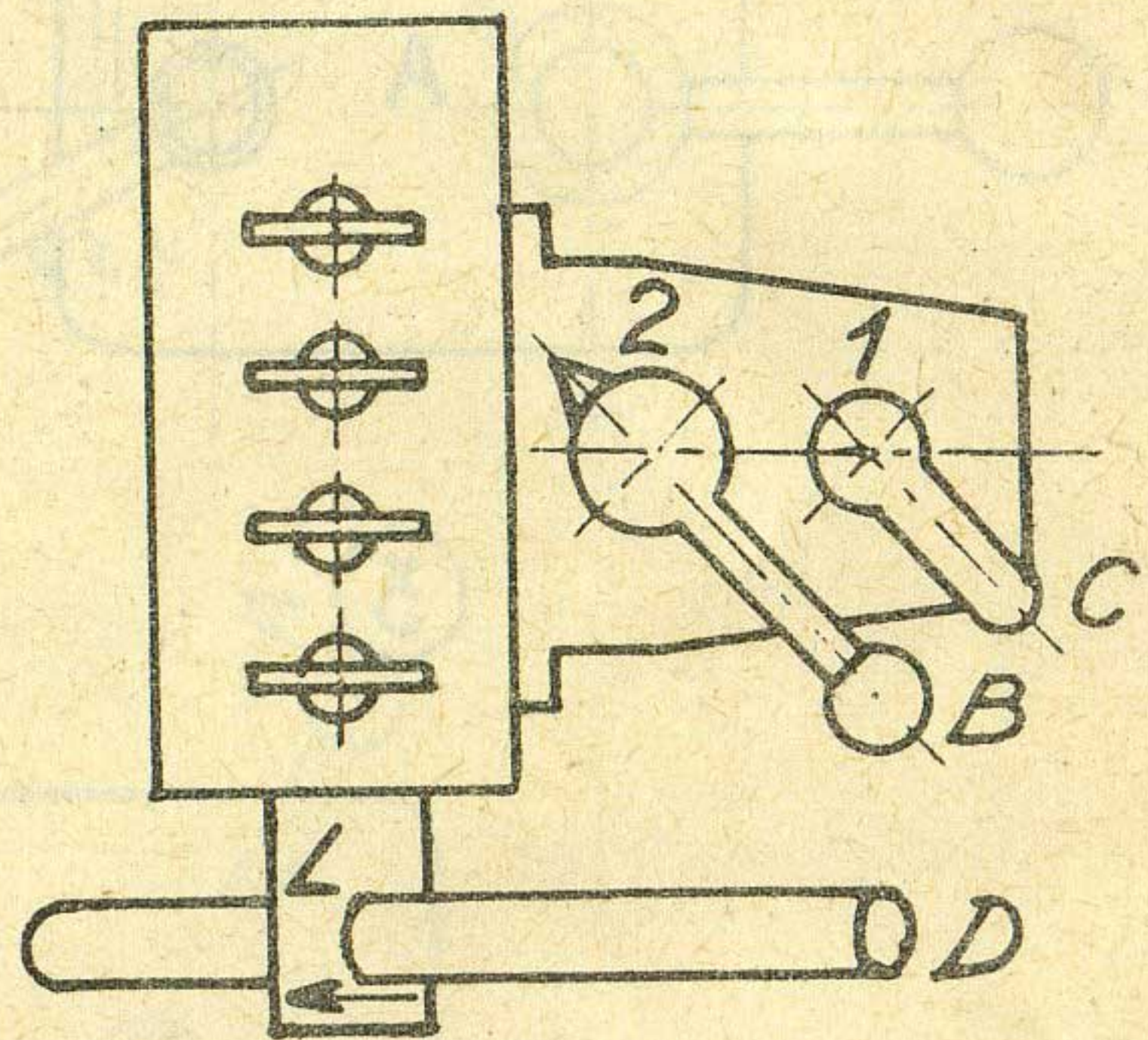


Fig. 63

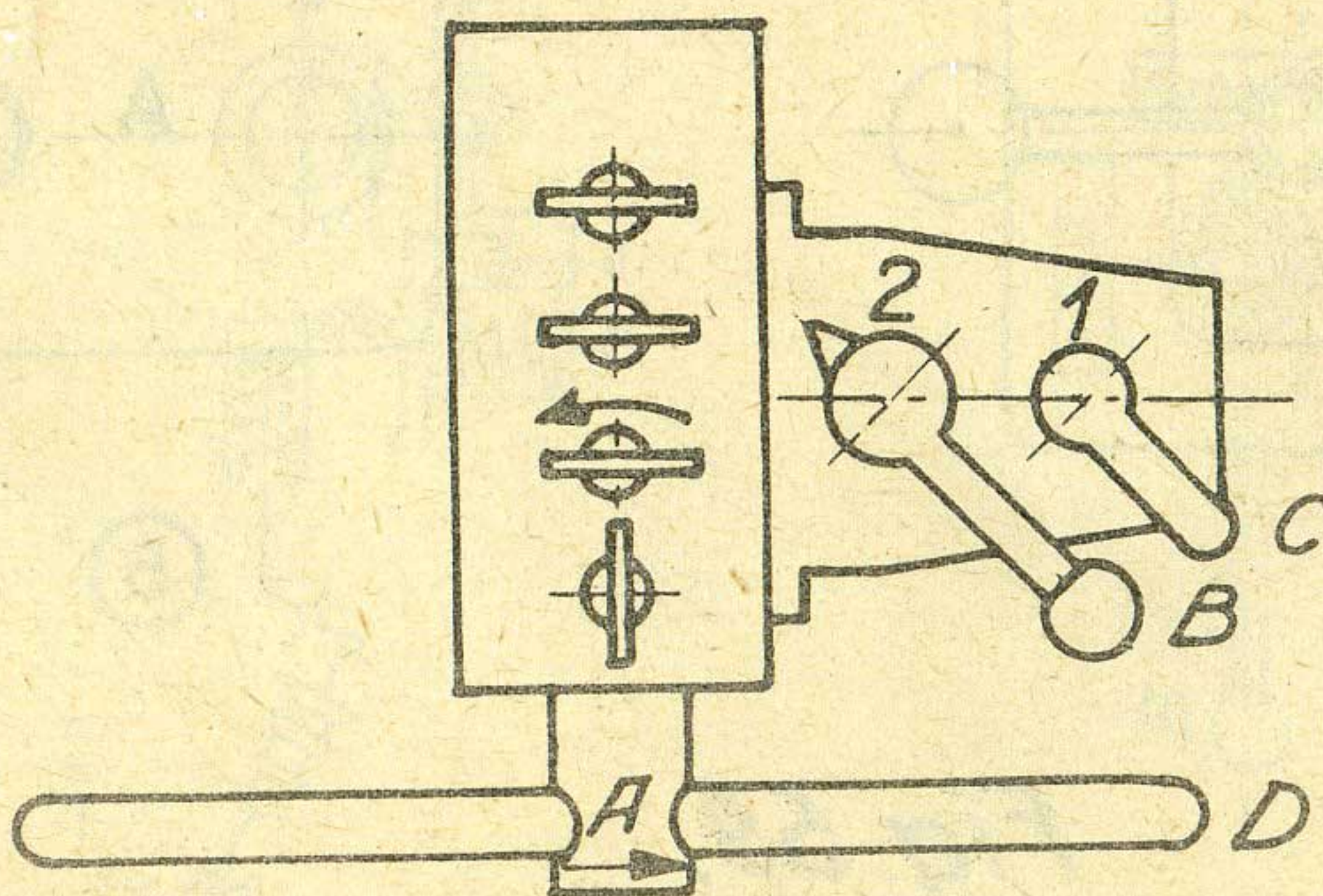


Fig. 64.

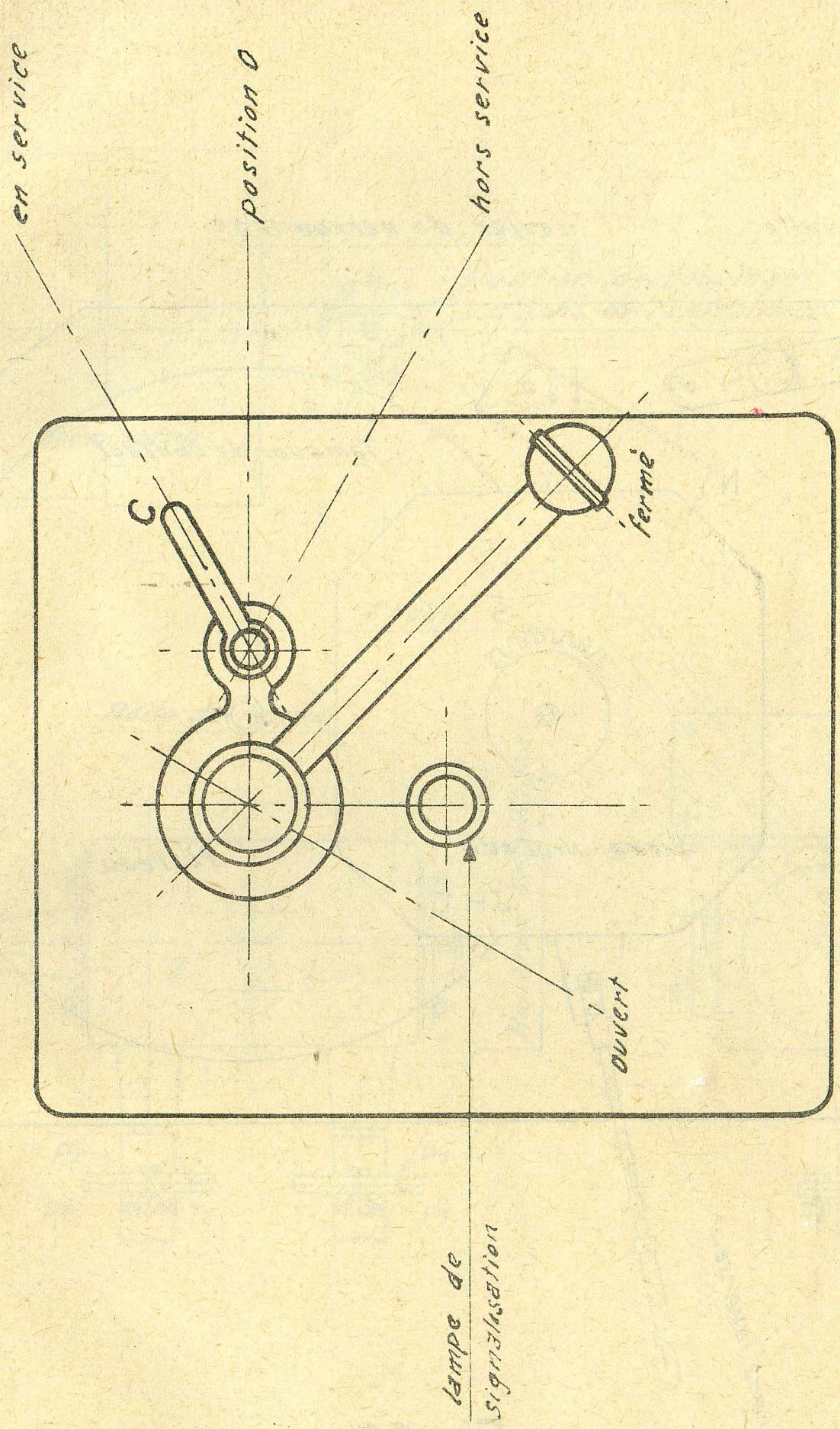


Fig. 65

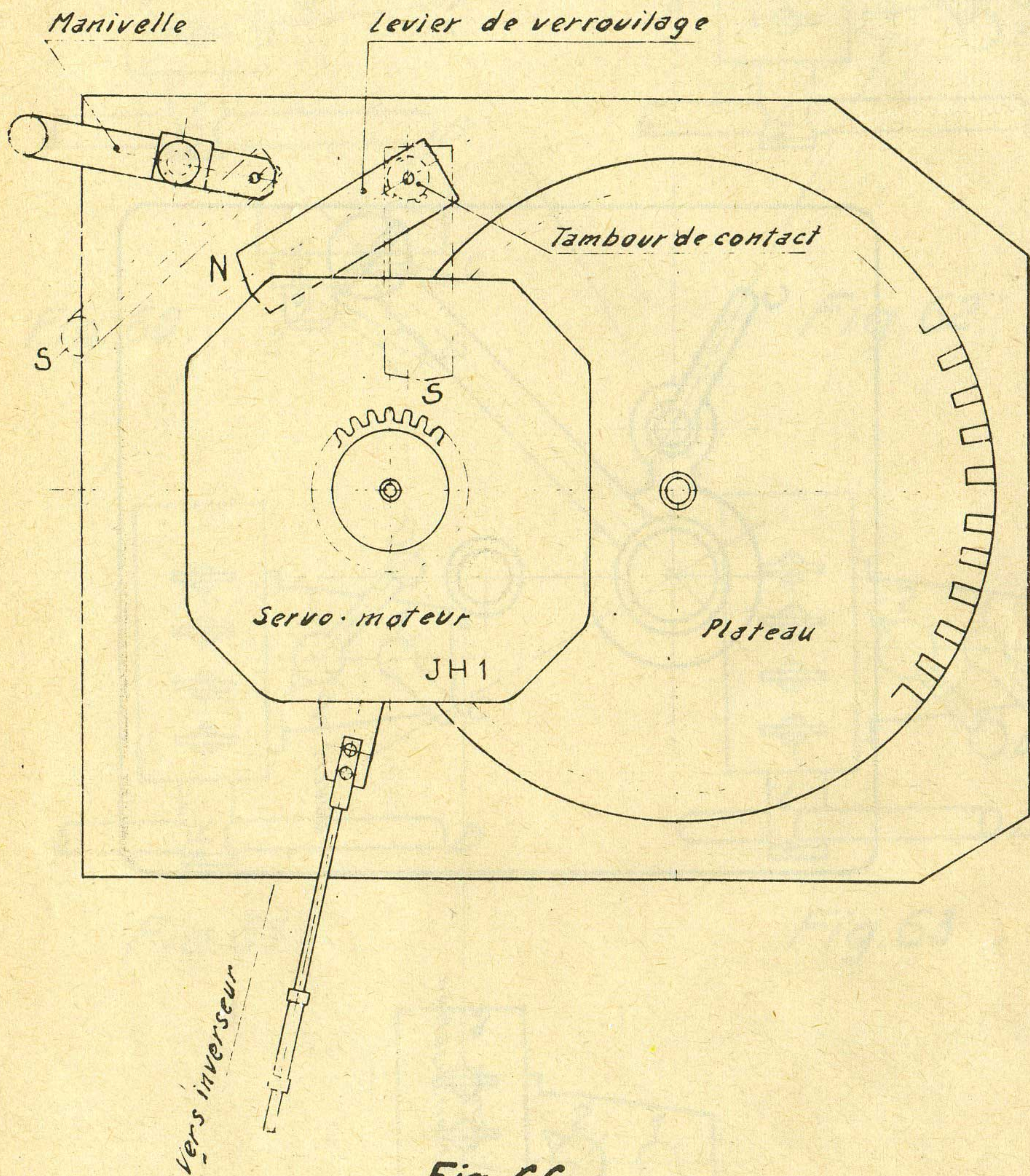


Fig. 66.

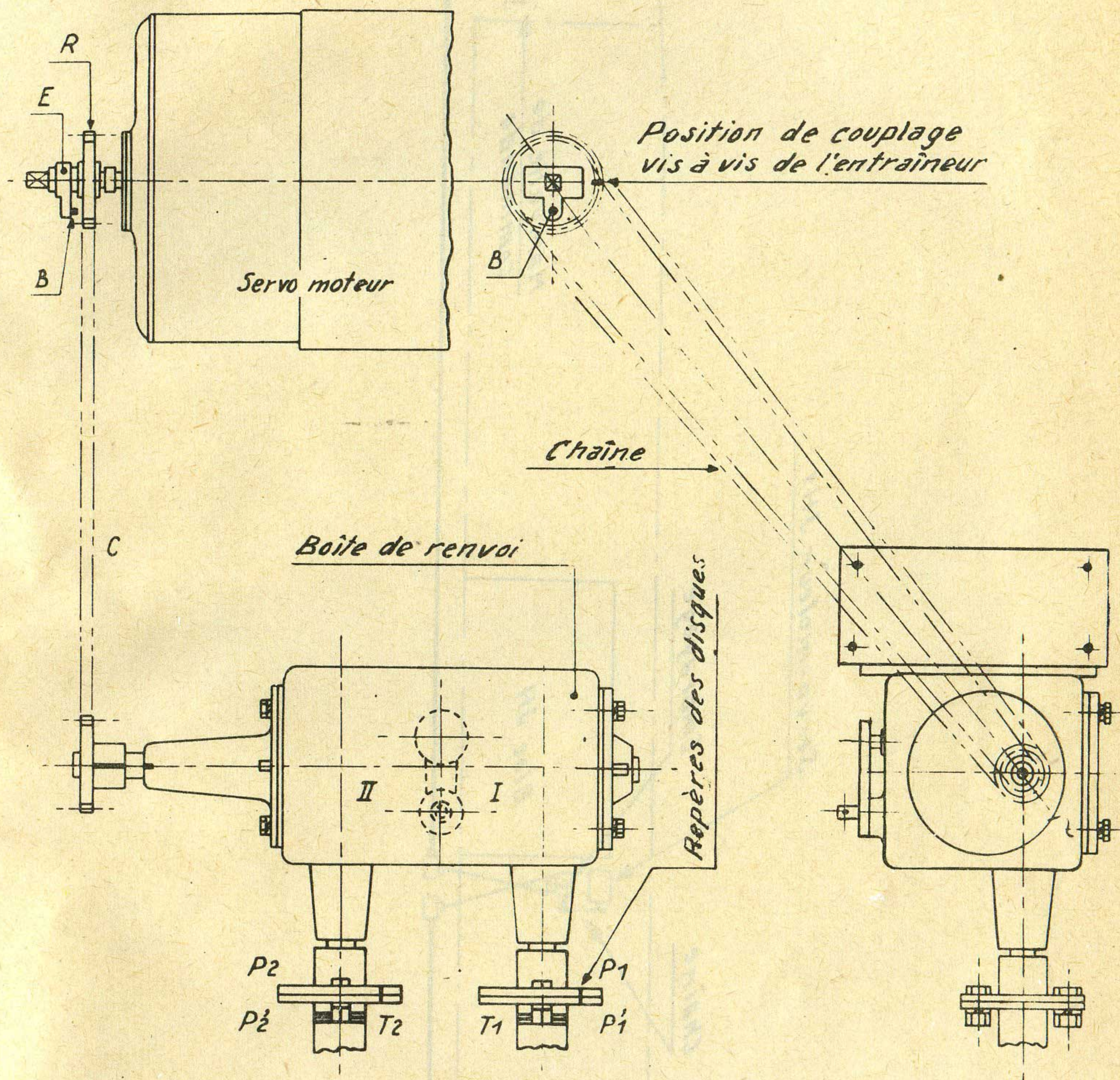


Fig. 67

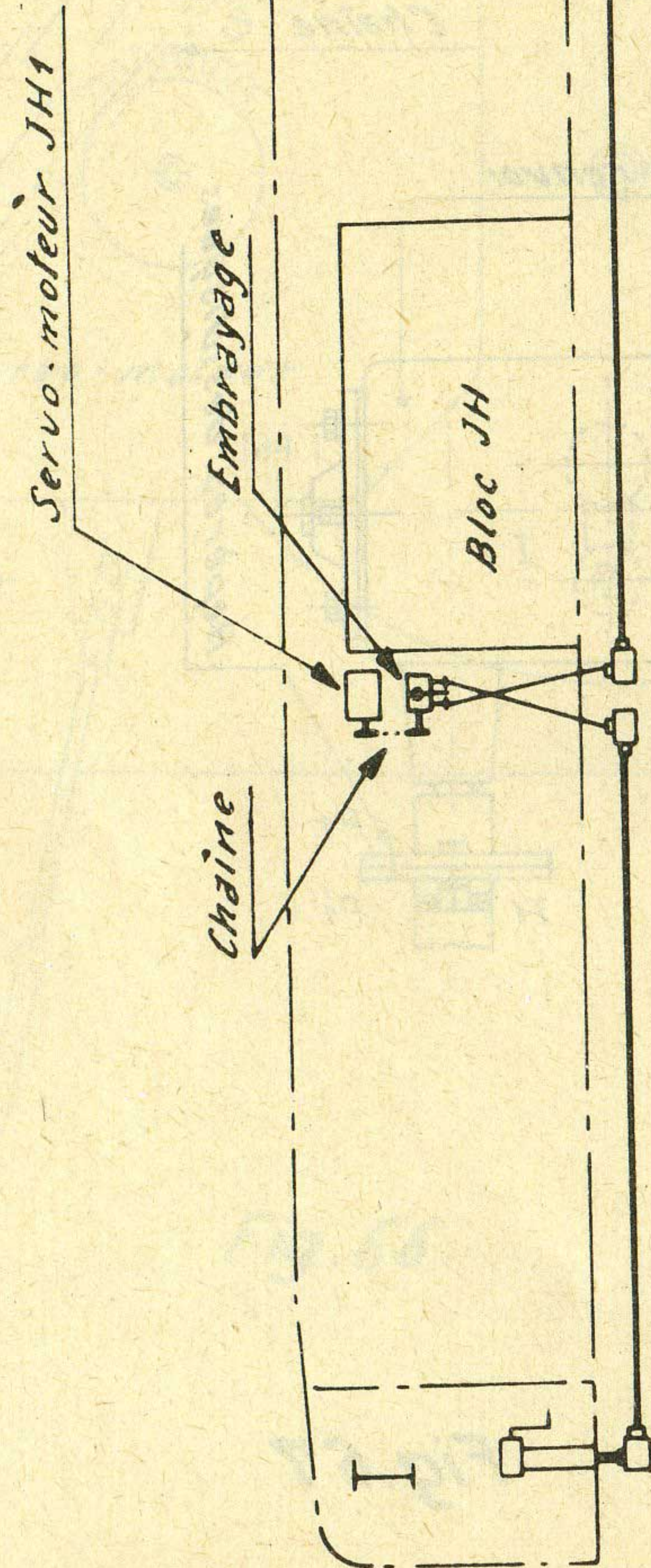
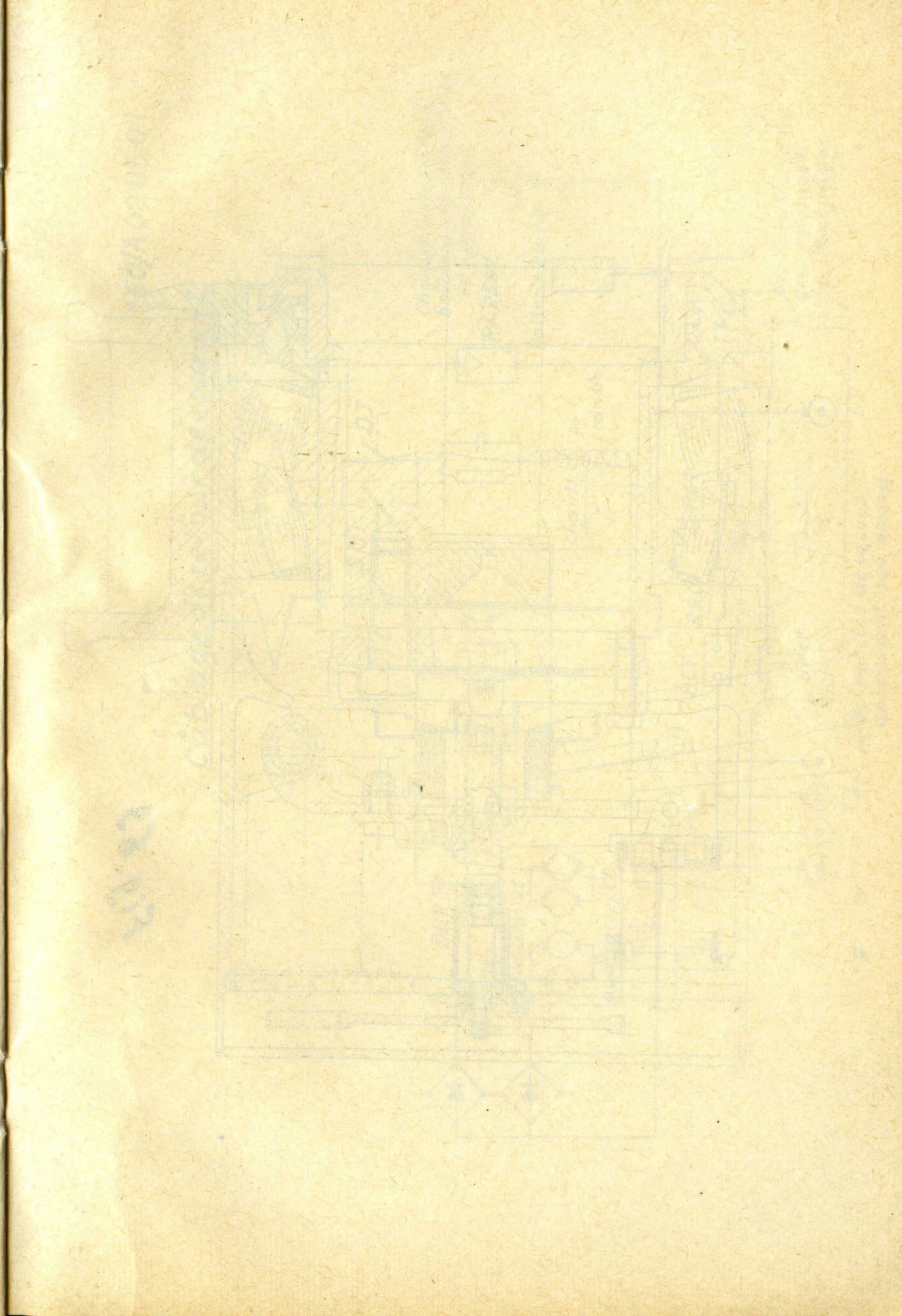


Fig. 68.



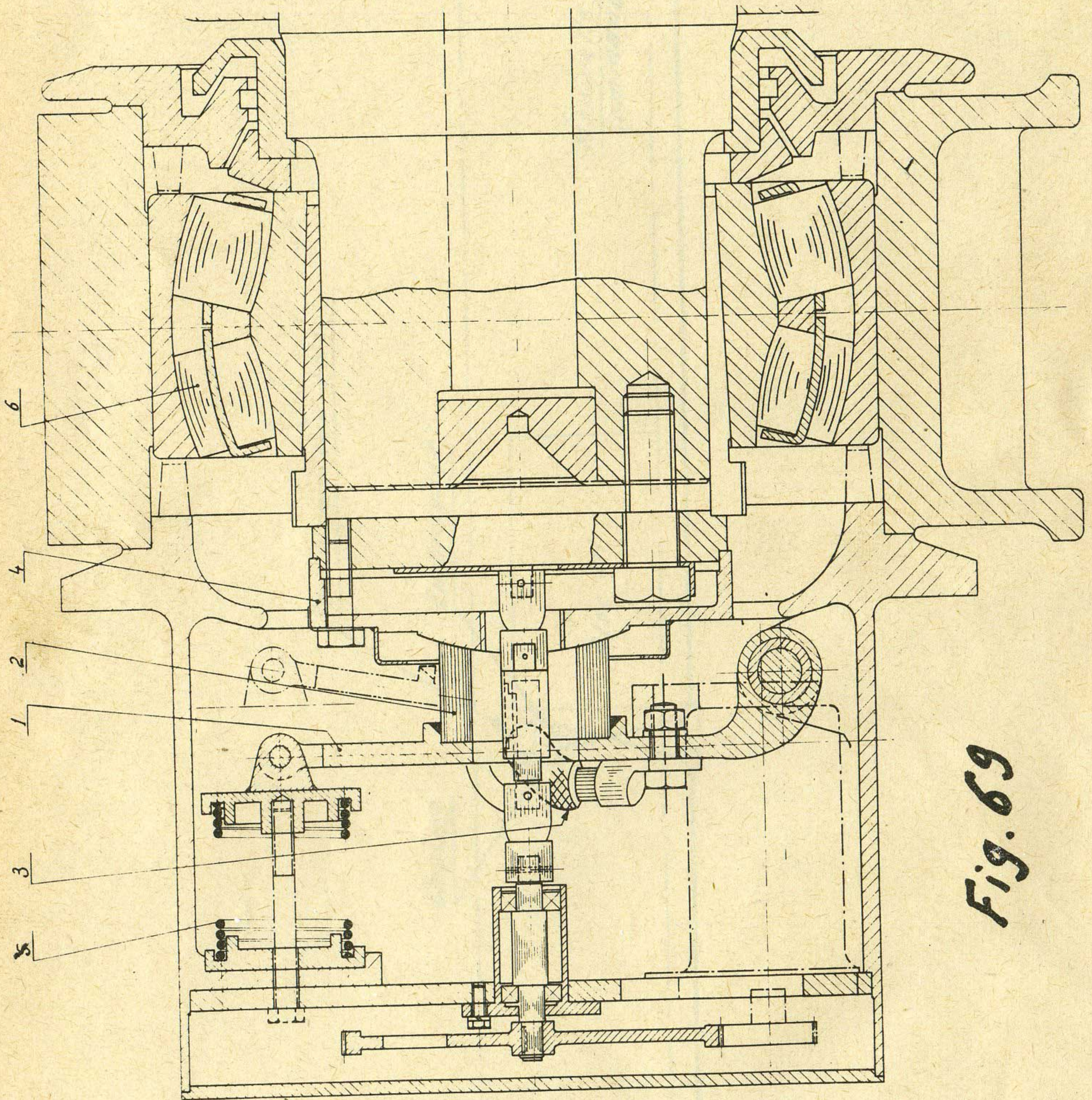
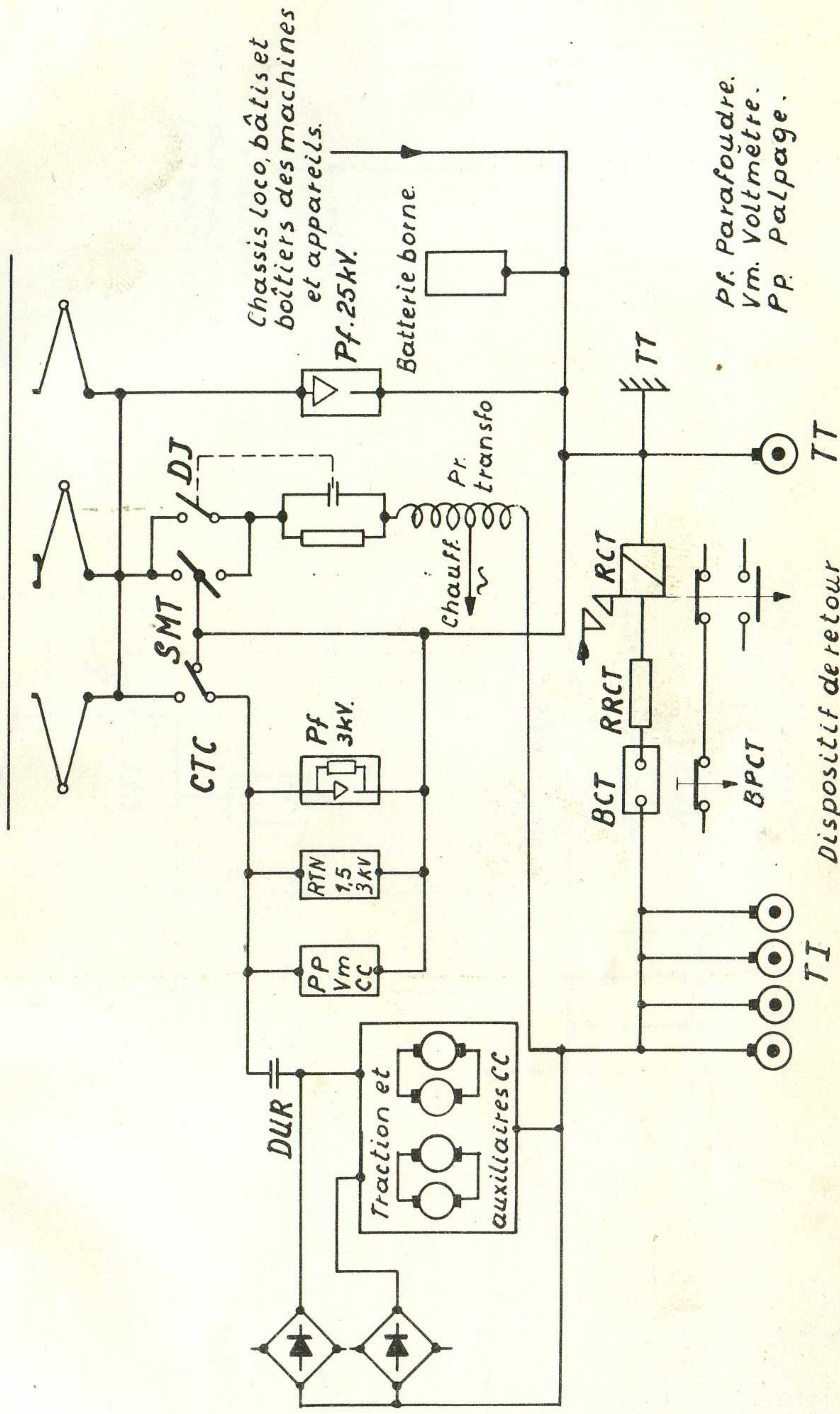


Fig. 69

160/A00.05.01

Câblage de retour de courant.



Chassis loco, bâtis et boîtiers des machines et appareils.

Pf. 25kV.

Batterie borne.

Pr. transfo

Chauff.

CTC

SMT

DJ

Pf 3kV.

RTN 1.5 3kV

PP Vm CC

DUR

Traction et auxiliaires CC

BCT

RRCT

RCT

TT

BCT
BCT

TI

TT

Pf. Parafoudre.
Vm. Voltmètre.
Pp. Palpage.

Dispositif de retour de courant sur essieu.

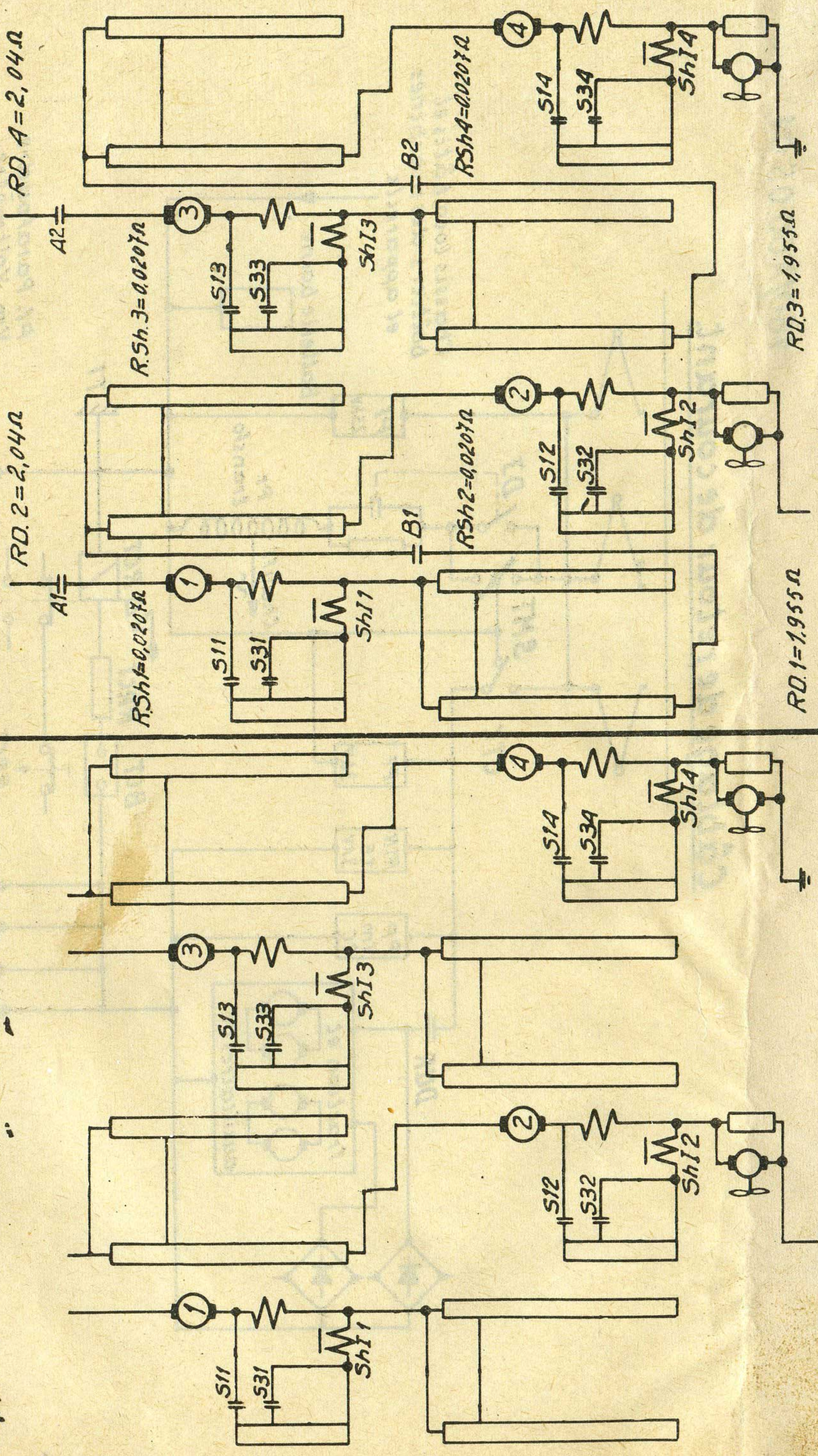
160/B.00.01.01.

Manipulat. en posit. 0
JH.1. en 0

Manipulat. en 1^{ère} posit. M.
JH.1 en 1

JH.3 en -2

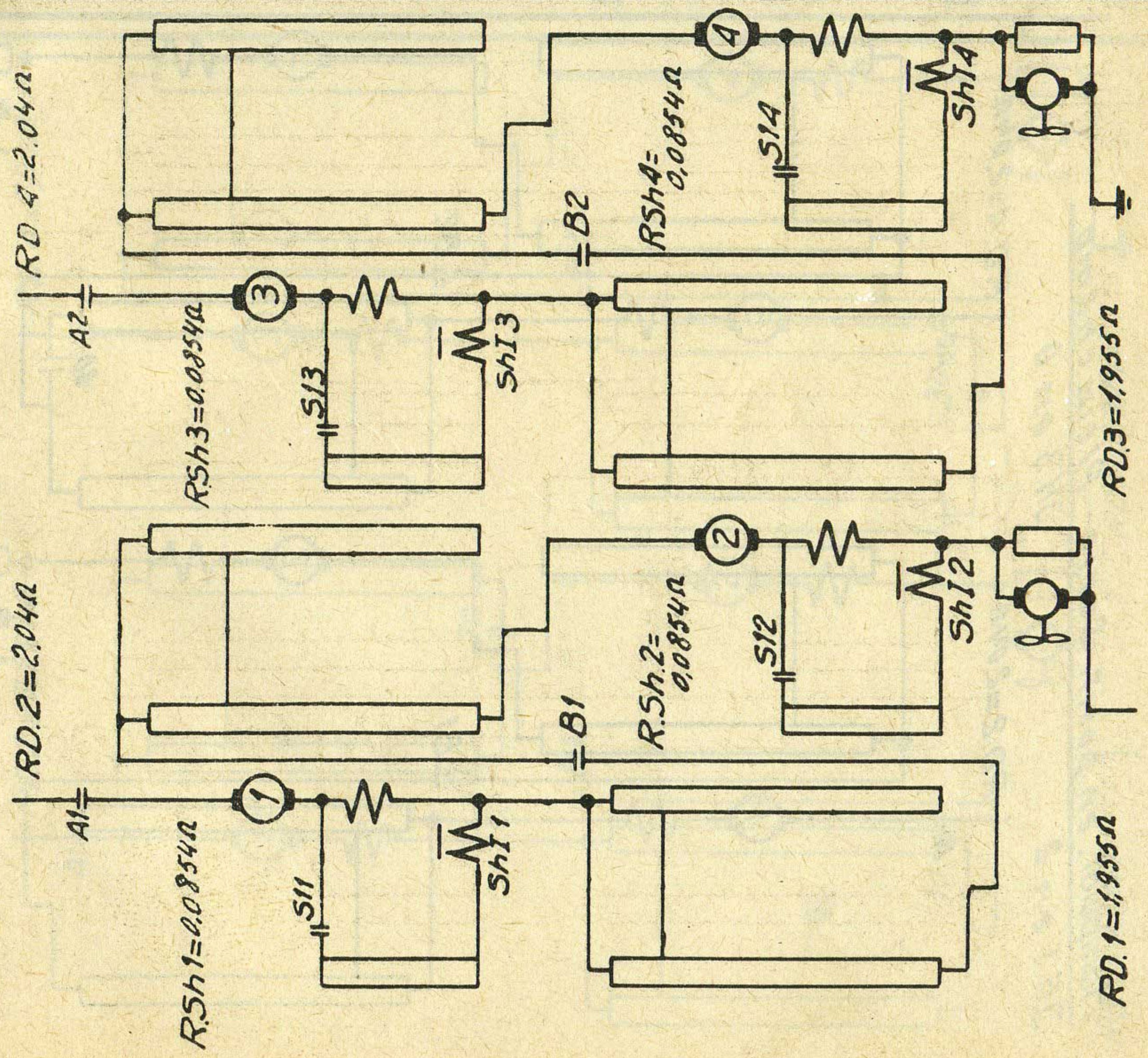
JH.3 en -2



160/B.00.01.0

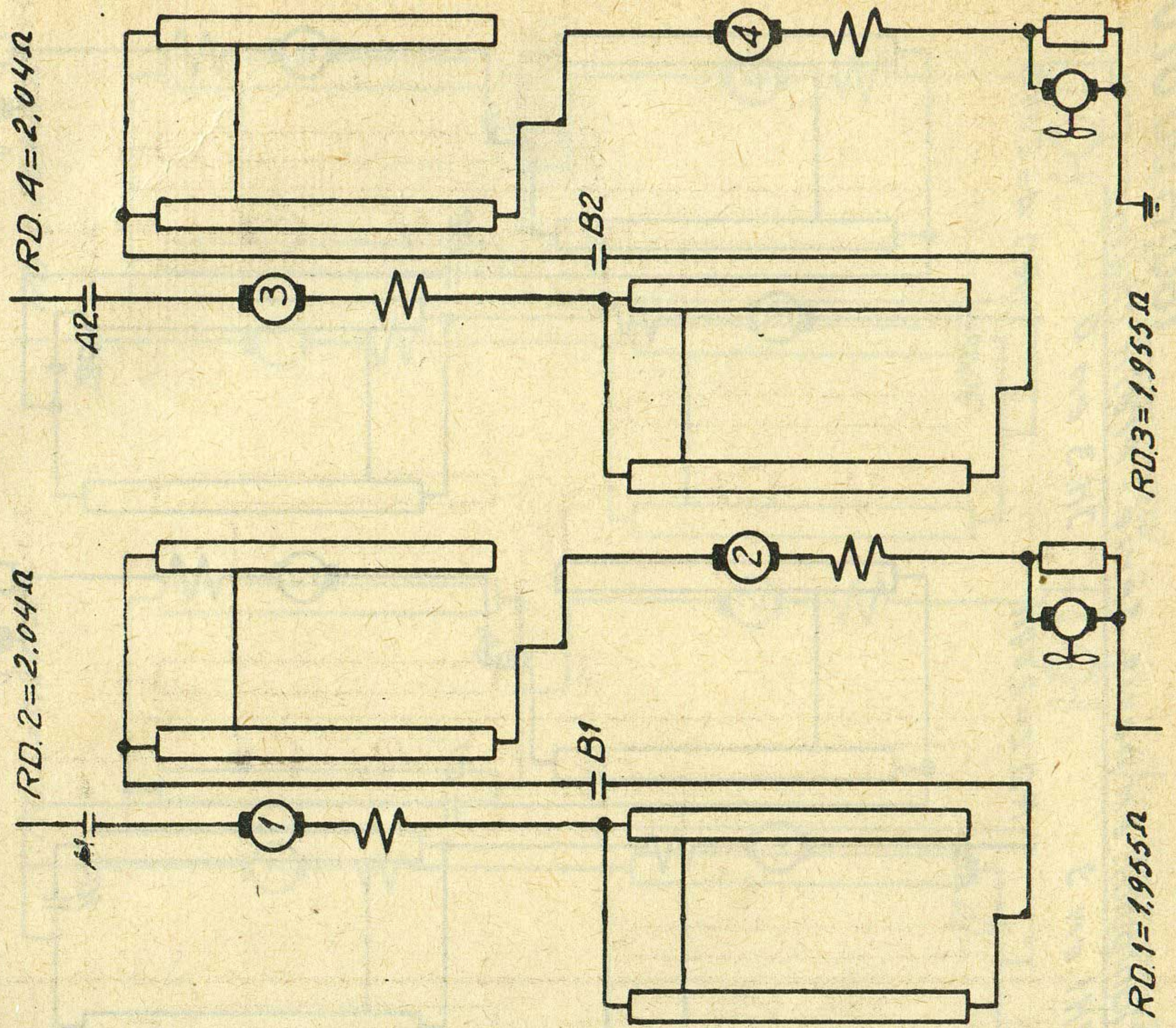
Manipulat. en 2^e posit. M
JH.1 en 1

JH.3 en -1



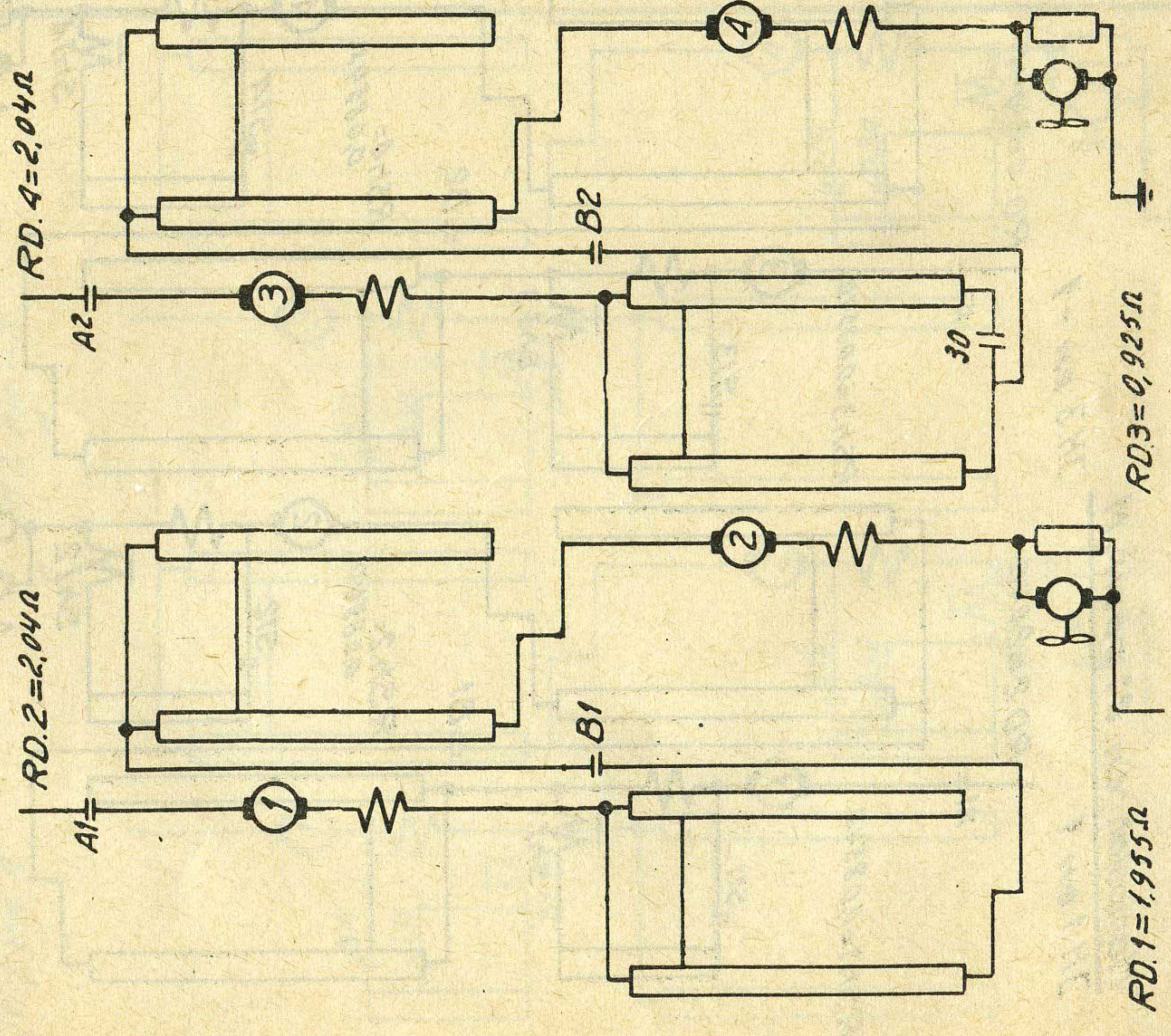
Manipulat. en 3^e posit. M
JH.1 en 1

JH.3 en 0

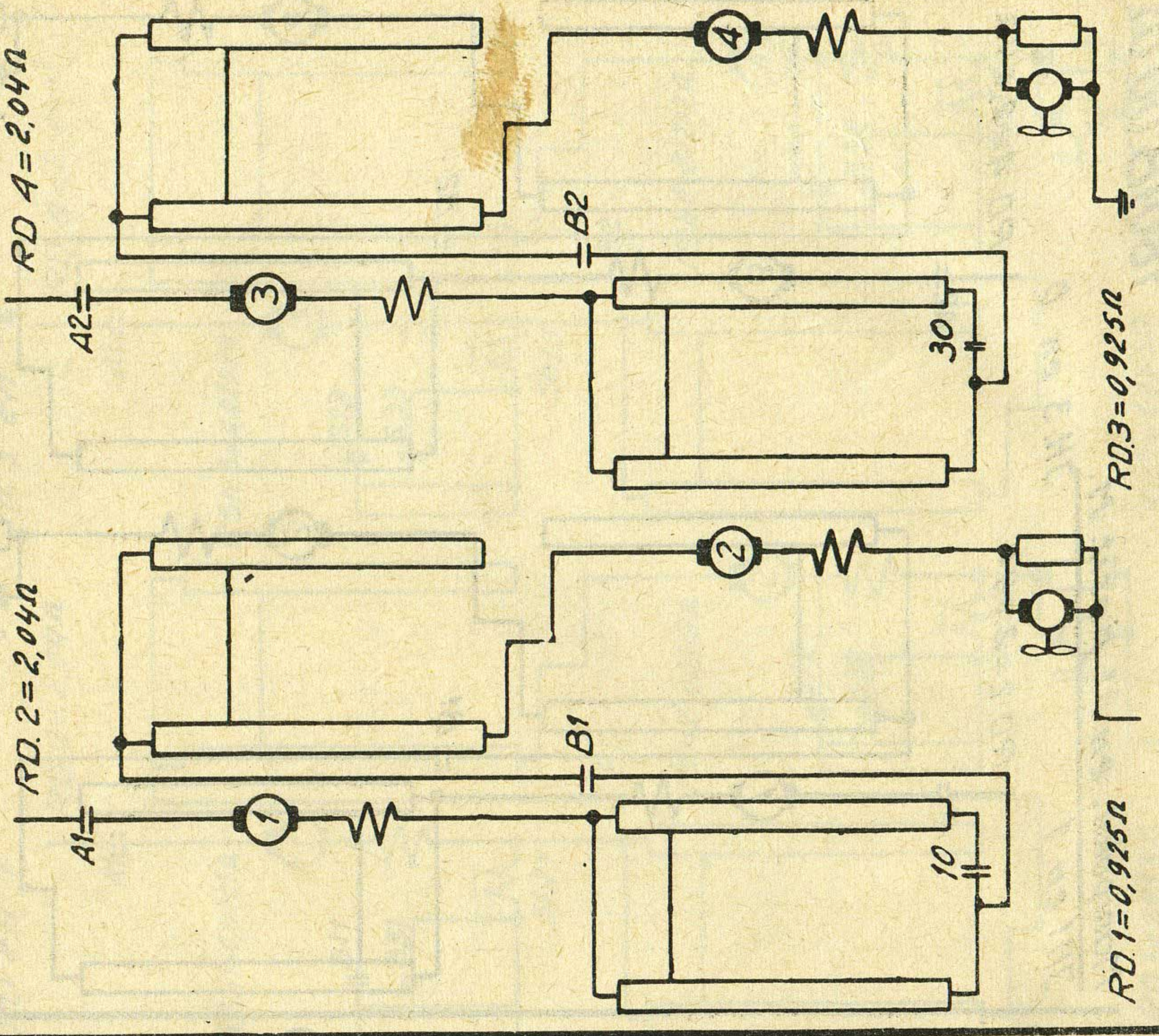


160/B.00.01.0

Manipulat. en posit. Série - Plein champ
JH.1 en 2



Manipulat. en posit. Série - Plein champ
JH.3 en 0



160/B.00.01.04

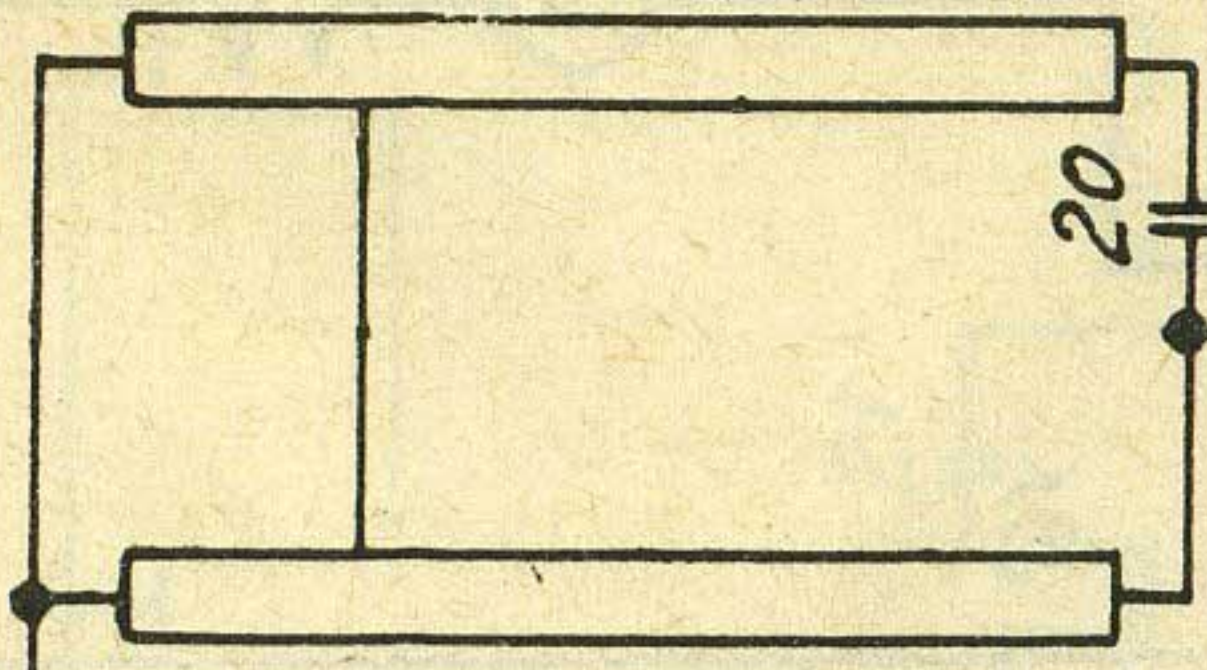
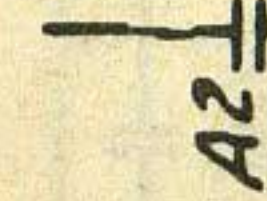
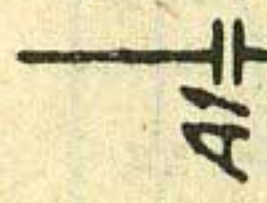
Manipulat. en posit. Série - Plein champ

JH1 en 4

JH3 en 0

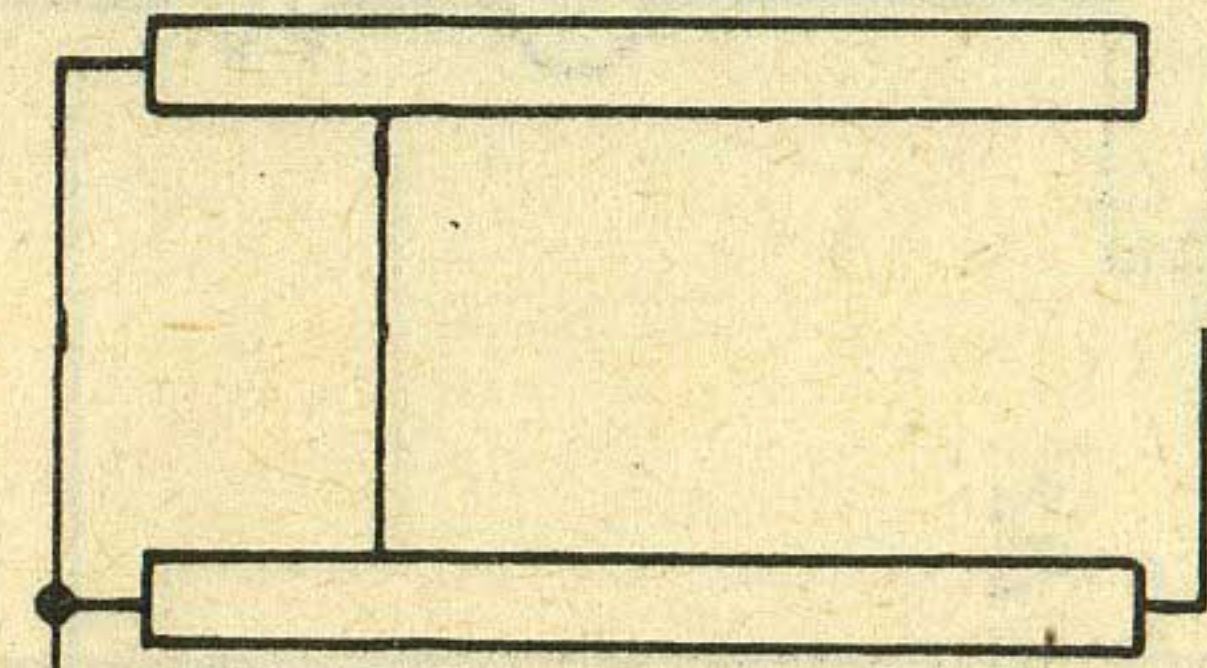
RD.2 = 0,945Ω

RD.4 = 2,04Ω



B1

B2



2

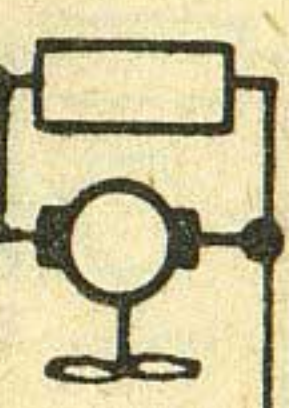
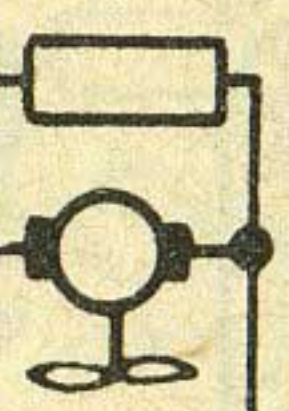
4

10

30

20

20



RD.1 = 0,925Ω

RD.3 = 0,925Ω

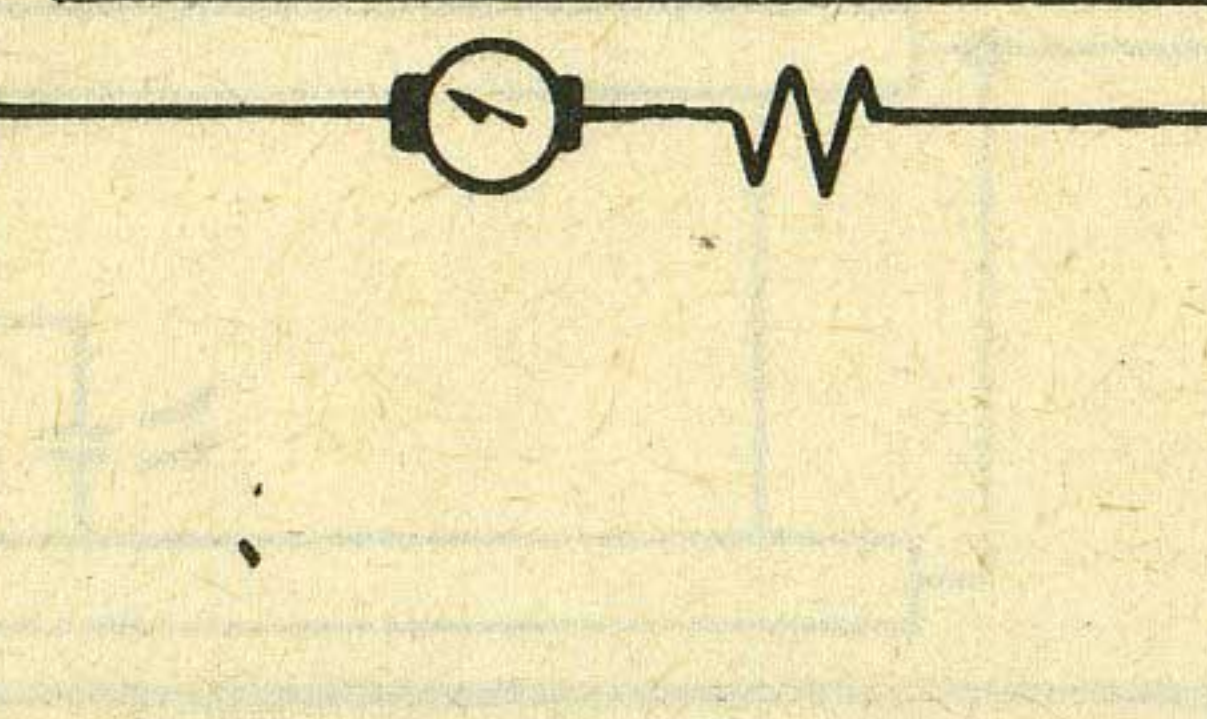
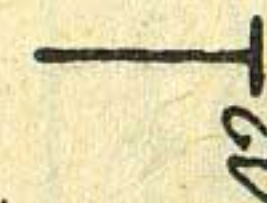
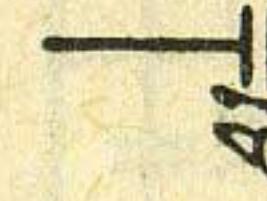
Manipulat. en posit. Série - Plein champ

JH1 en 5

JH3 en 0

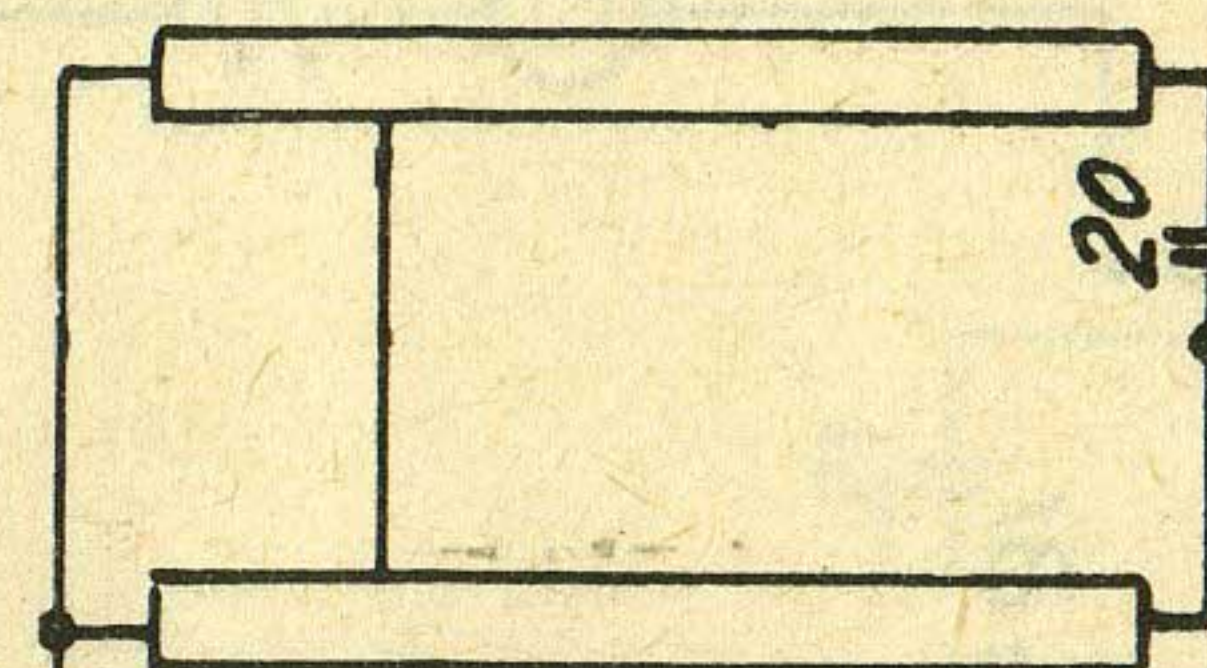
RD.2 = 0,945Ω

RD.4 = 0,945Ω



B1

B2



1

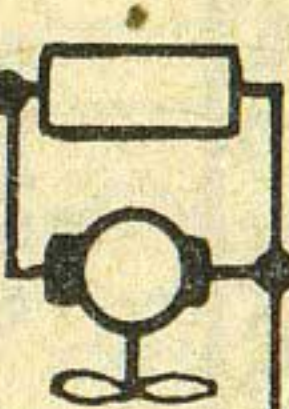
2

10

30

20

40



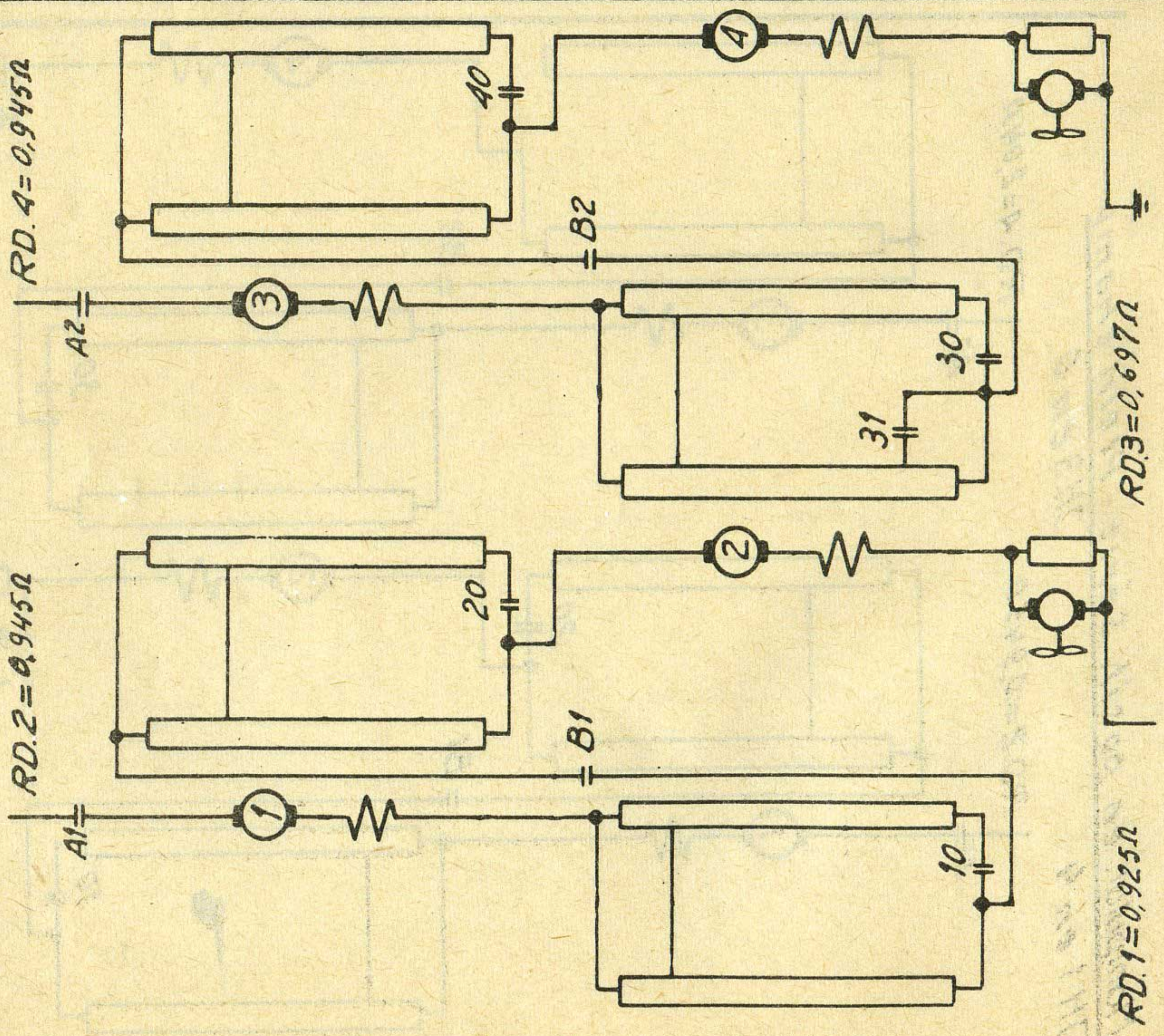
RD.1 = 0,925Ω

RD.3 = 0,925Ω

160/B.00.01.0.

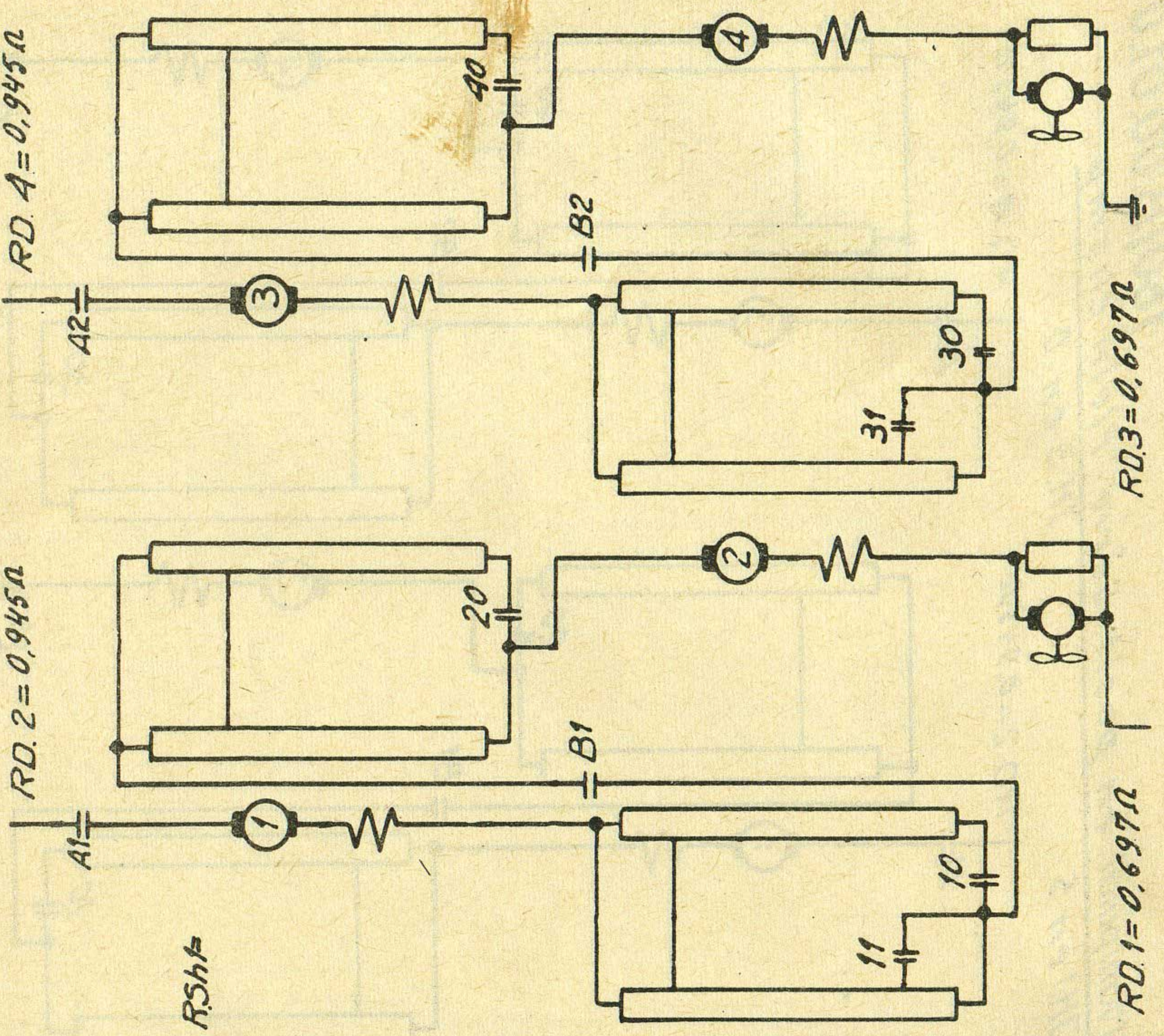
Manipulat. en posit. Série - Plein champ

JH.1 en 6

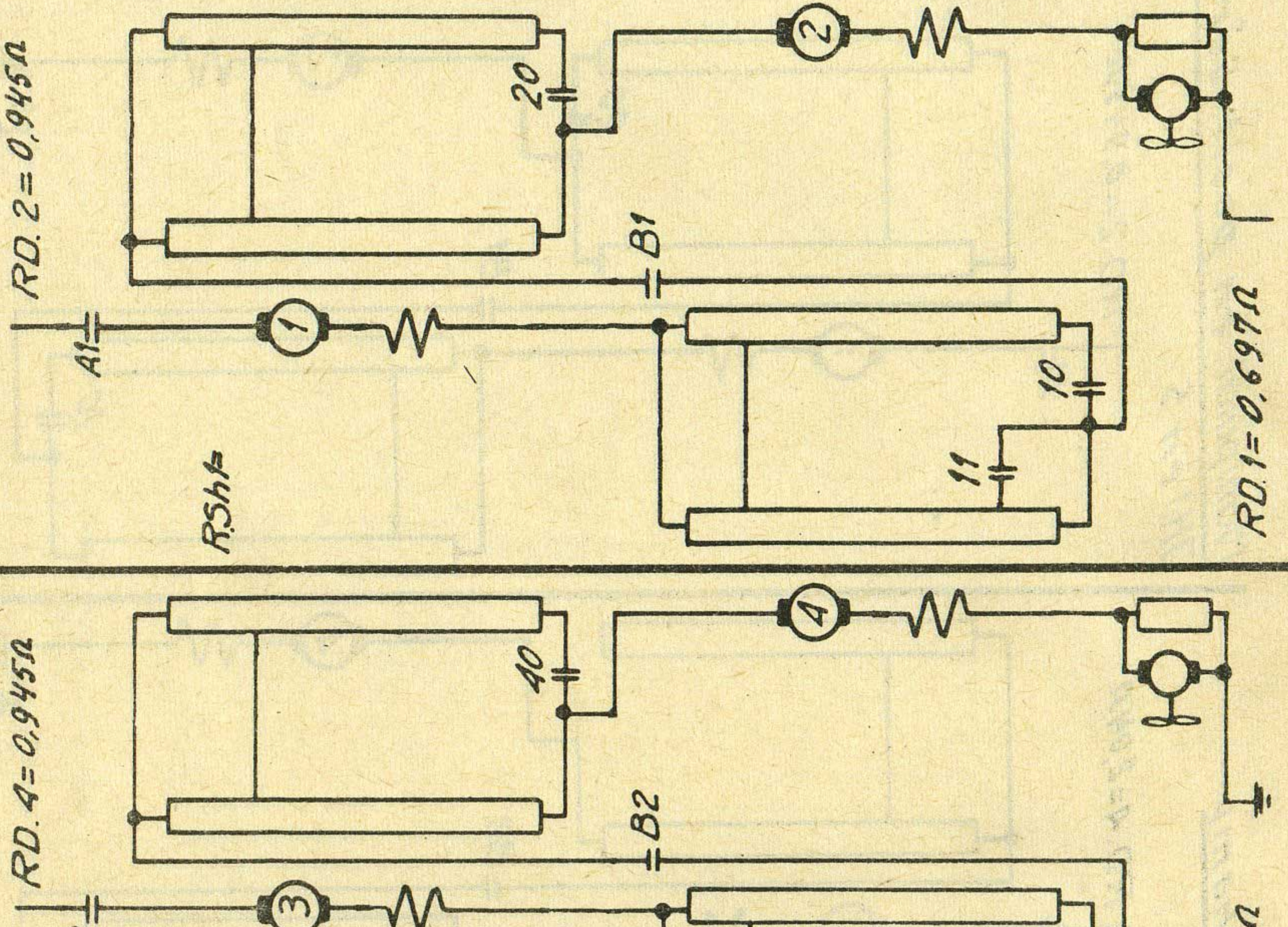


Manipulat. en posit. Série - Plein champ

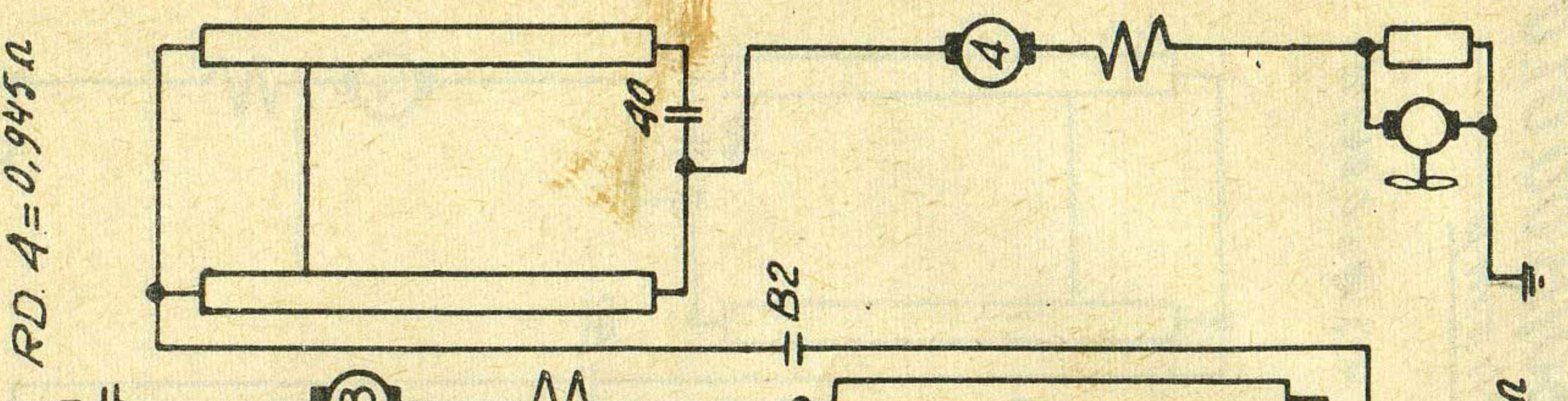
JH.1 en 7



JH.3 en 0



JH.3 en 0



RSht

160/B.00.01.06

Manipulat. en posit. Série - Plein champ

JH.1 en 8

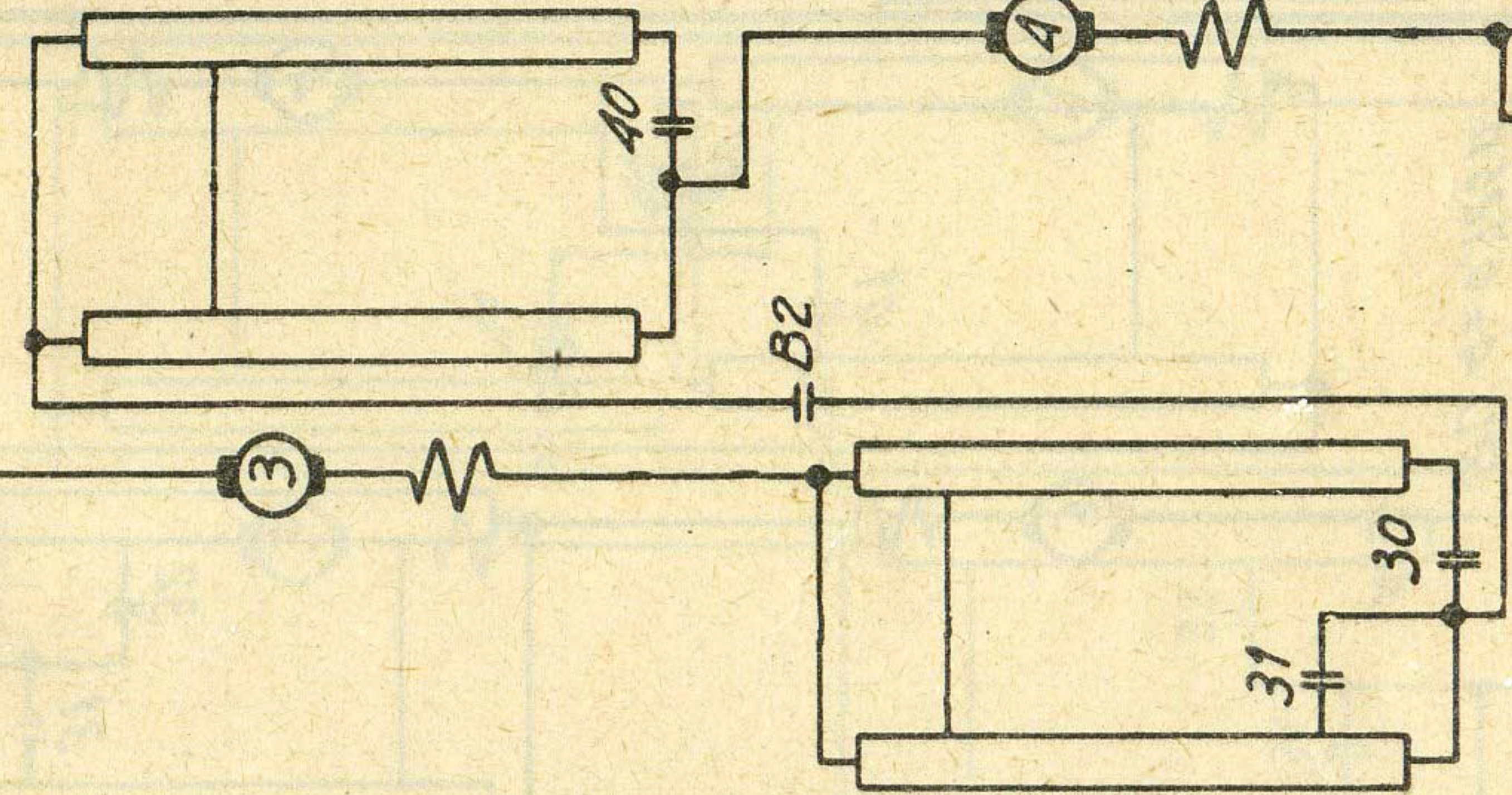
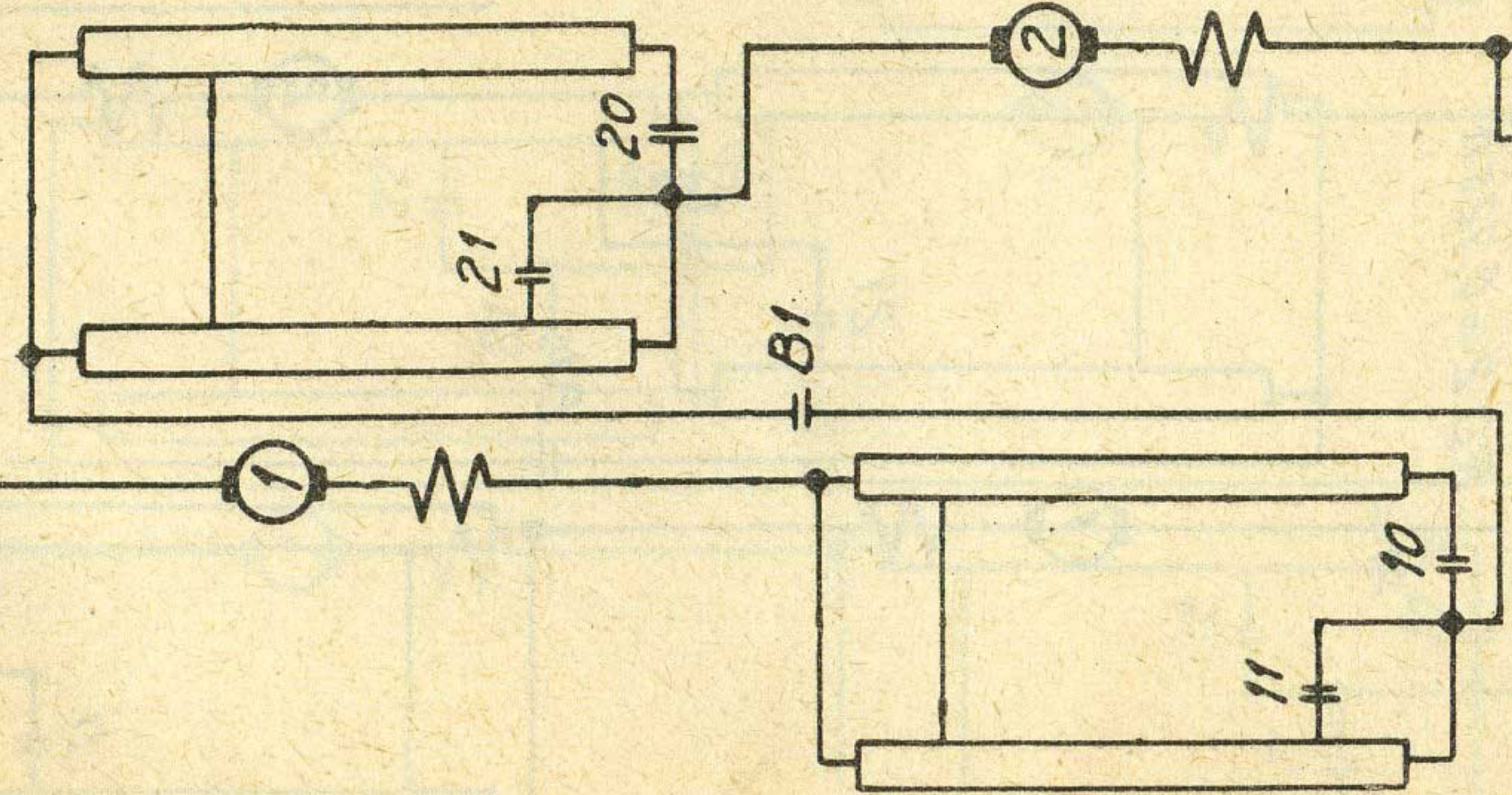
JH.3 en 0

RD.2 = 0,725Ω

RD.4 = 0,945Ω

A1

A2



RD.1 = 0,697Ω

RD.3 = 0,697Ω

Manipulat. en posit. Série - Plein champ

JH.1 en 9

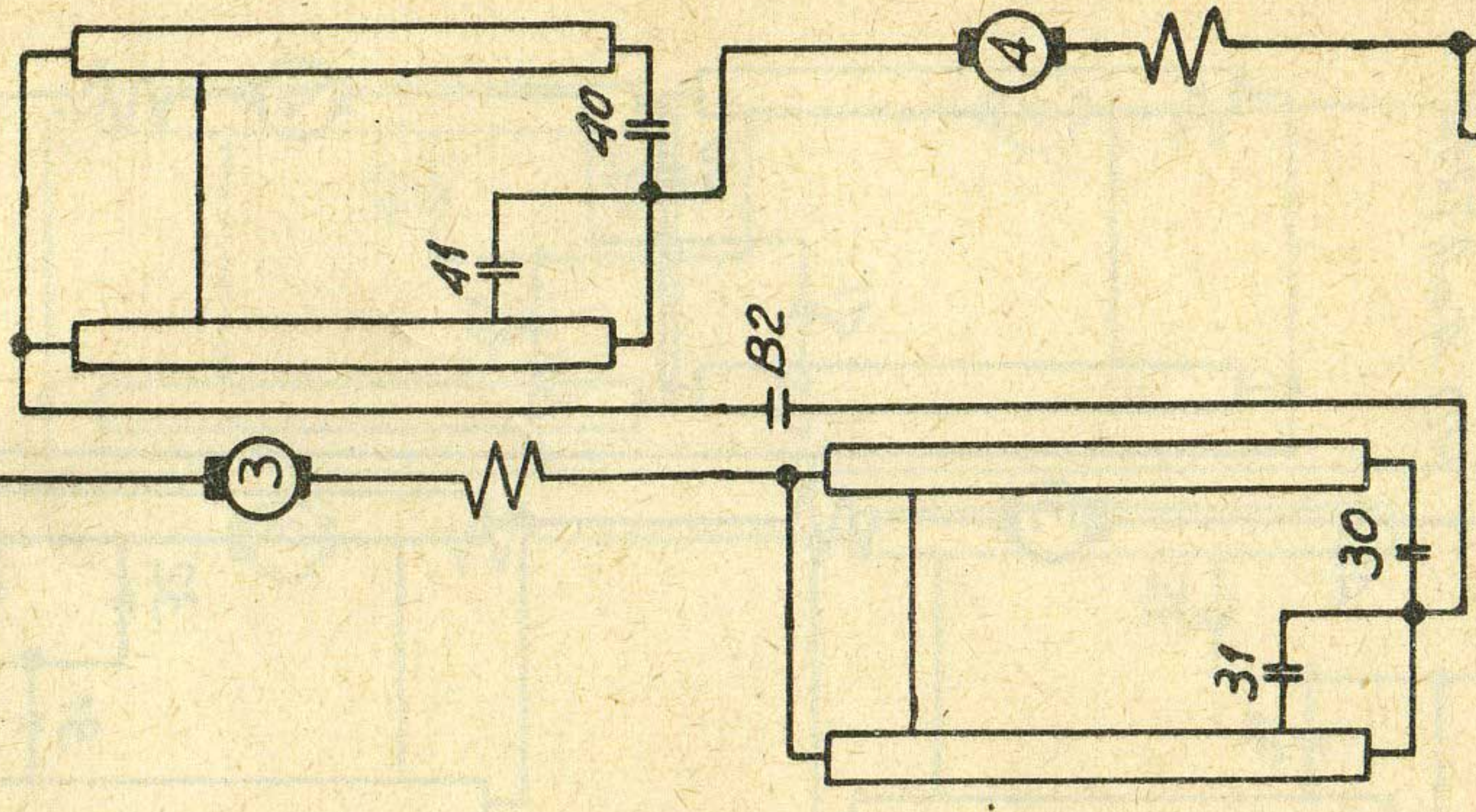
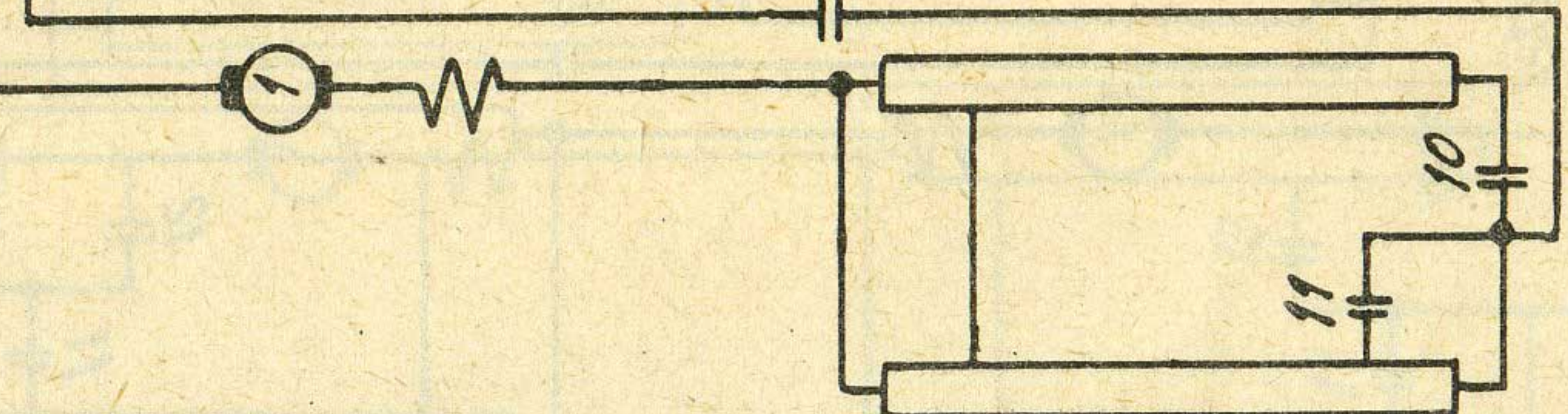
JH.3 en 0

RD.2 = 0,725Ω

RD.4 = 0,725Ω

A1

A2



RD.1 = 0,697Ω

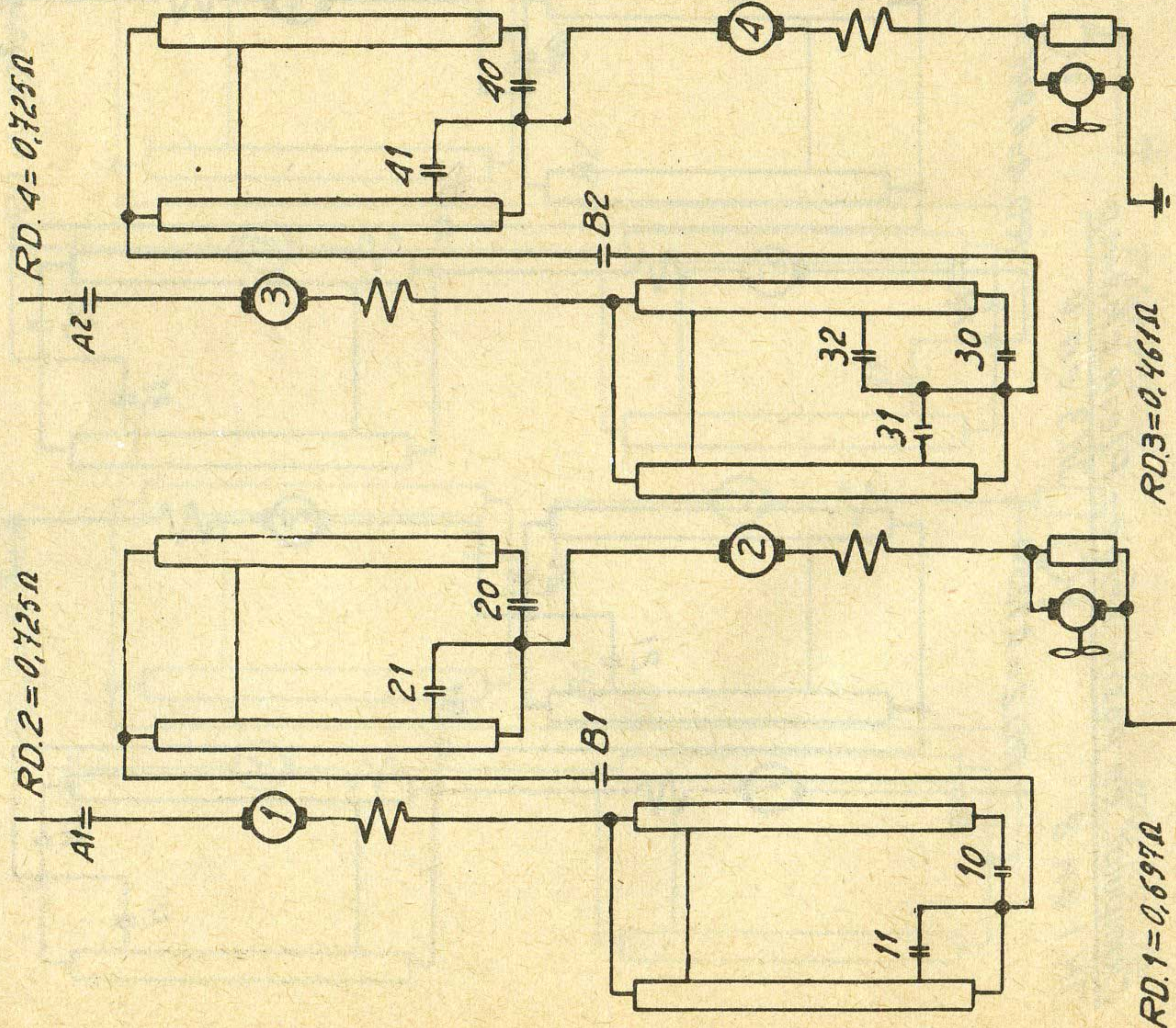
RD.3 = 0,697Ω

160/B.00.01.07

Manipulat. en posit. Série - Plein champ

JH.1 en 10

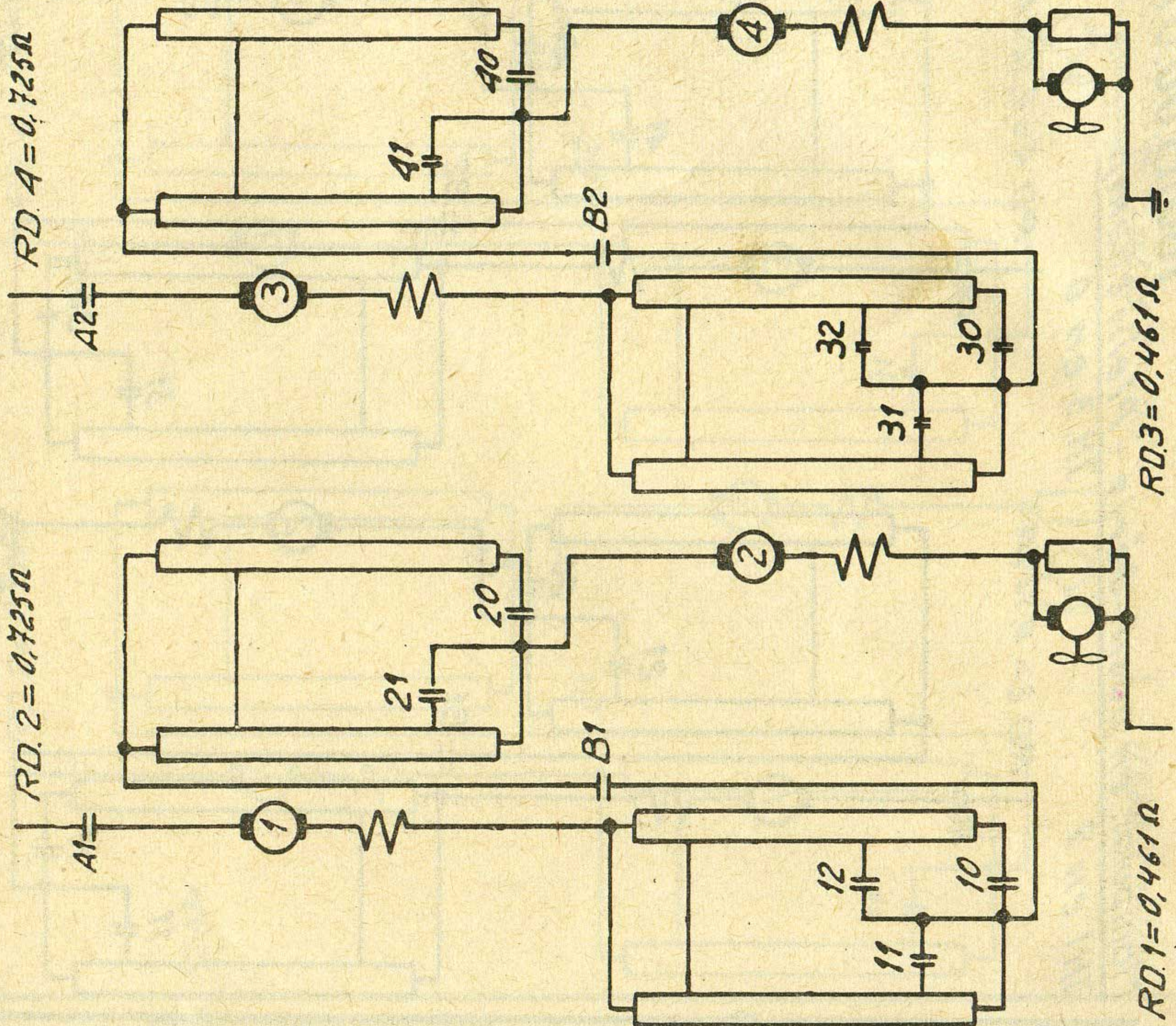
JH.3 en 0



Manipulat. en posit. Série - Plein champ

JH.1 en 11

JH.3 en 0

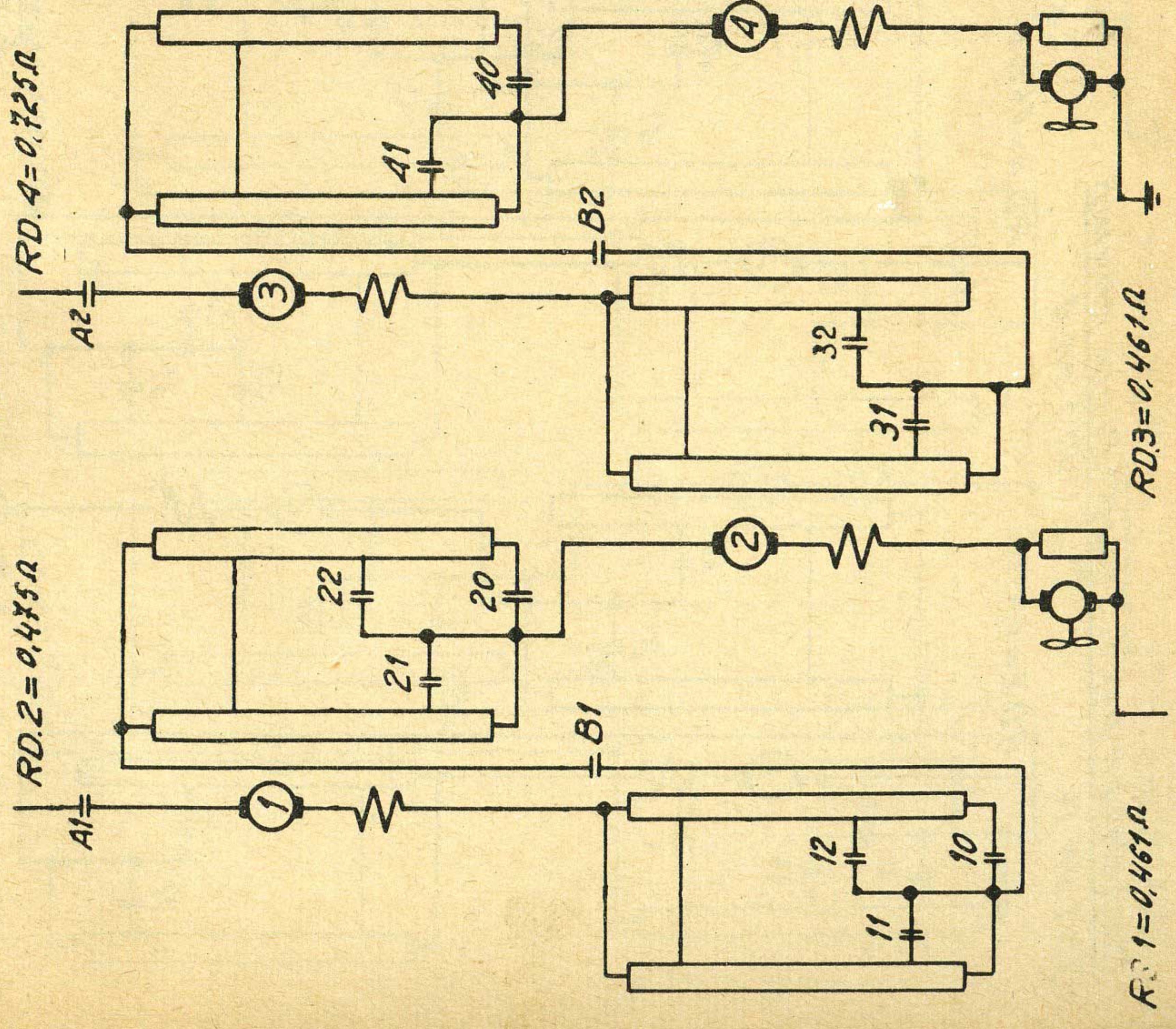


160/B.00.01.08

Manipulat. en posit. Série - Plein champ

JH.1 en 12

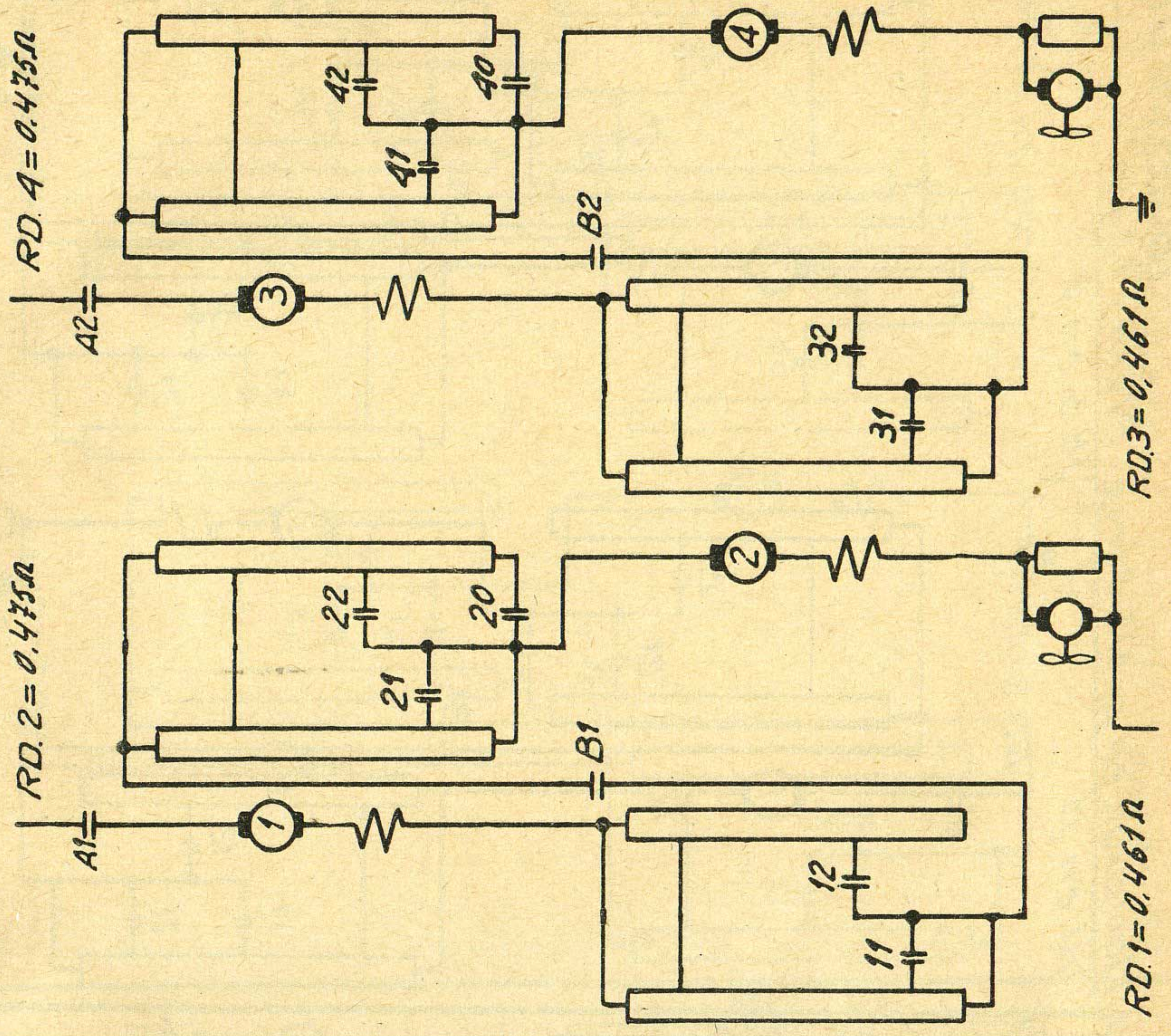
JH.3 en 0



Manipulat. en posit. Série - Plein champ

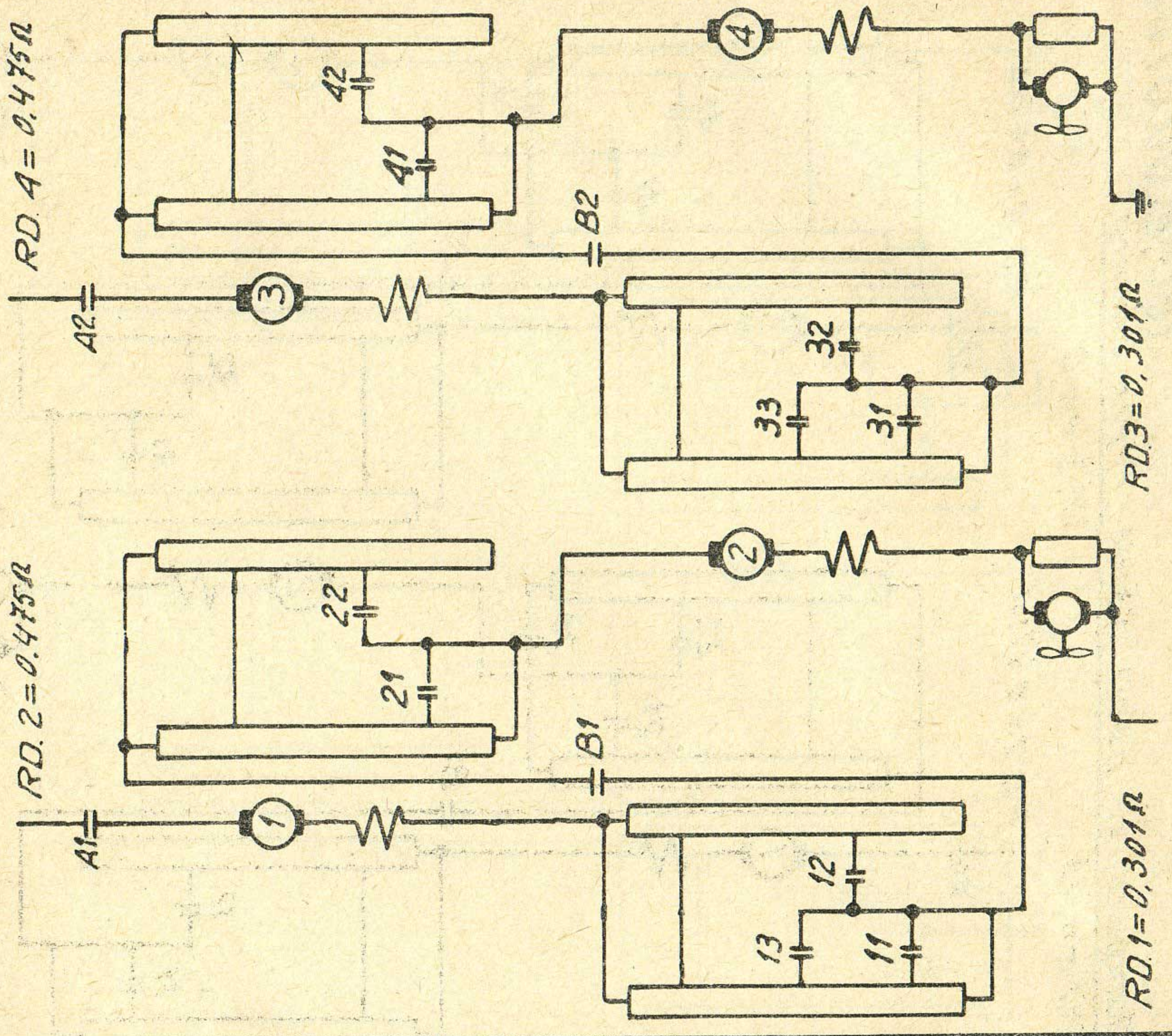
JH.1 en 13

JH.3 en 0

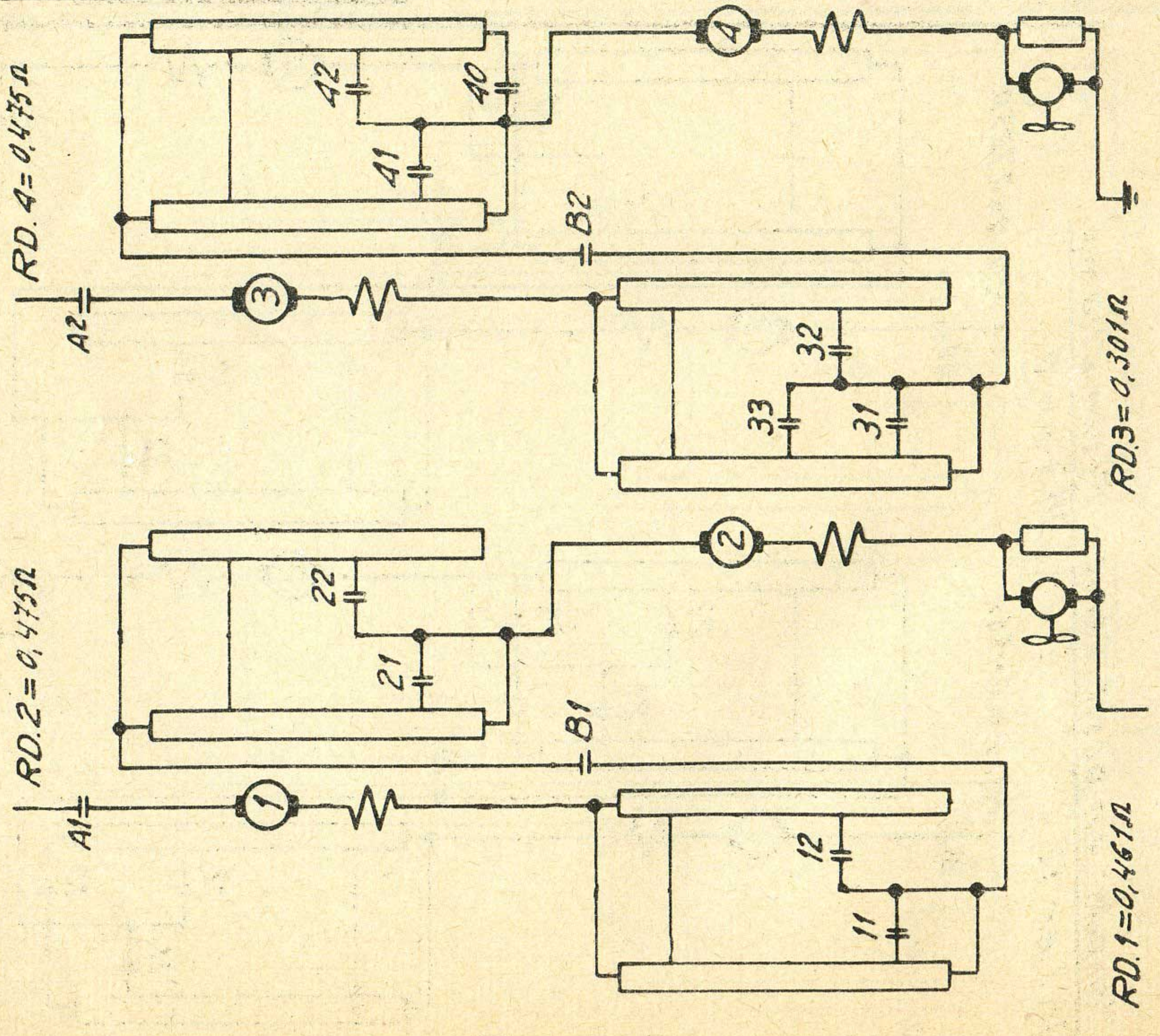


160/B.00.01.09

Manipulat. en posit. Série - Plein champ
JH1 en 15



Manipulat. en posit. Série - Plein champ
JH1 en 14

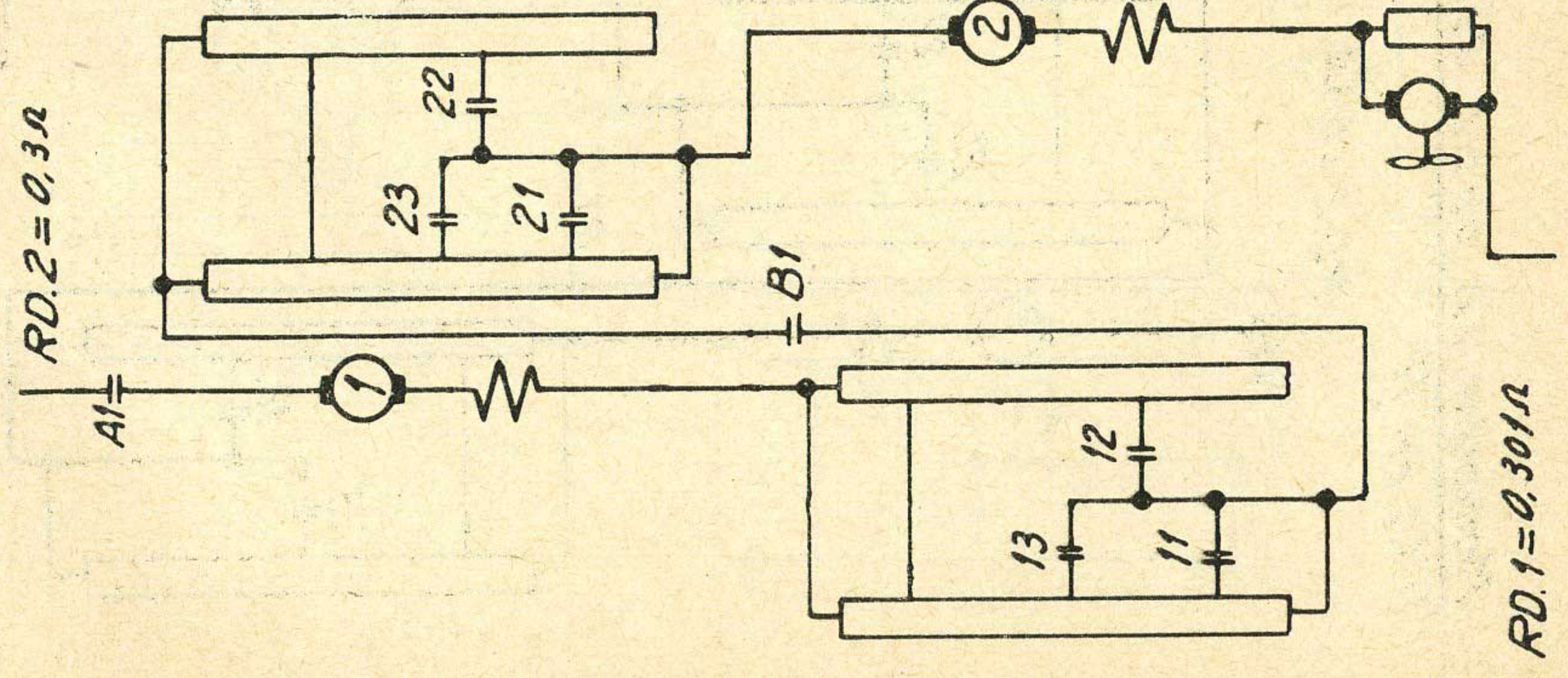


160/B.00.01.01

Manipulat. en posit. Série - Plein champ

JH.1 en 16

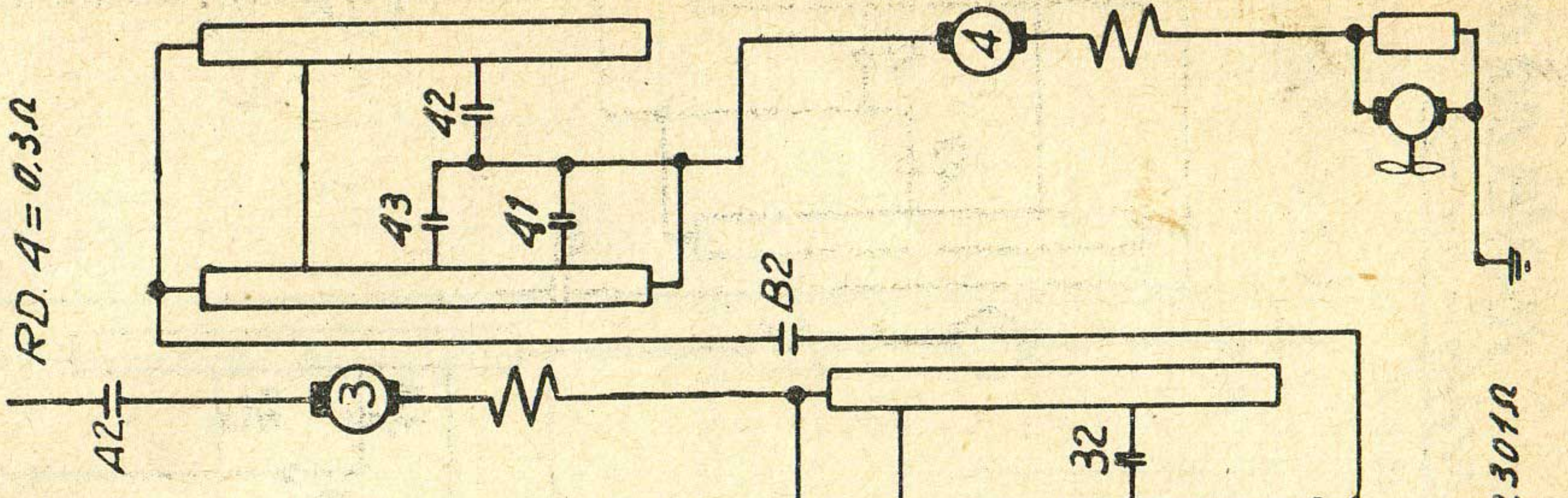
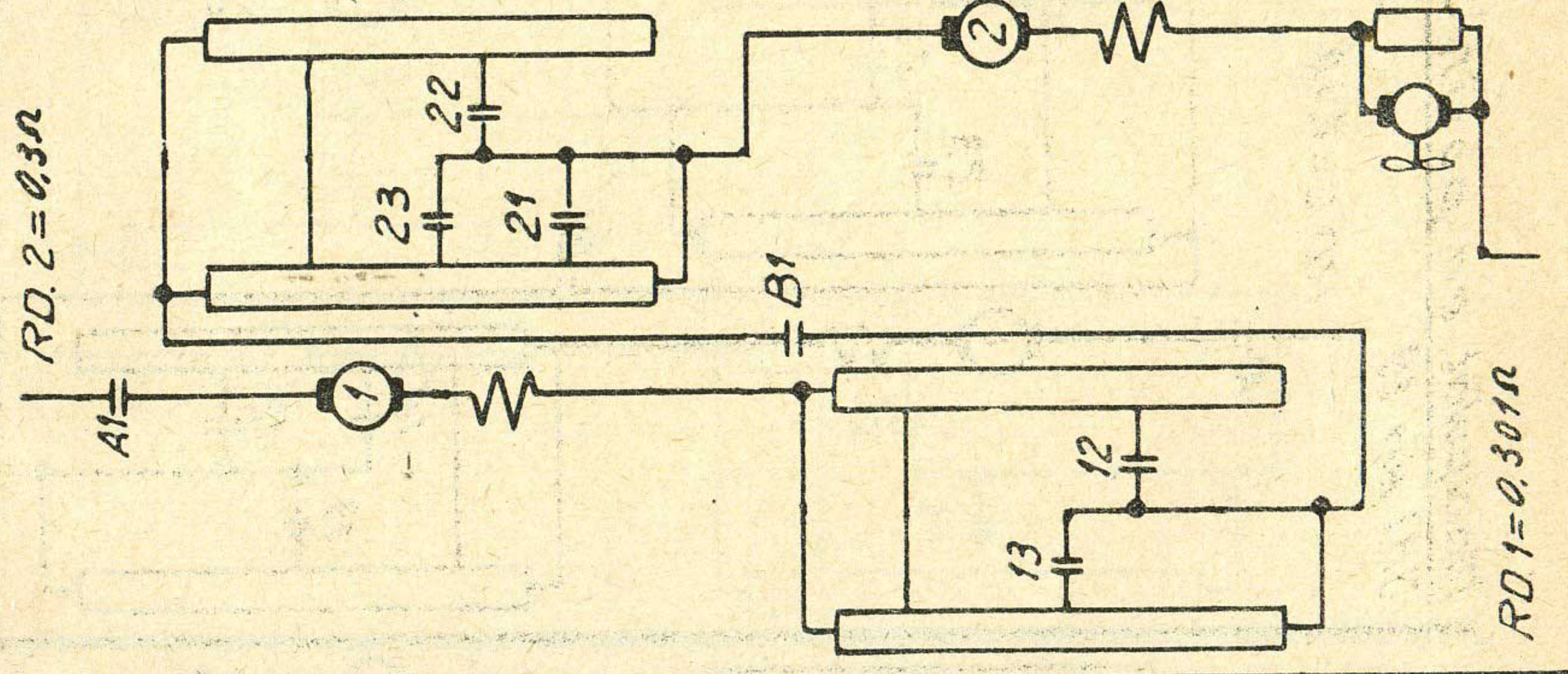
JH.3 en 0



Manipulat. en position Série - Plein champ

JH.1 en 17

JH.3 en 0

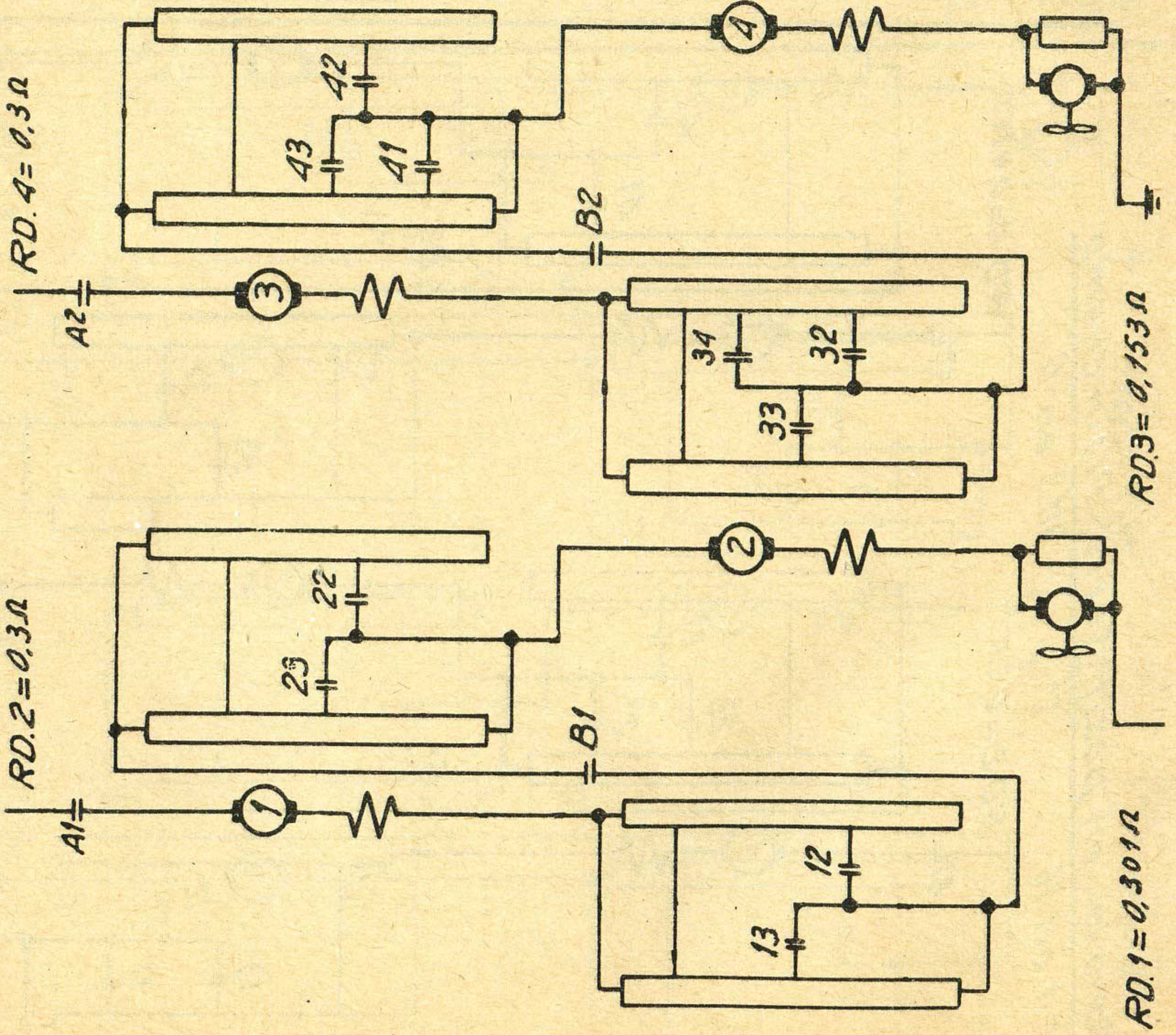


160/B.00.01.

Manipulat. en posit. Série - Plein champ

JH.1 en 18

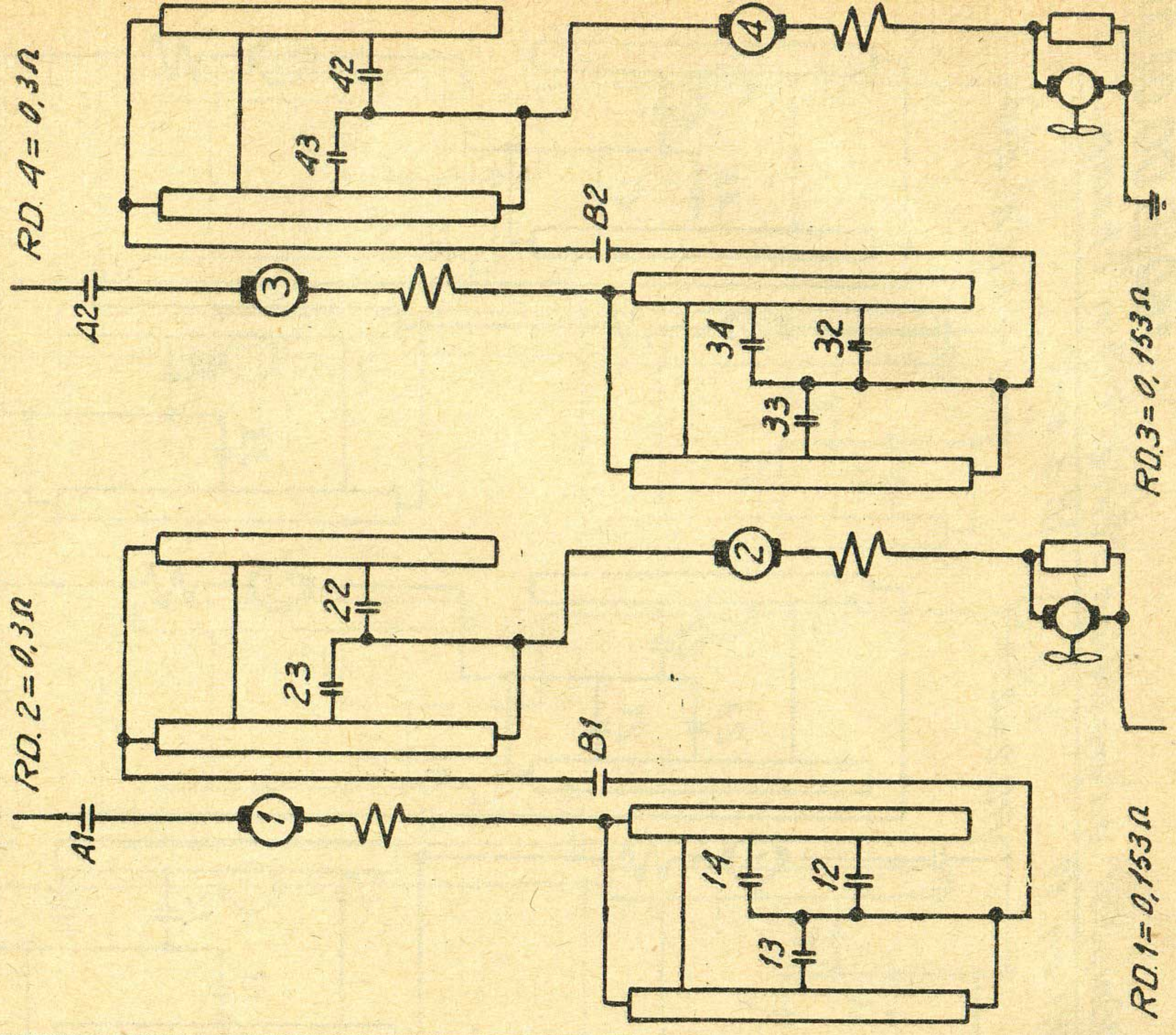
JH.3 en 0



Manipulat. en posit. Série - Plein champ

JH.1 en 19

JH.3 en 0

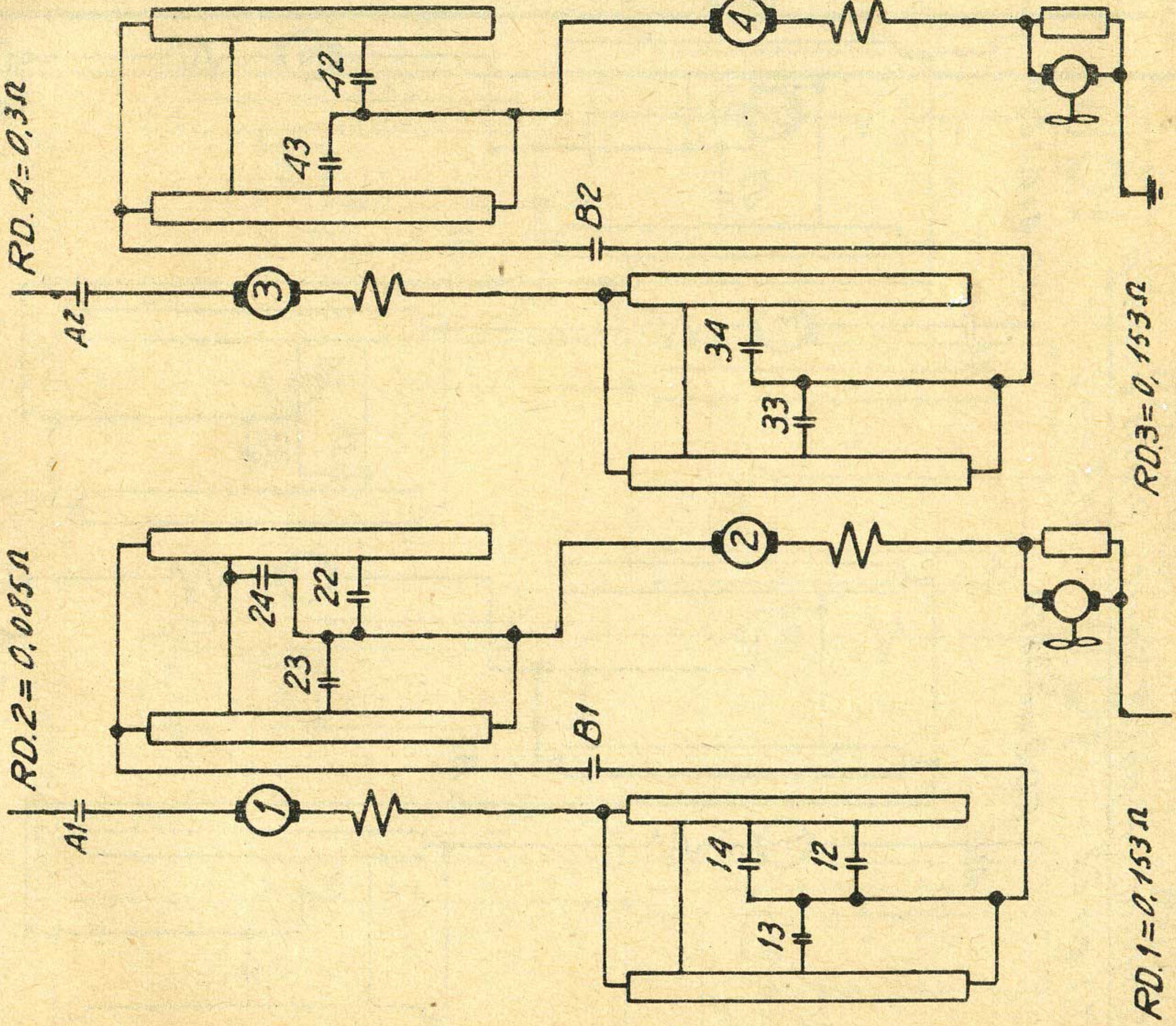


160/B.00.01.0

Manipulat. en posit. Série - Plein champ
JH.1 en 20.

RD.2 = 0,085Ω

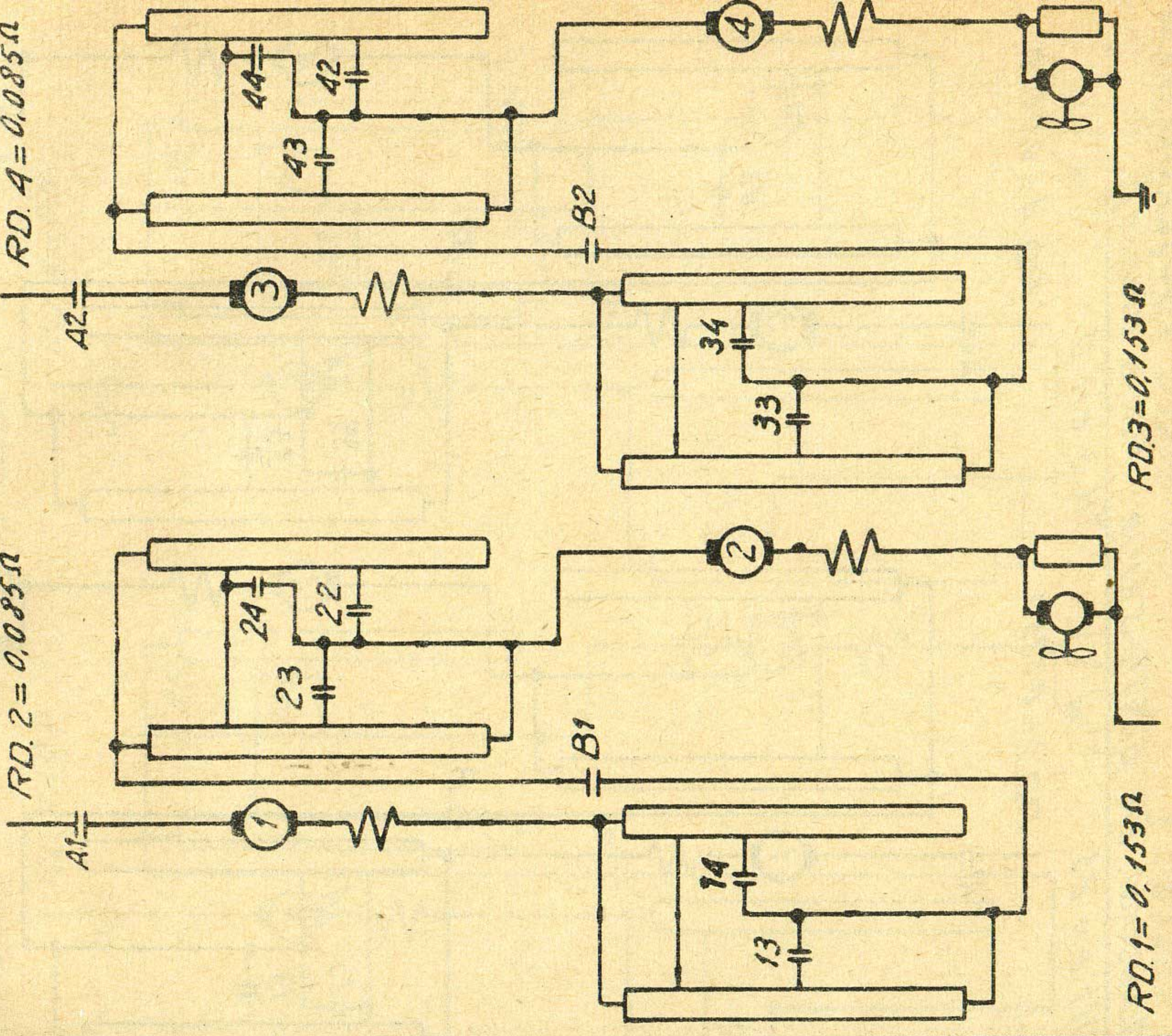
RD.4 = 0,3Ω



Manipulat. en posit. Série - Plein champ
JH.3 en 0

RD.2 = 0,085Ω

RD.4 = 0,085Ω

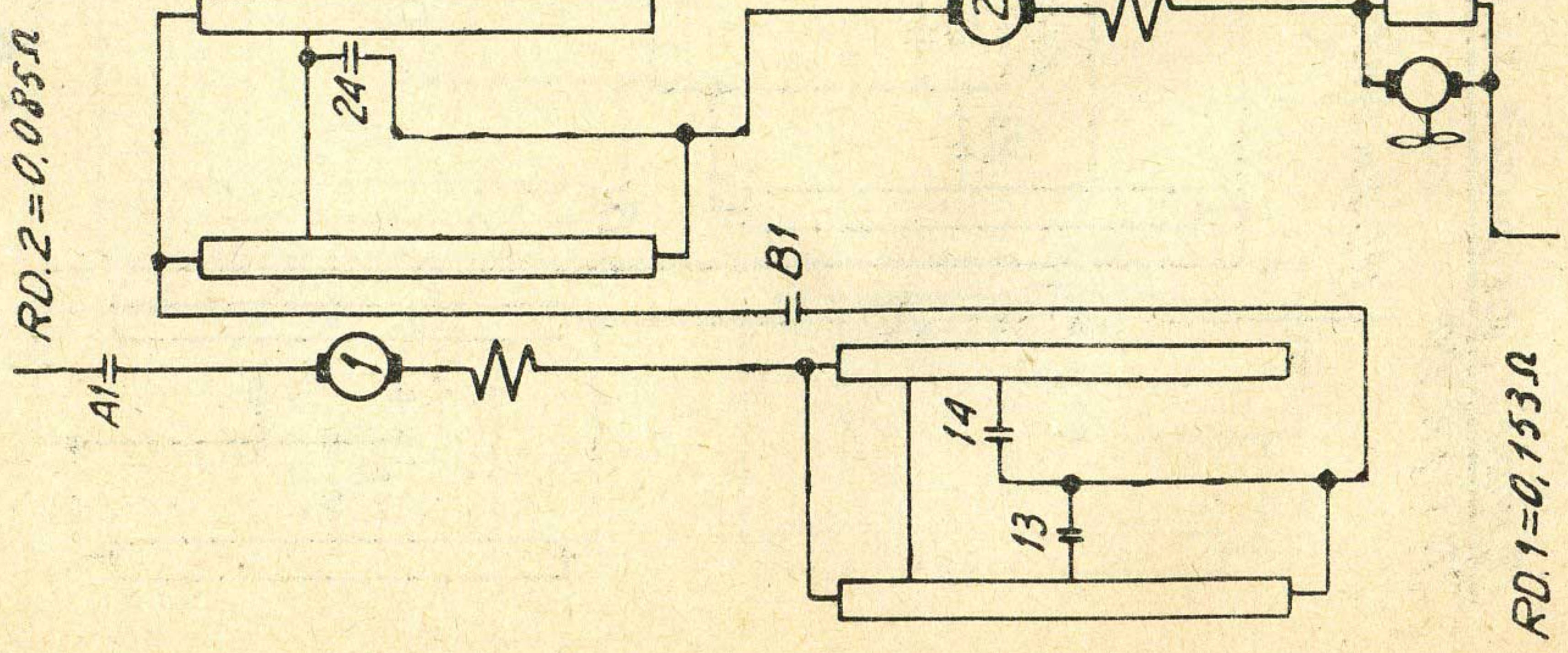


160/B.00.01.0.

Manipulat. en posit. Série - Plein champ

JH.1 en 22

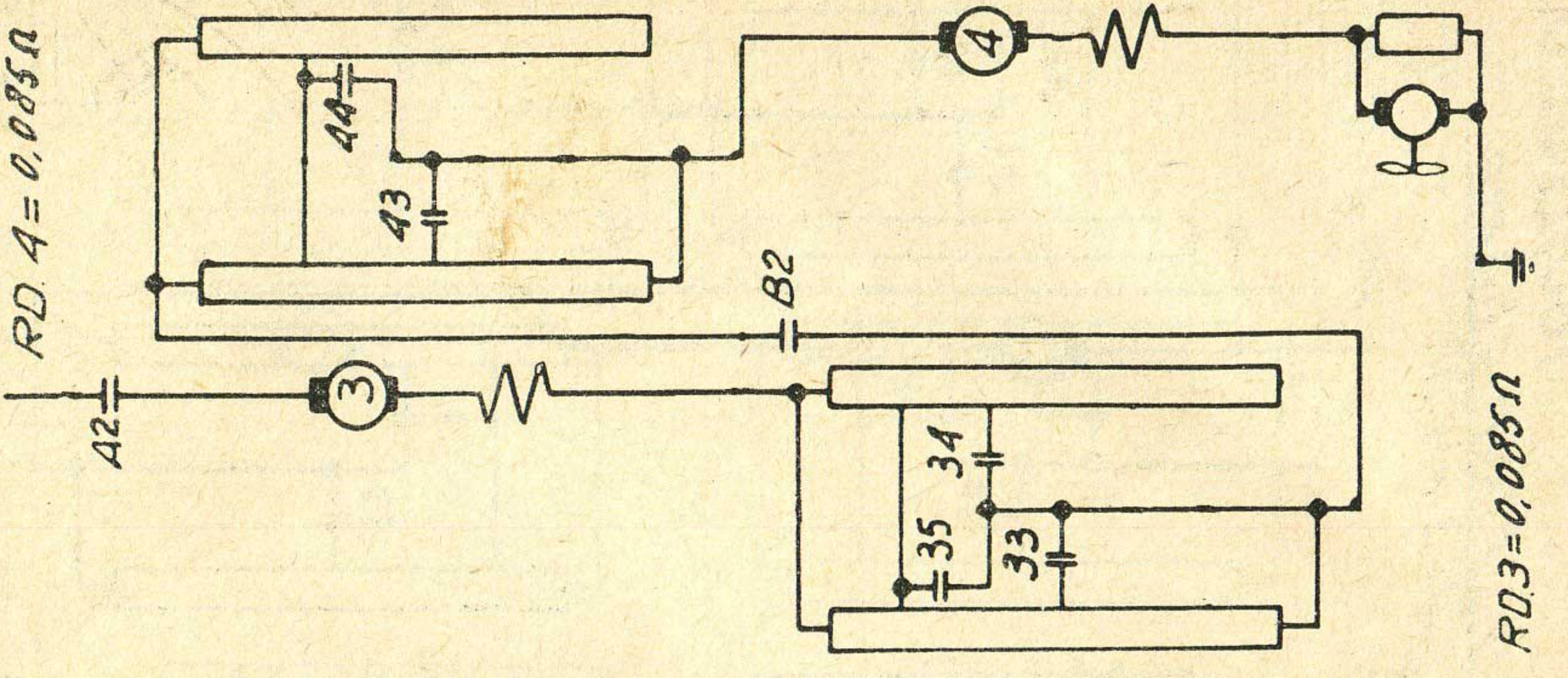
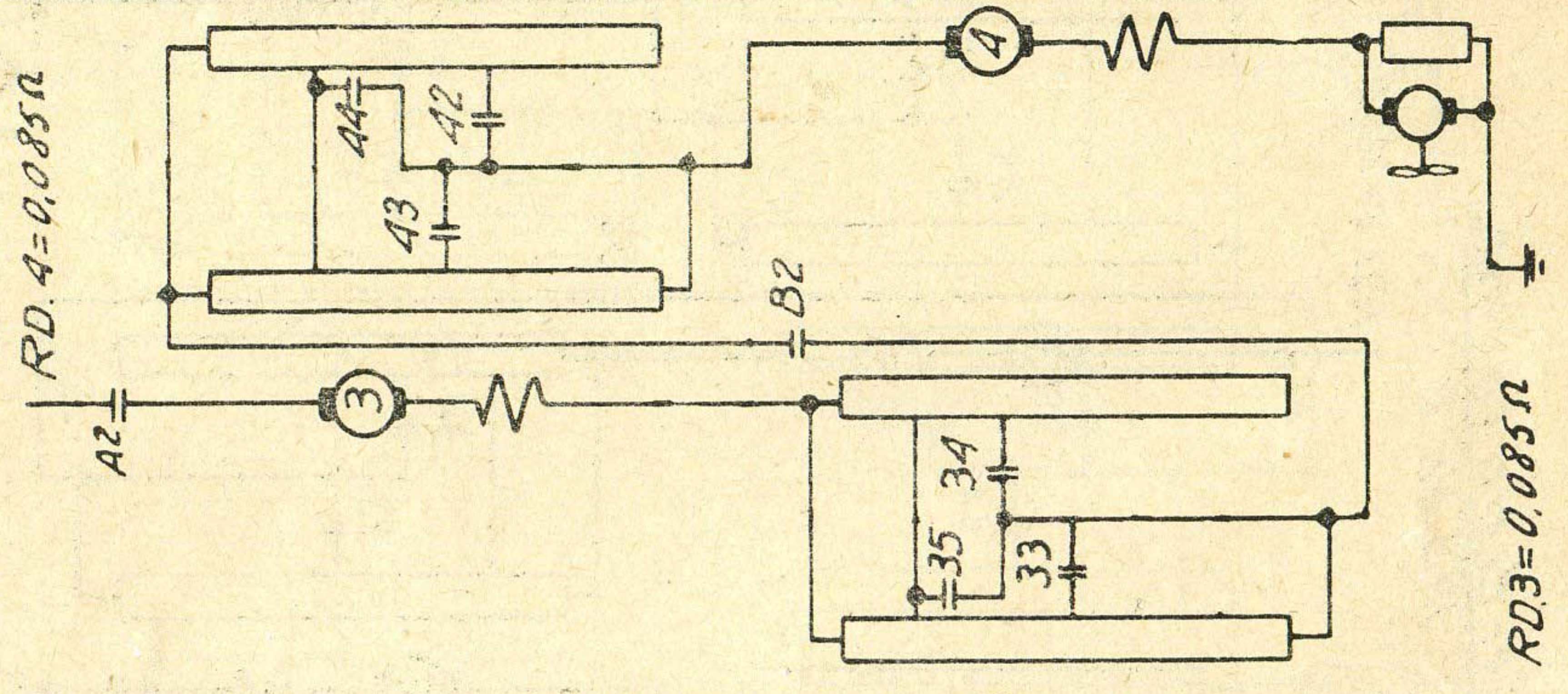
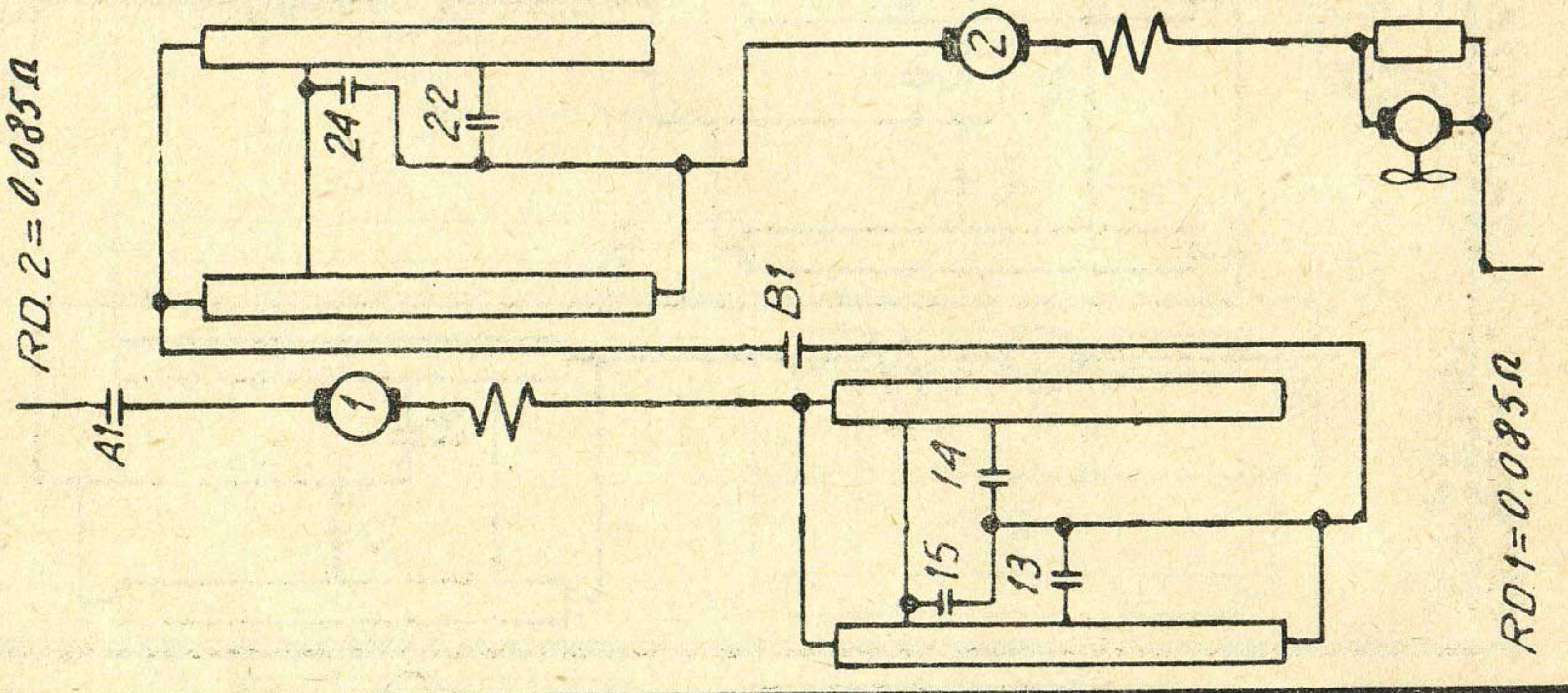
JH.3 en 0



Manipulat. en posit. Série - Plein champ

JH.1 en 23

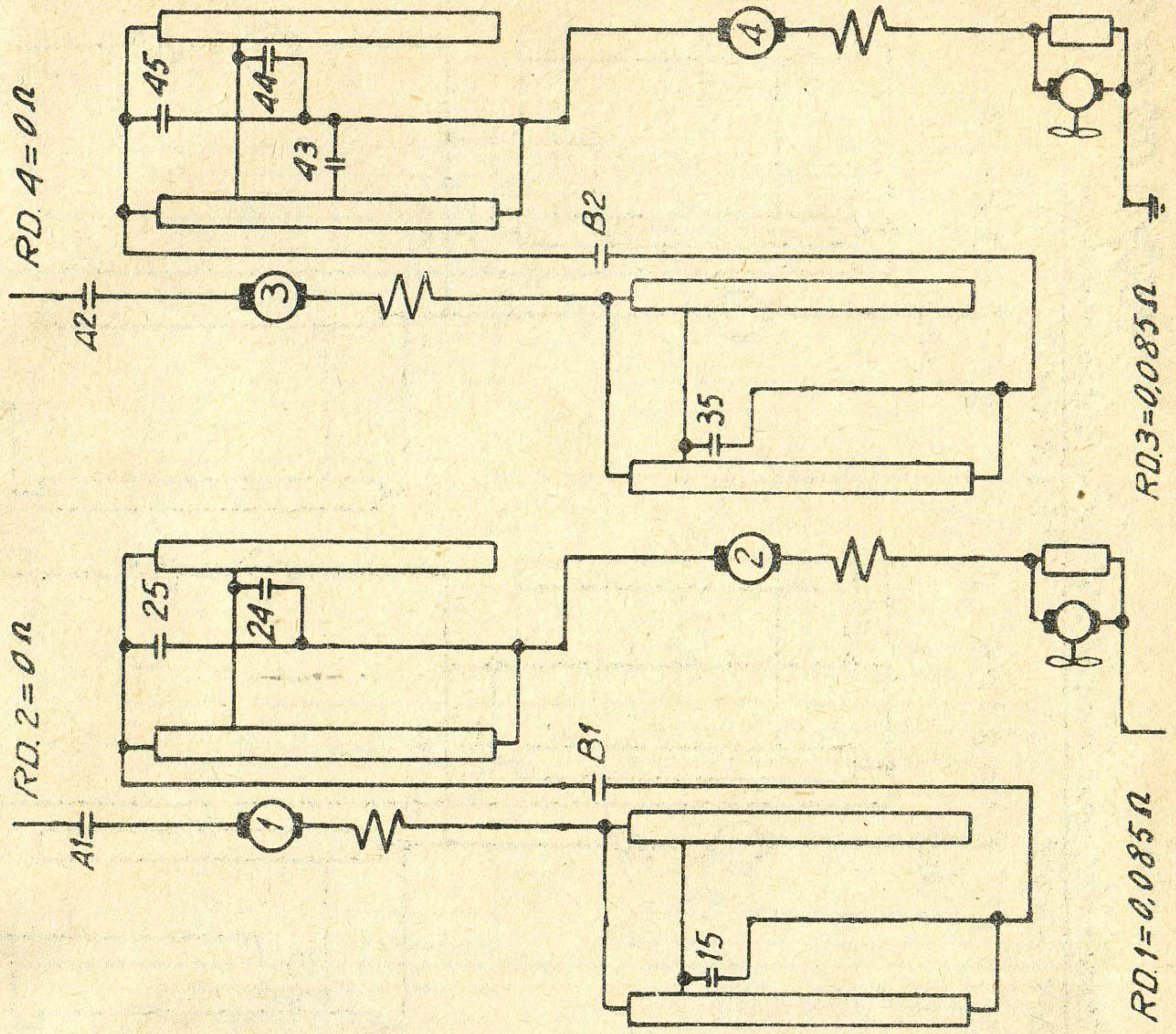
JH.3 en 0



160/B.00.01.014

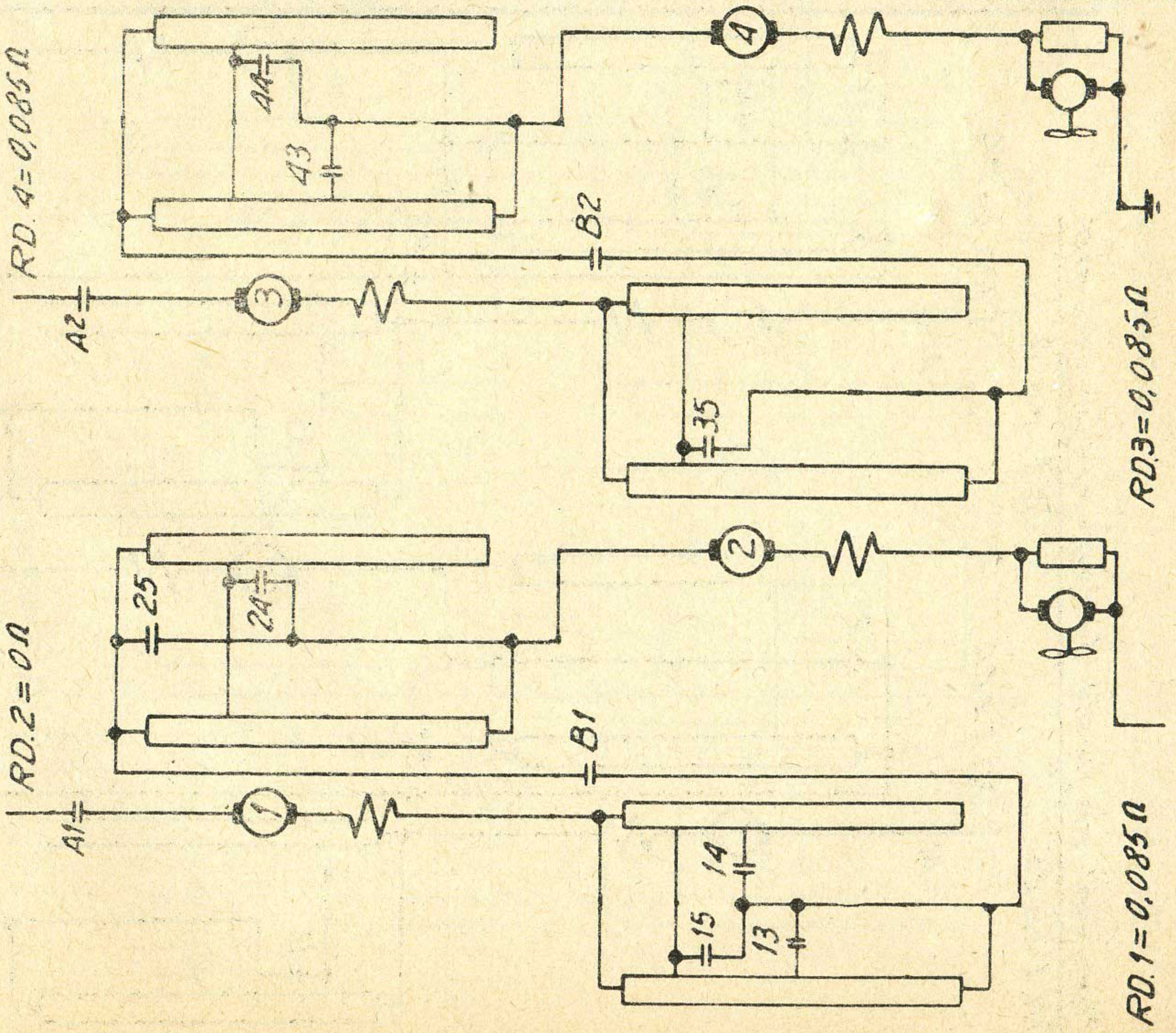
Manipulat. en posit. Série - Plein champ
JH1 en 25

JH.3 en 0



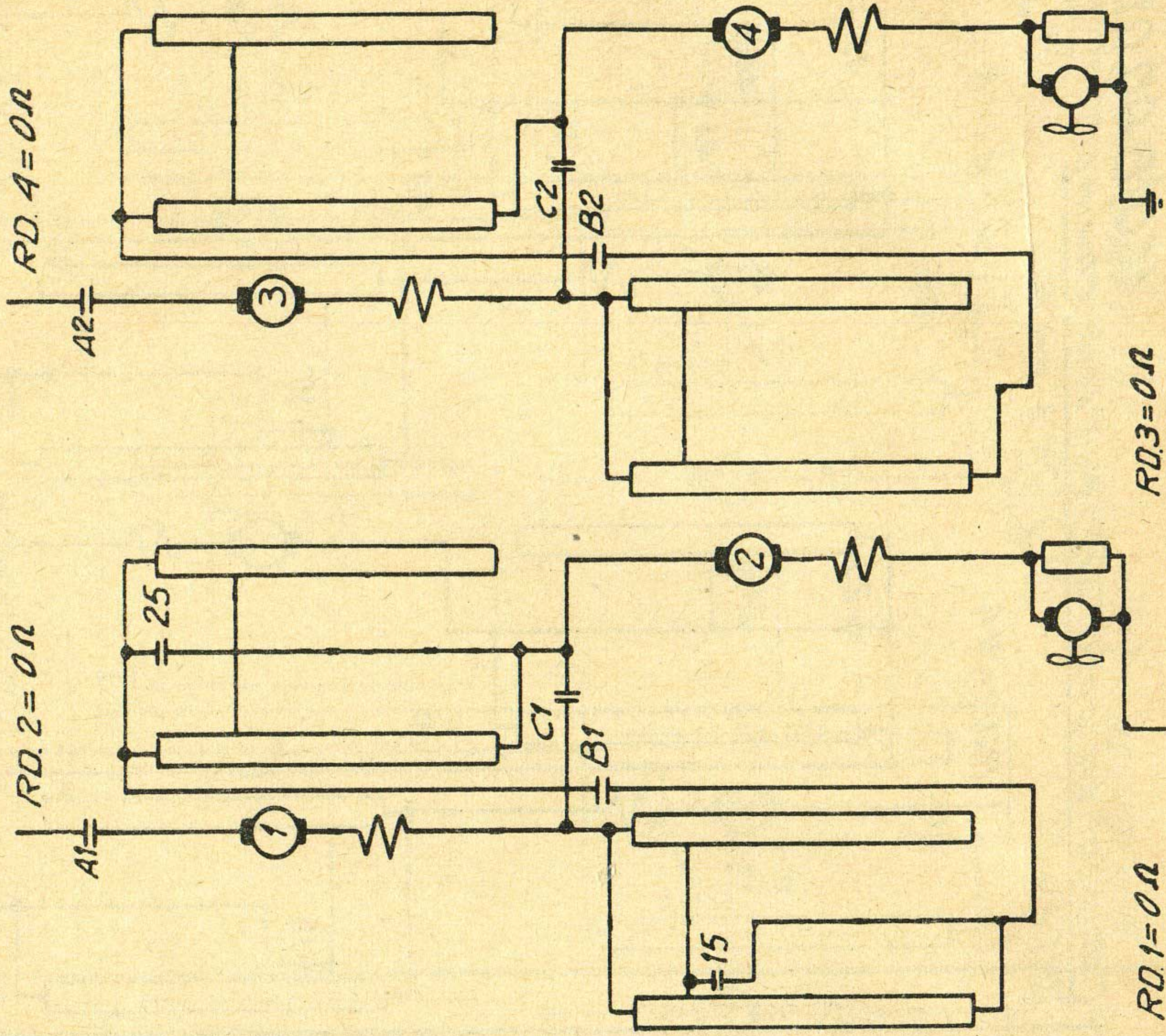
Manipulat. en posit. Série - Plein champ
JH1 en 24

JH.3 en 0

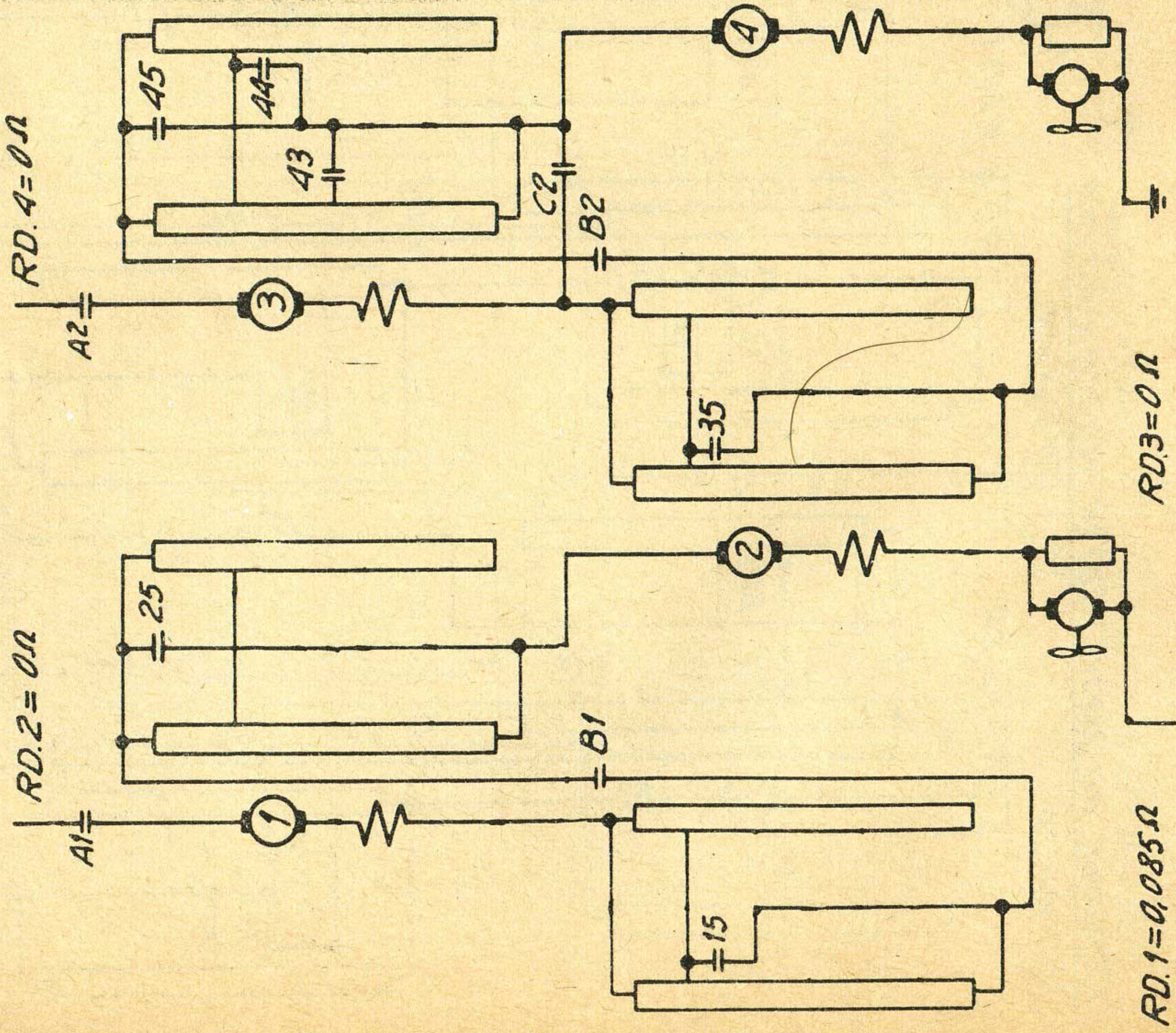


160/B.00.01.015

Manipulat. en posit. Série - Plein champ
JH.1. en 27



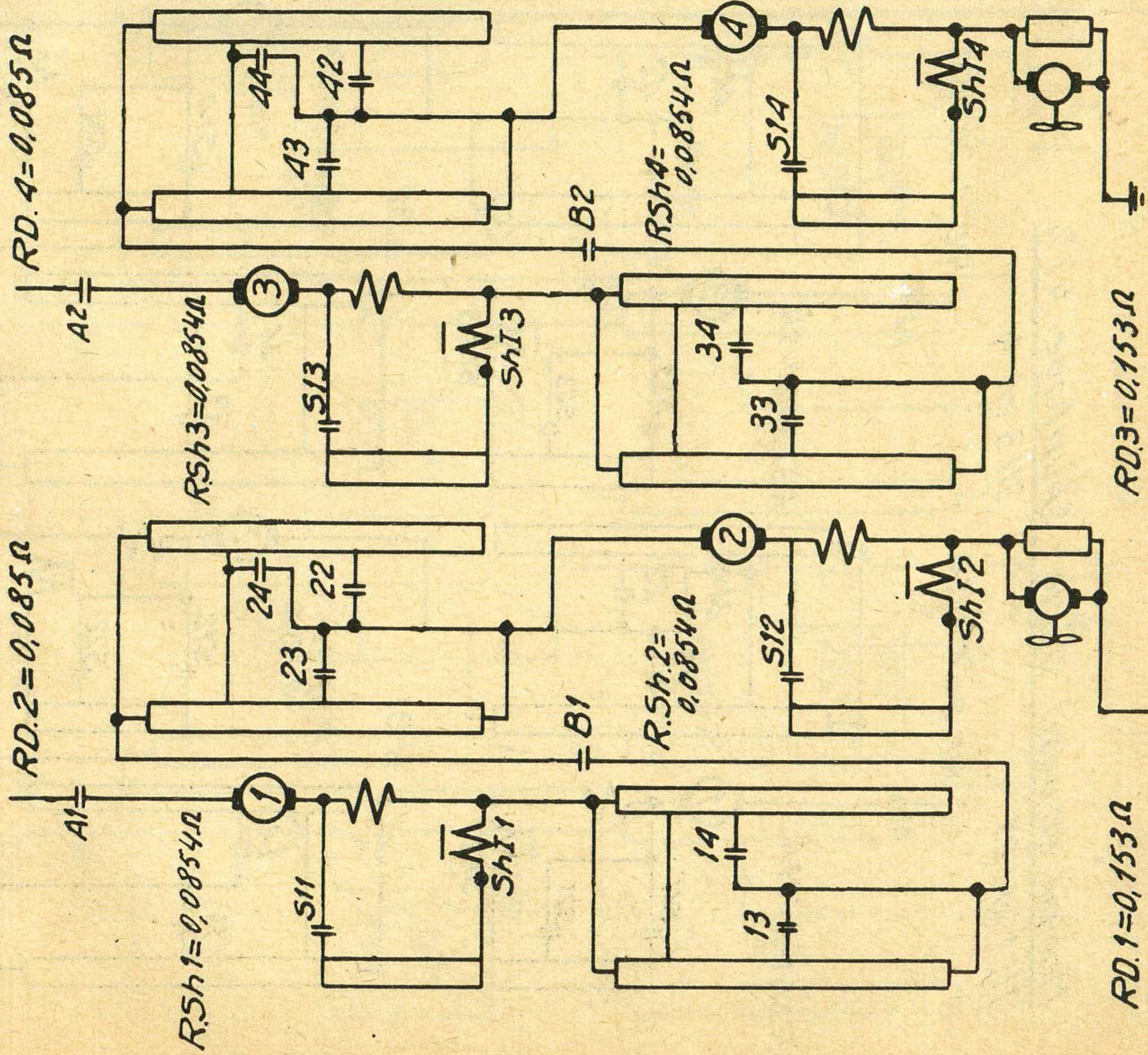
Manipulat. en posit. Série - Plein champ
JH.1 en 26



160/B.00.01.0

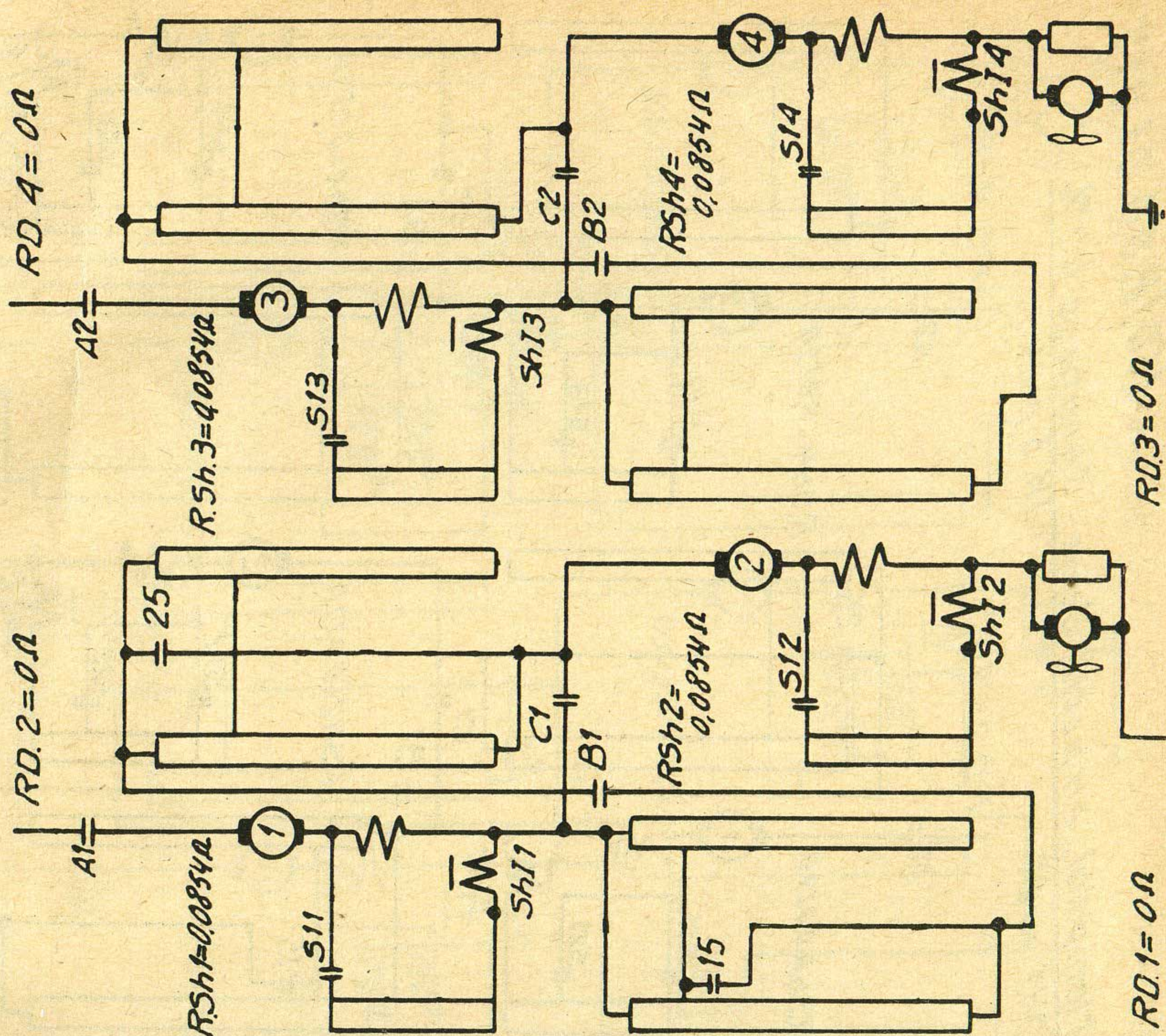
Manipulat. en posit. Serie - Shuntage 28%

JH.1 en 21



Manipulat. en posit. Serie - Shuntage 28%

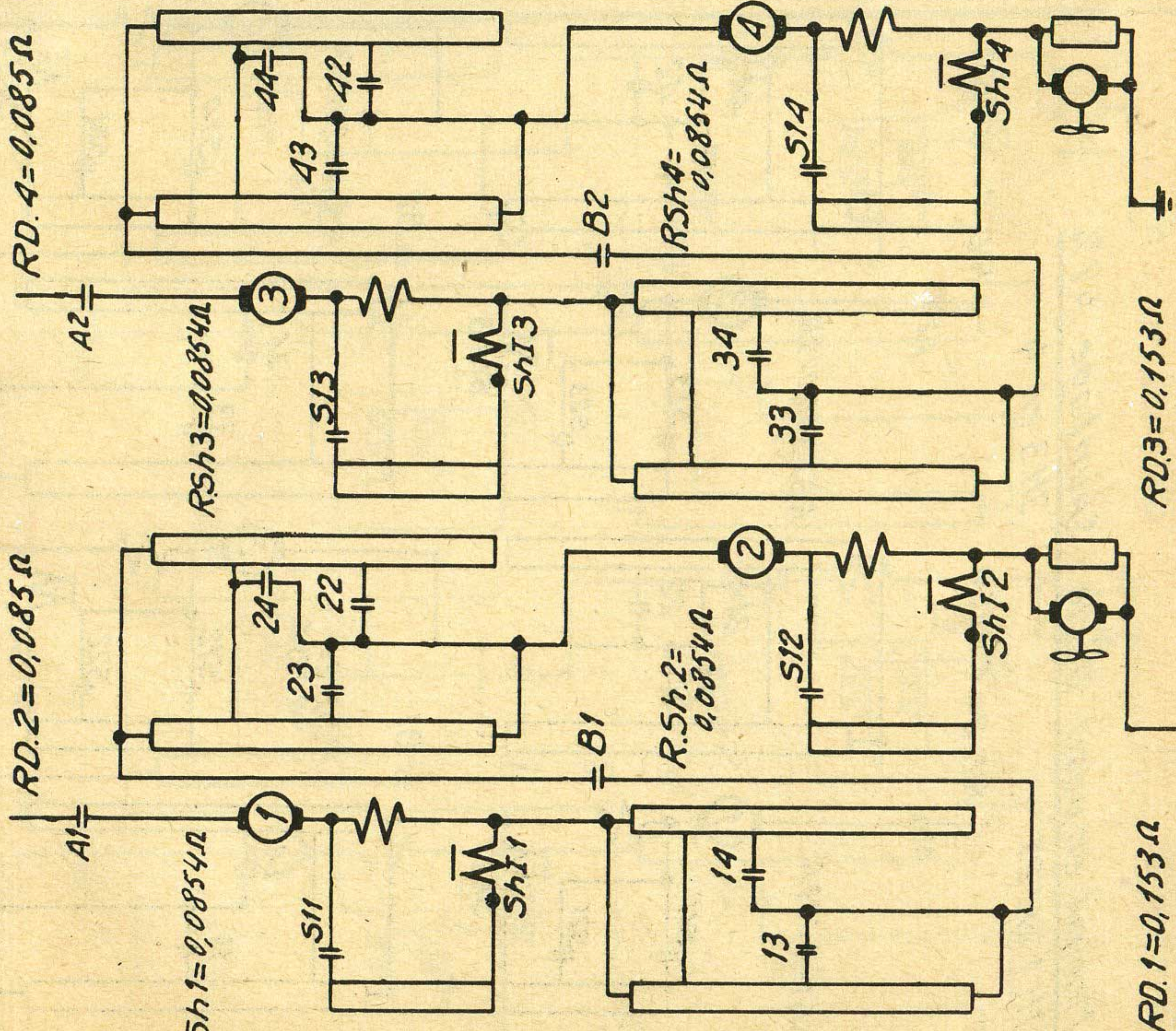
JH.1 en 27



JH.3 en 2

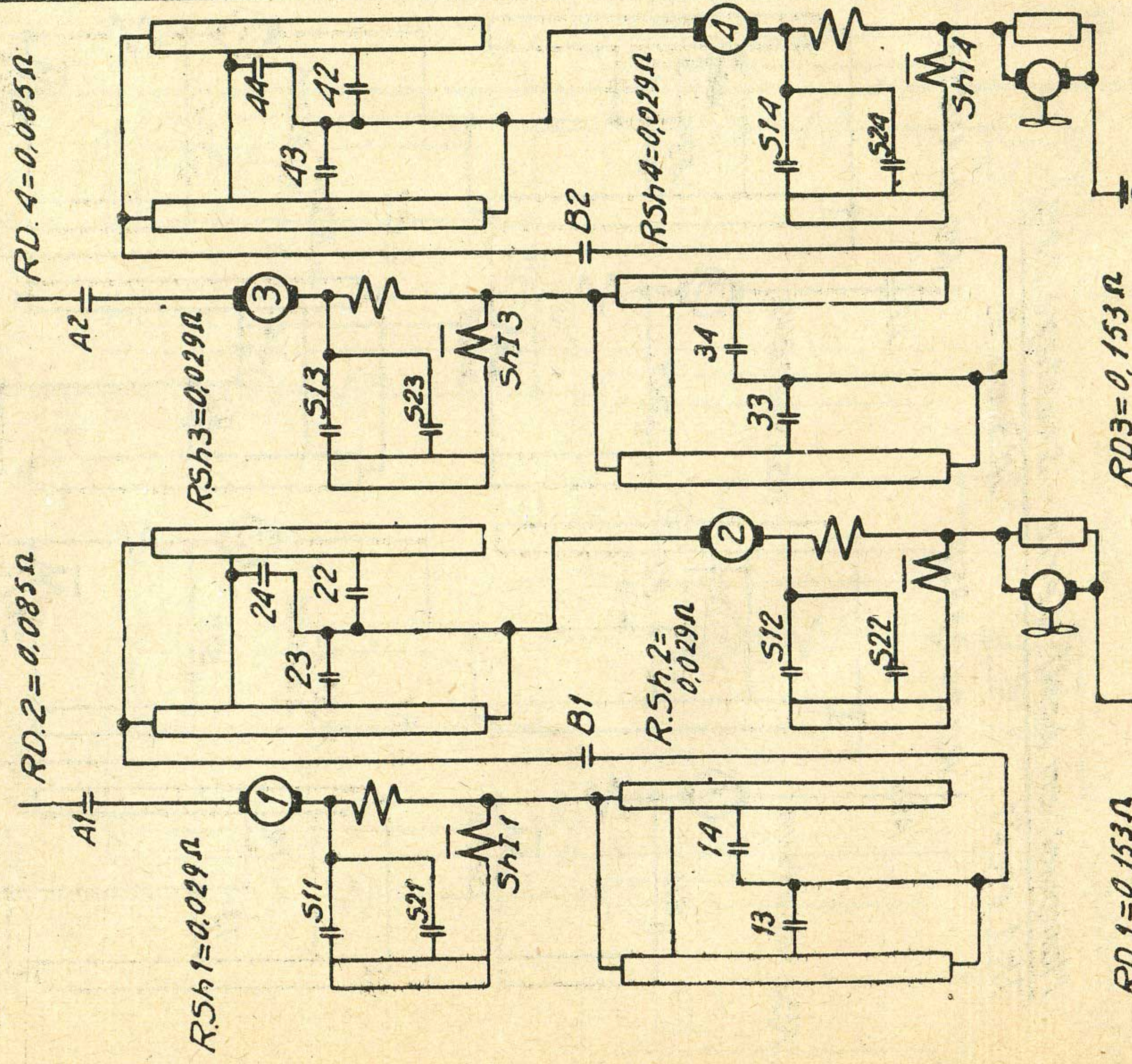
Manipulat. en posit. Serie - Shuntage 28%

JH.3 en 2

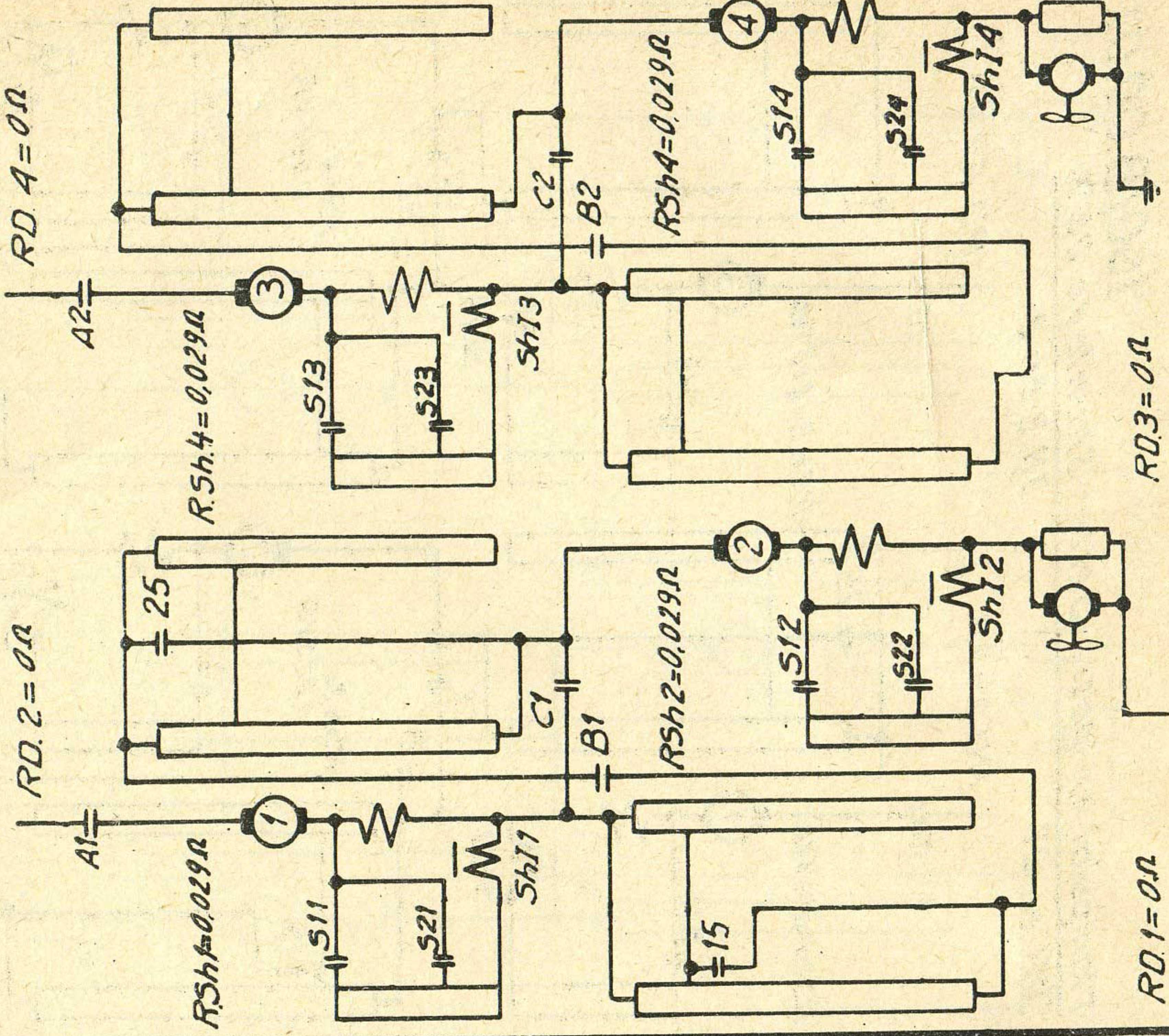


160/B00.01.017

Manipul. en posit. Série - Shuntage 47%
 JH.1 en 21



Manipul. en posit. Série - Shuntage 47%
 JH.3 en 4

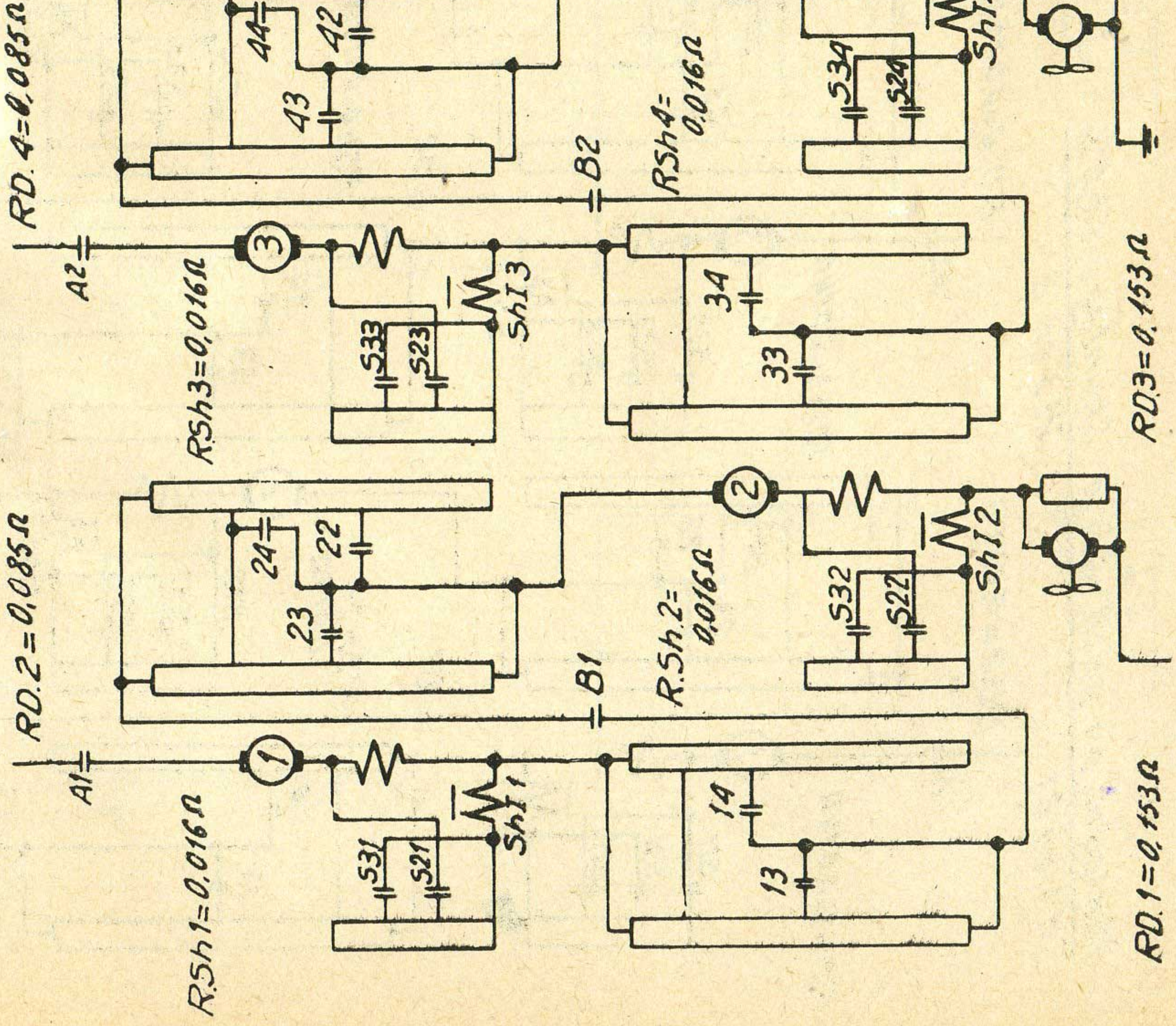


160/B.00.01.018

Manipulat. en posit. Série - Shuntage 56%

JH 1 en 21

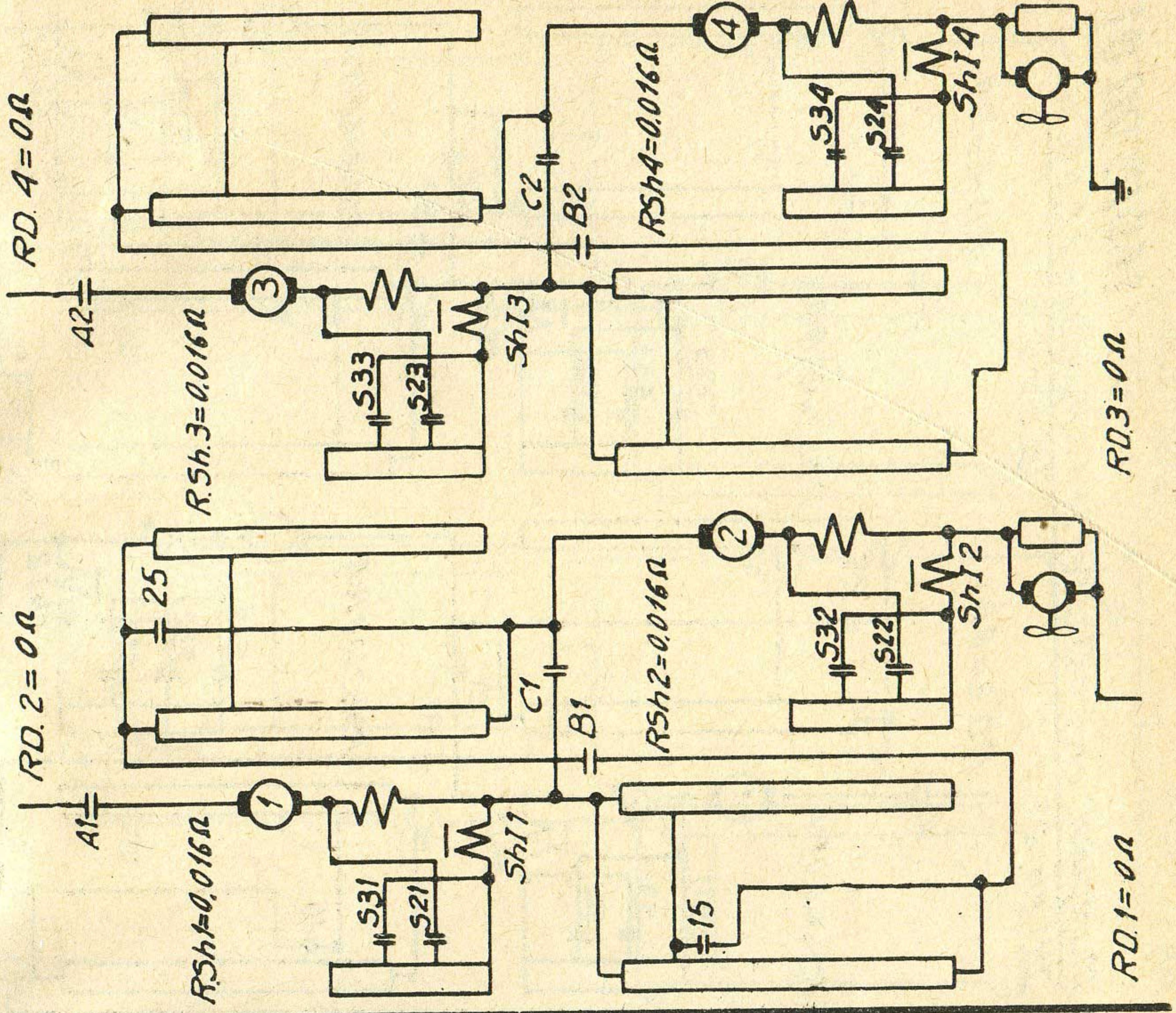
JH 3 en 6



Manipulat. en posit. Série - Shuntage 56%

JH 1 en 27

JH 3 en 6



160/B.00.01.01

Manipulat. en posit. Série - Shuntage 62,5%

JH.1 en 21

$RD.2 = 0.085\Omega$

$RD.4 = 0.085\Omega$

JH.3 en 8

A2

A1

$RD.2 = 0\Omega$

$RD.4 = 0\Omega$

Manipulat. en posit. Série - Shuntage 62,5%

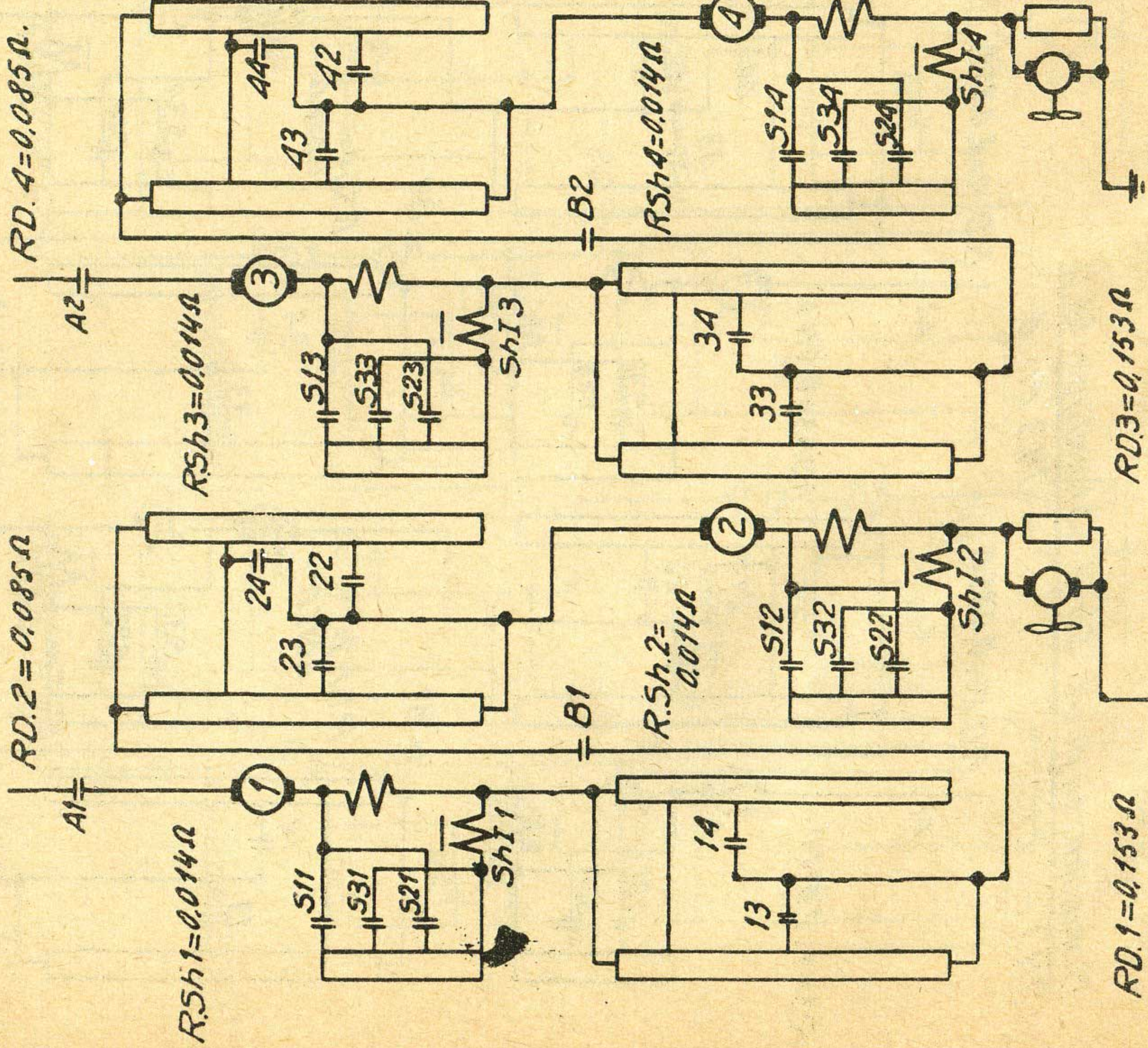
JH.3 en 8

A1

A2

$RD.2 = 0\Omega$

$RD.4 = 0\Omega$



A1

A2

$RD.2 = 0.085\Omega$

$RD.4 = 0.085\Omega$

A2

A1

$RD.2 = 0\Omega$

$RD.4 = 0\Omega$

A1

A2

$RD.2 = 0\Omega$

$RD.4 = 0\Omega$

A1

A2

$RD.2 = 0\Omega$

$RD.4 = 0\Omega$

160/B.00.01.020

Transition Série - Parallèle.

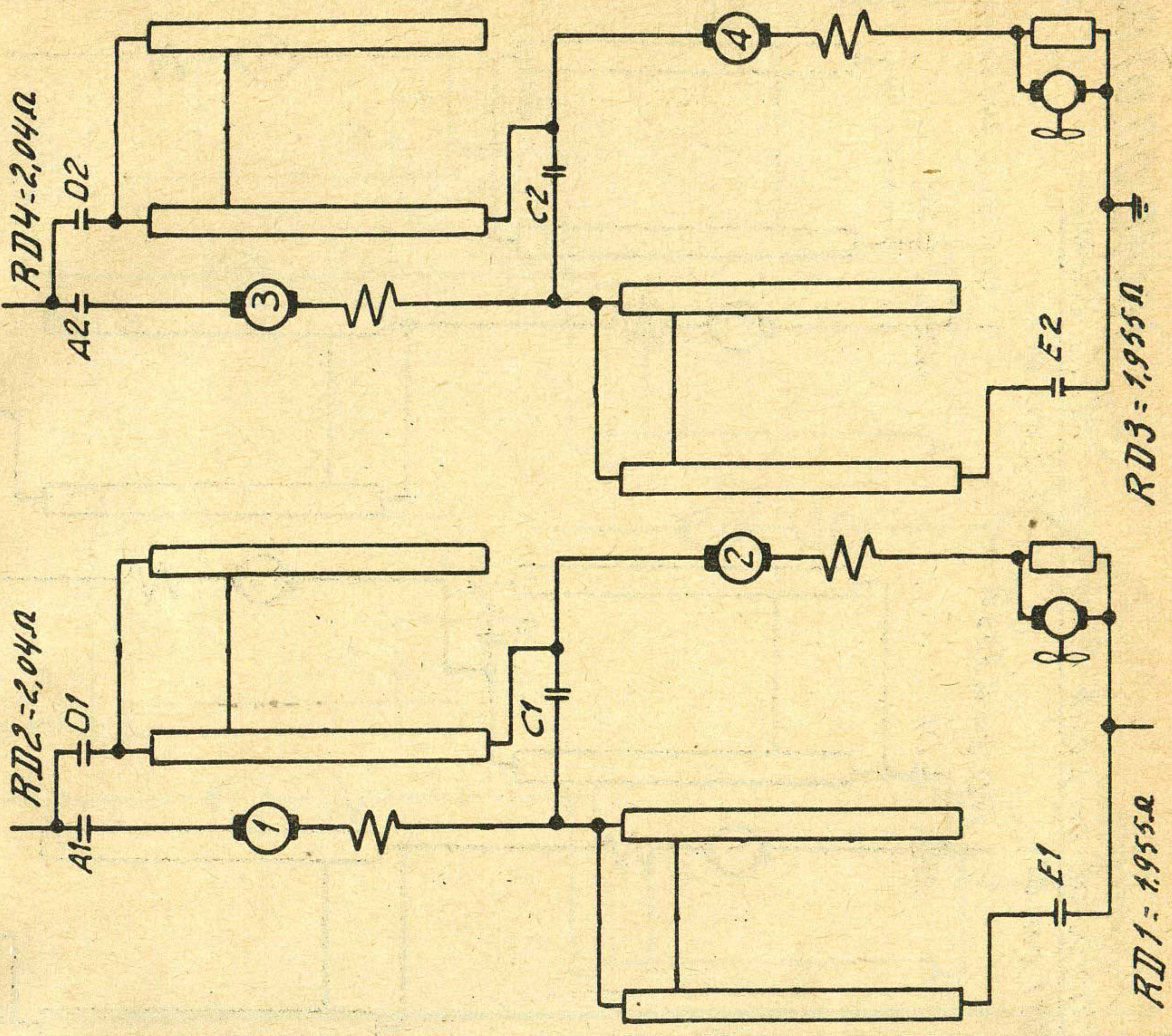
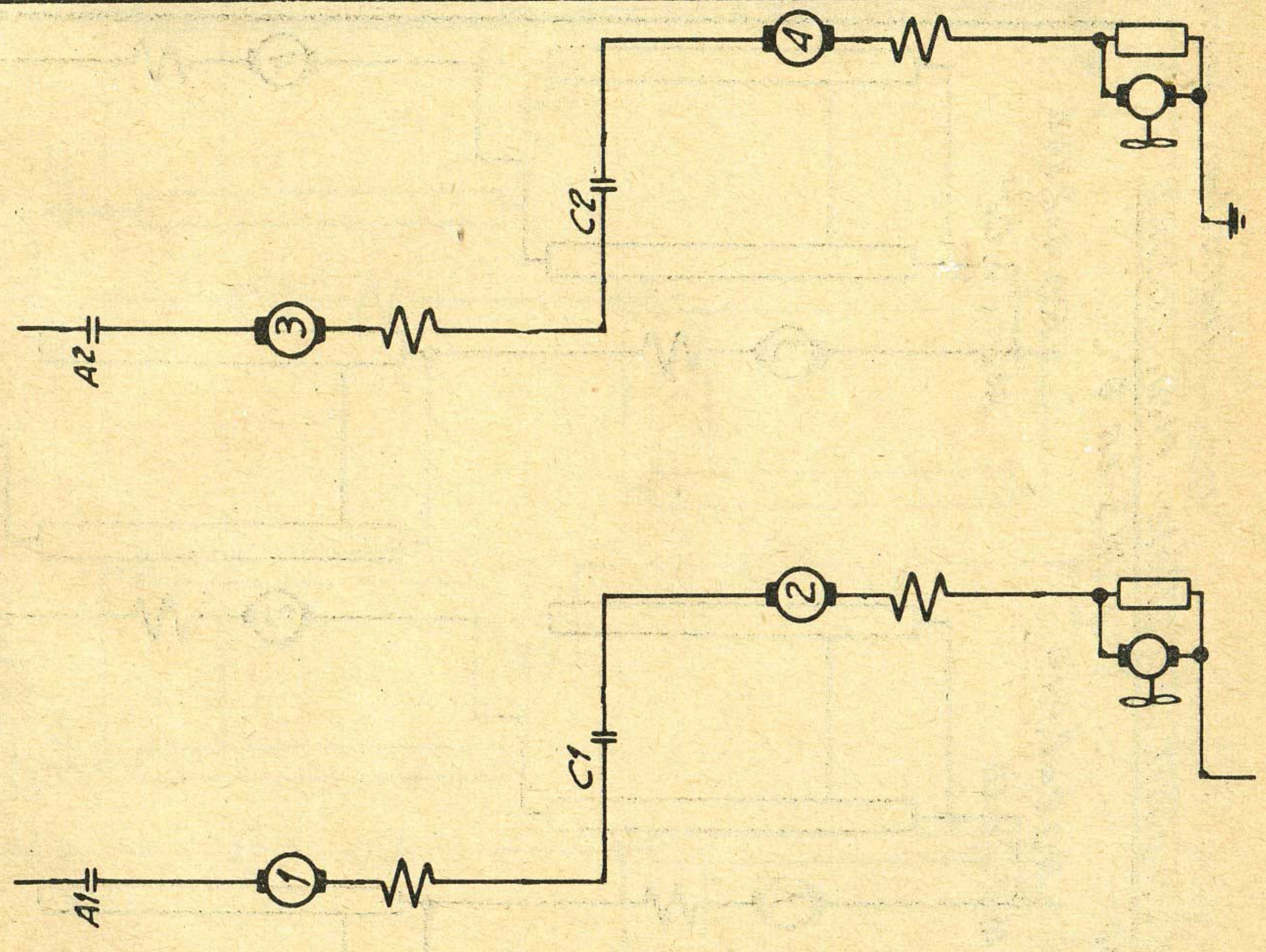
Manipulat. en posit. - Parallèle - Plein champ

JH.1 en 28

Manipulat. en posit. Parallèle - Plein champ

JH.1 en 29

JH.3 en 0



Transition Série - Parallèle

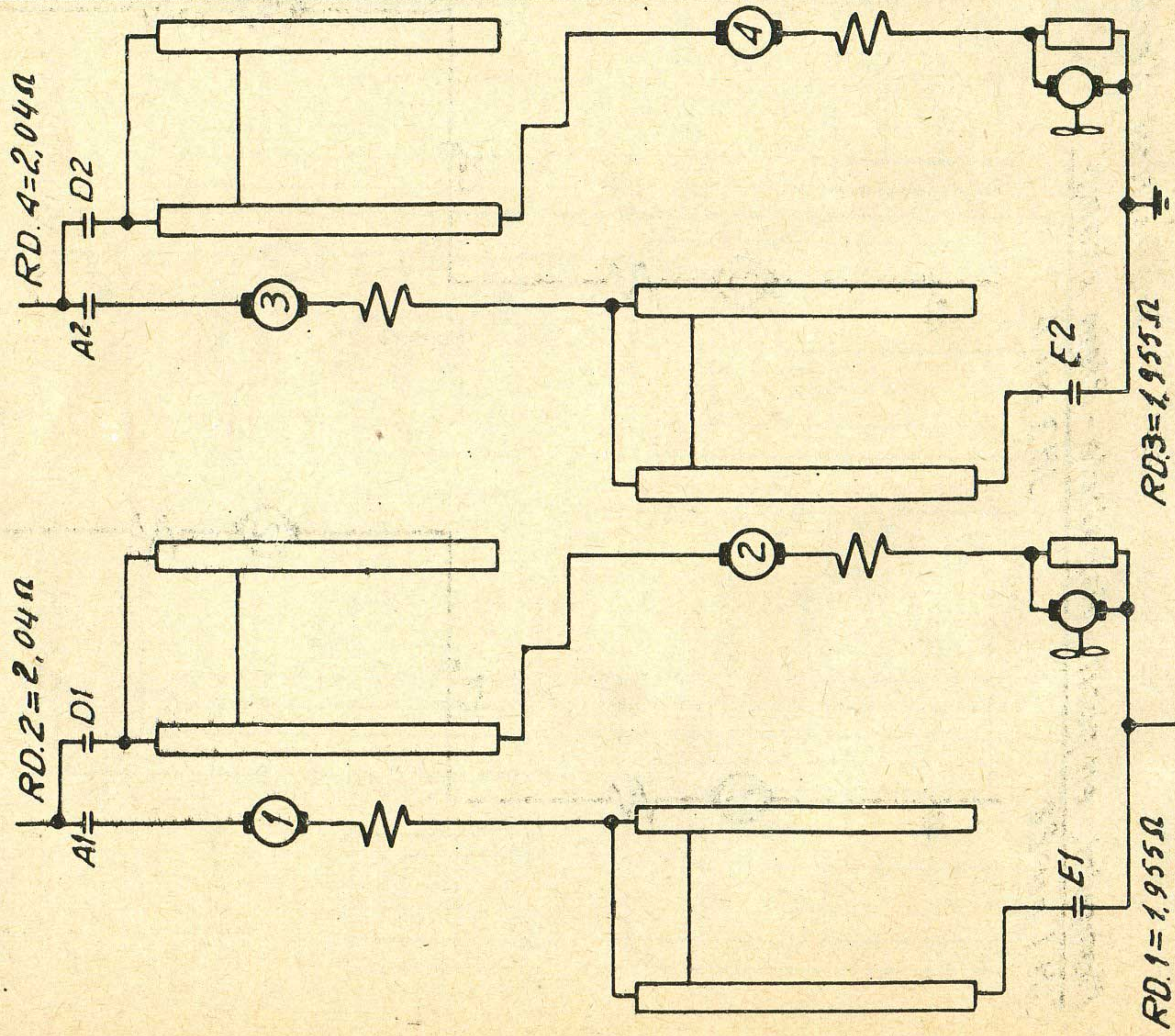
160/B.00.01.021

Manipulat. en posit. Parallèle - Plein champ

Manipulat. en posit. Parallèle - Plein champ

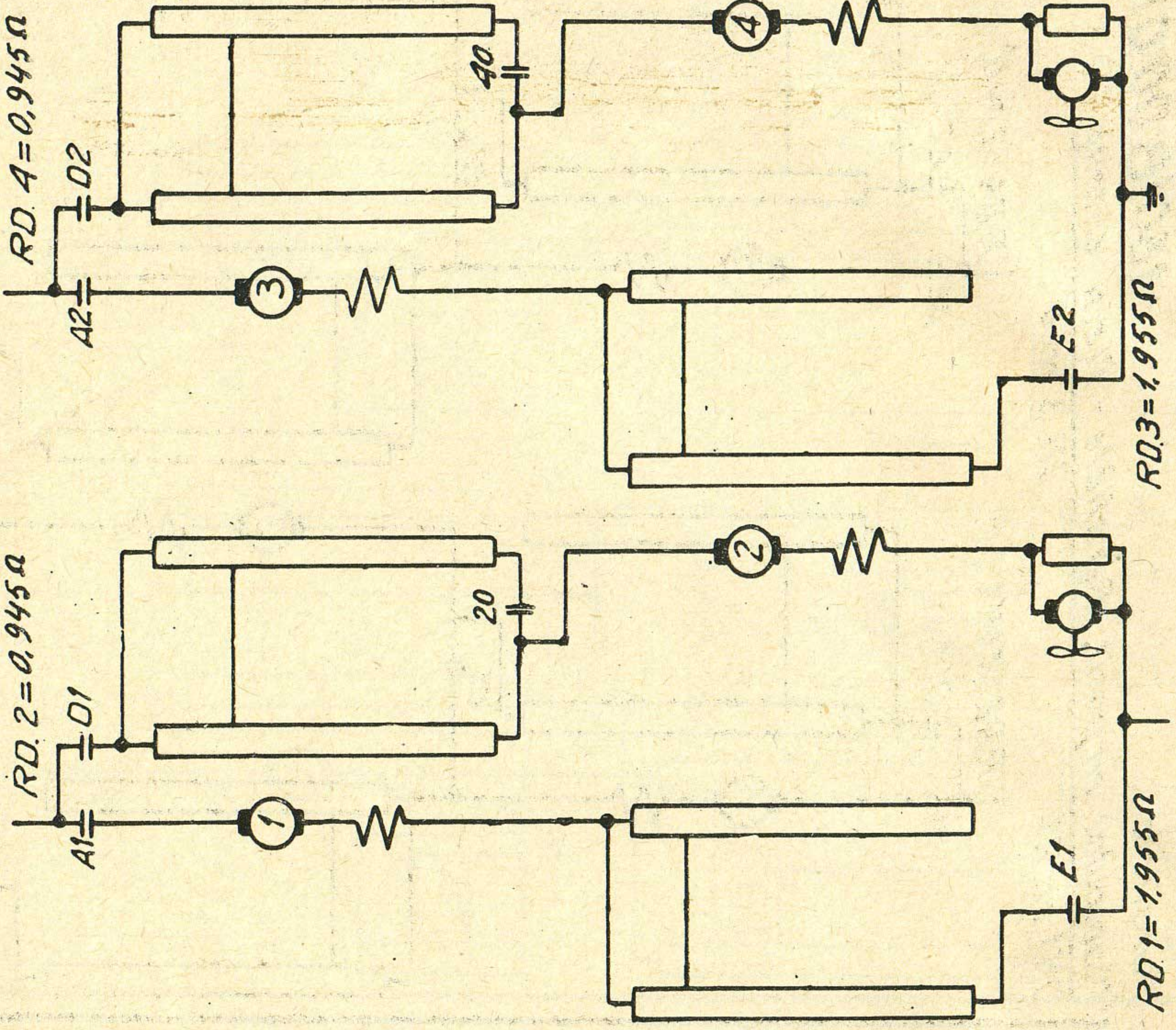
JH.1 en 30

JH.3 en 0



JH.1 en 31

JH.3 en 0

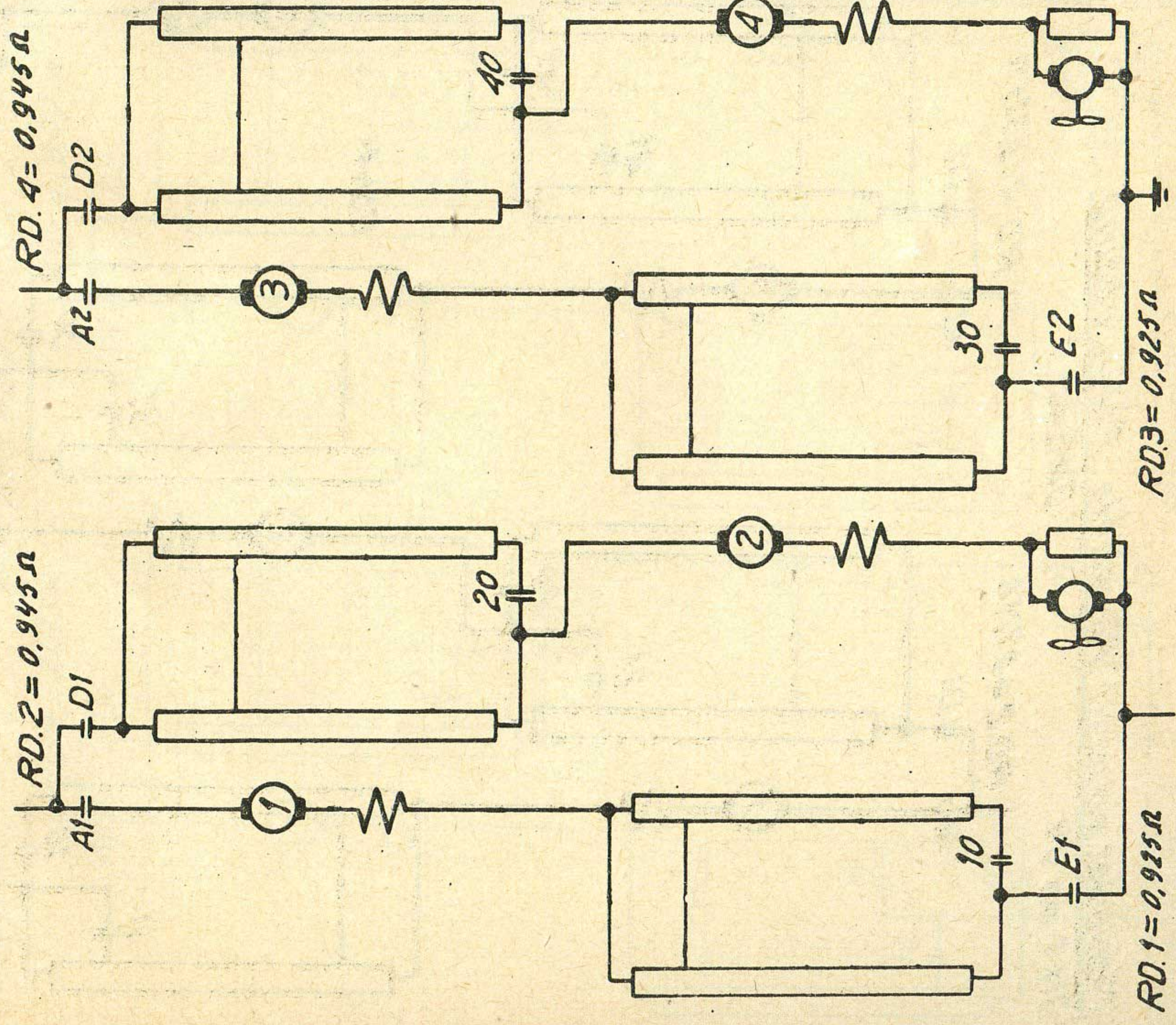


160/B.00.01.02

Manipulat. en posit. Parallèle - Plein champ

JH.1 en 32

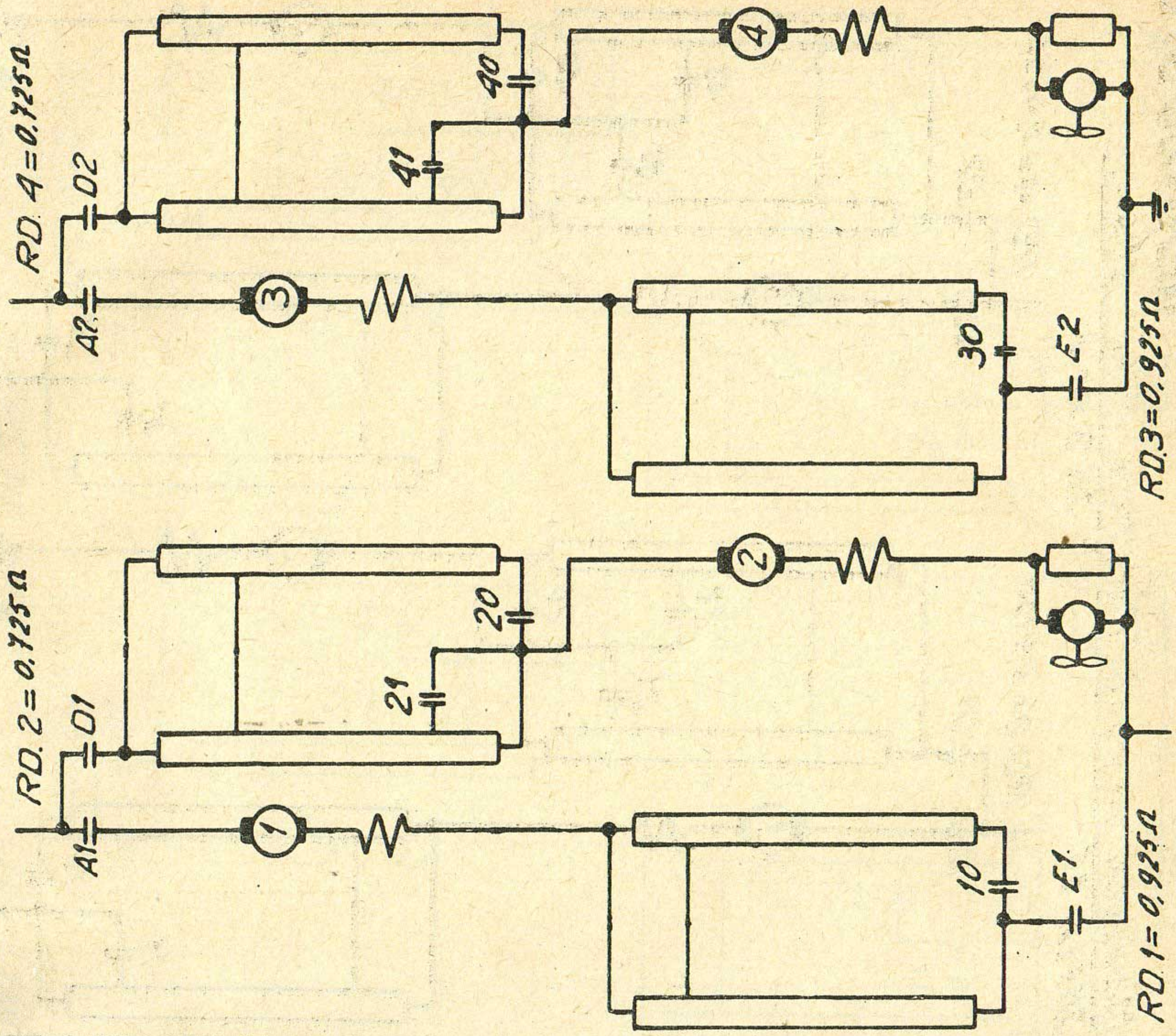
JH.3 en 0.



Manipulat. en posit. Parallèle - Plein champ

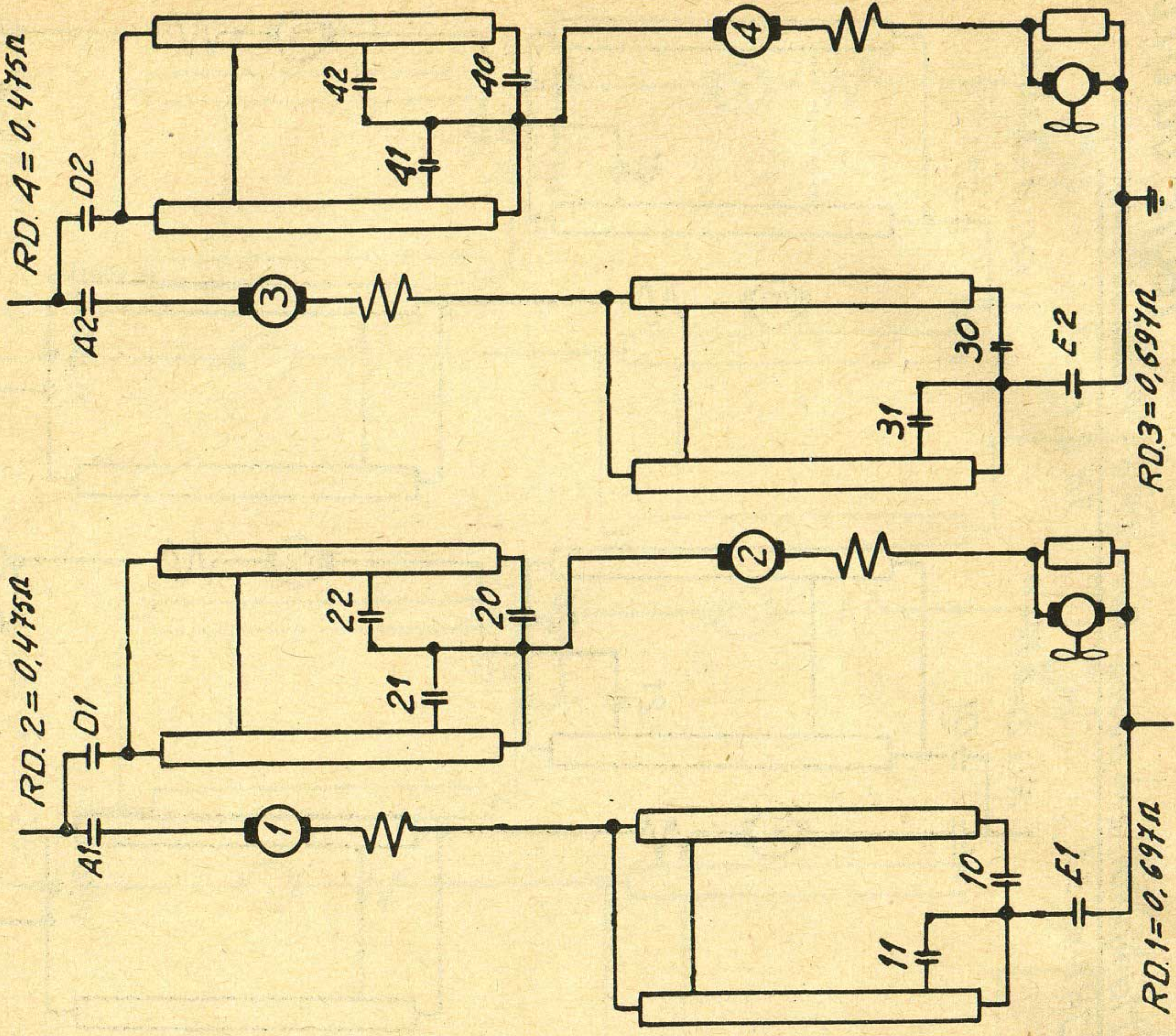
JH.1 en 33

JH.3 en 0

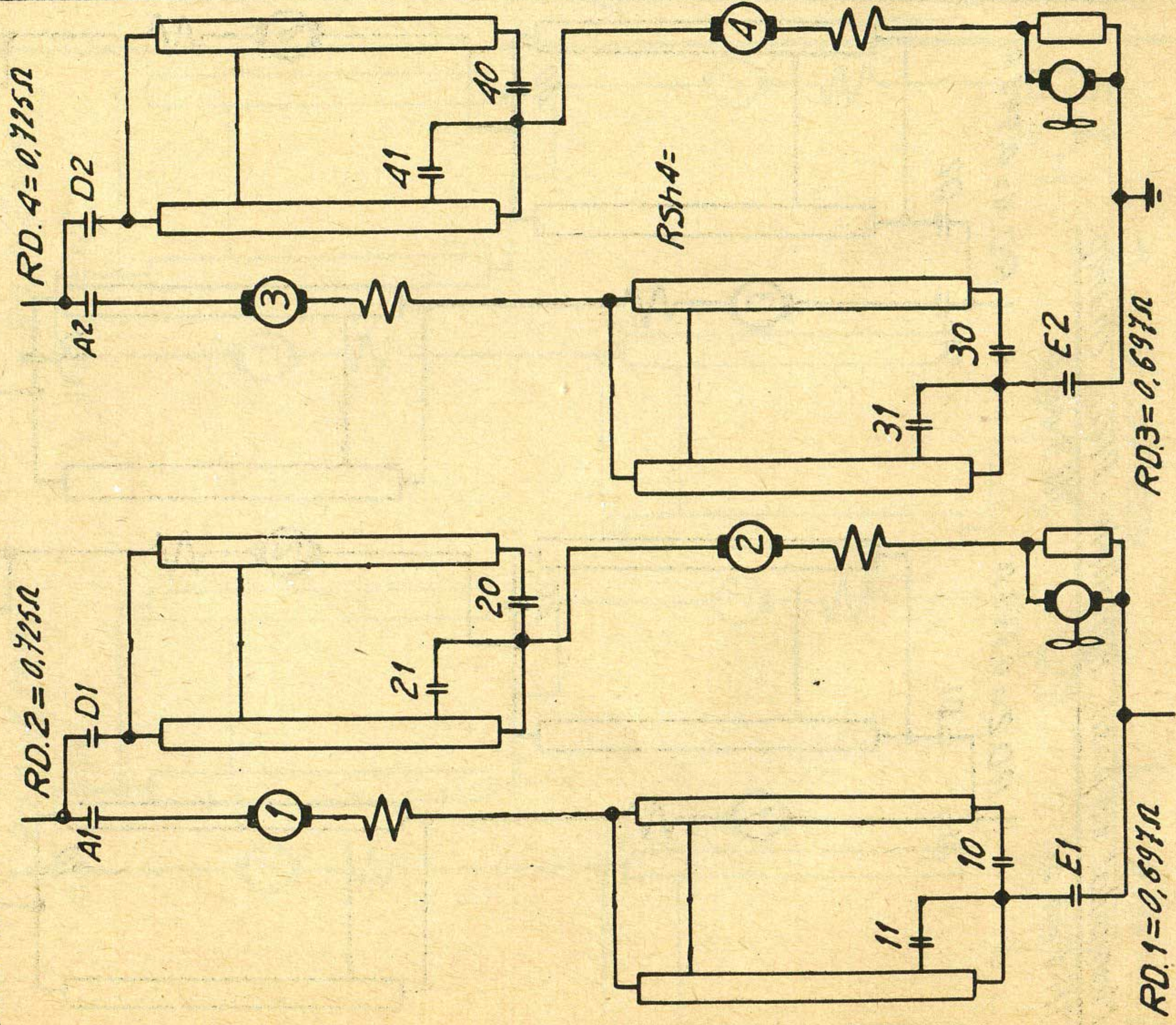


160/B.00.01.02

Manipulat. en posit. Parallèle - Plein champ
JH.1 en 35



Manipulat. en posit. Parallèle - Plein champ
JH.3 en 0

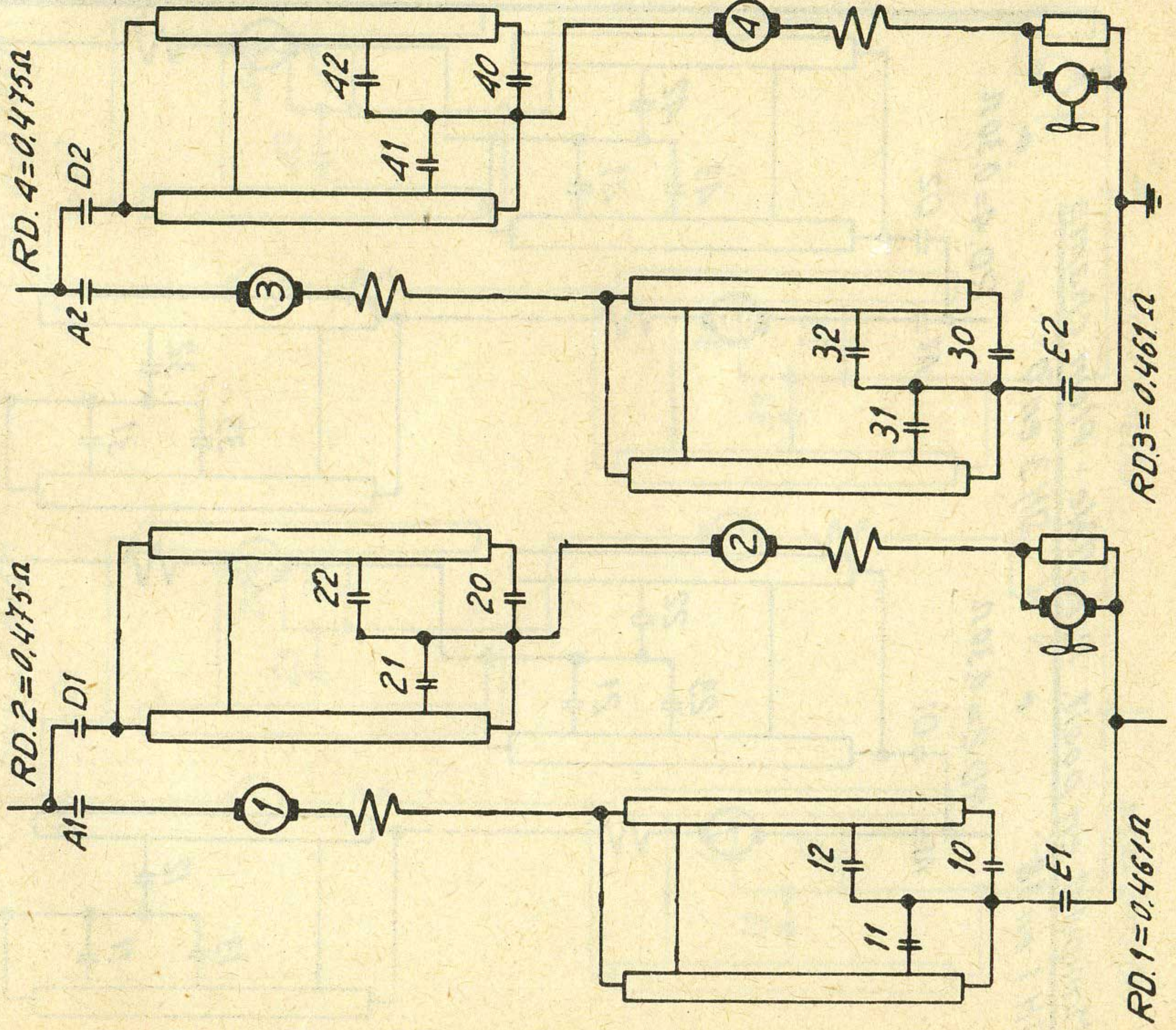


160/B.00.01.02

Manipulat. en posit. Parallele - Plein champ

JH.1 en 36

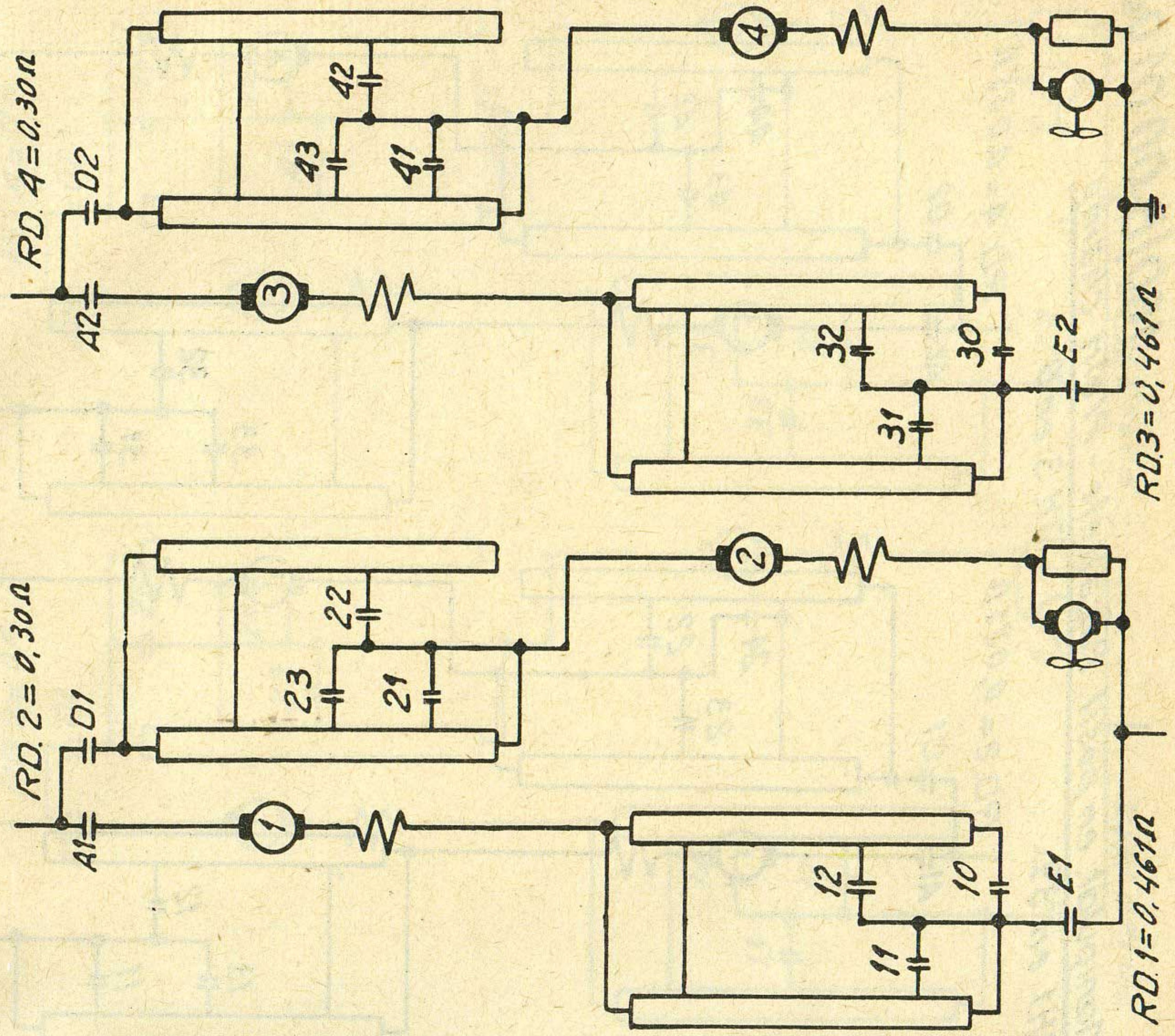
JH.3 en 0



Manipulat. en posit. Parallele - Plein champ

JH.1 en 37

JH.3 en 0

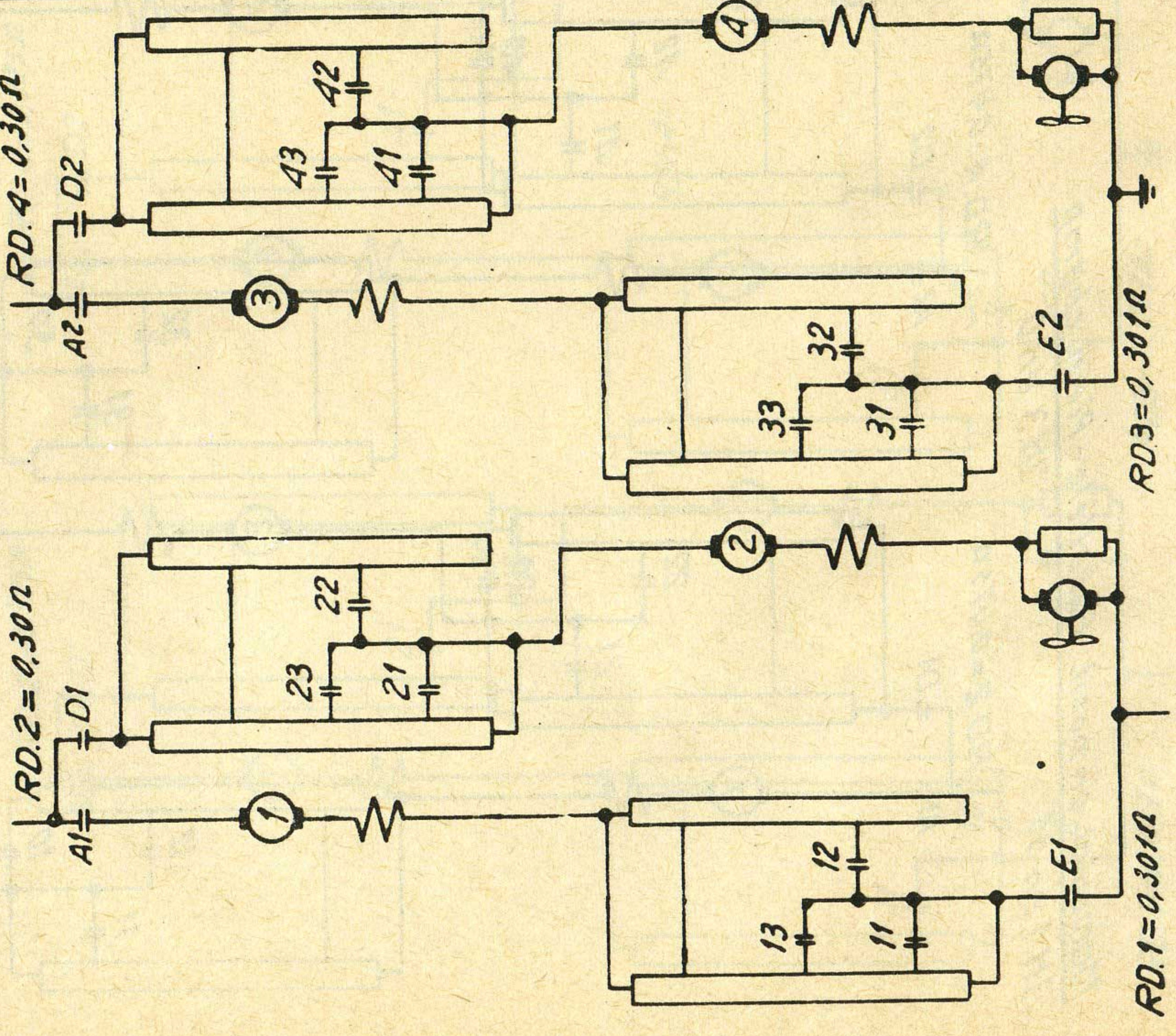


160/B.00.01.025

Manipulat. en posit. Parallèle - Plein champ

JH.1 en 38

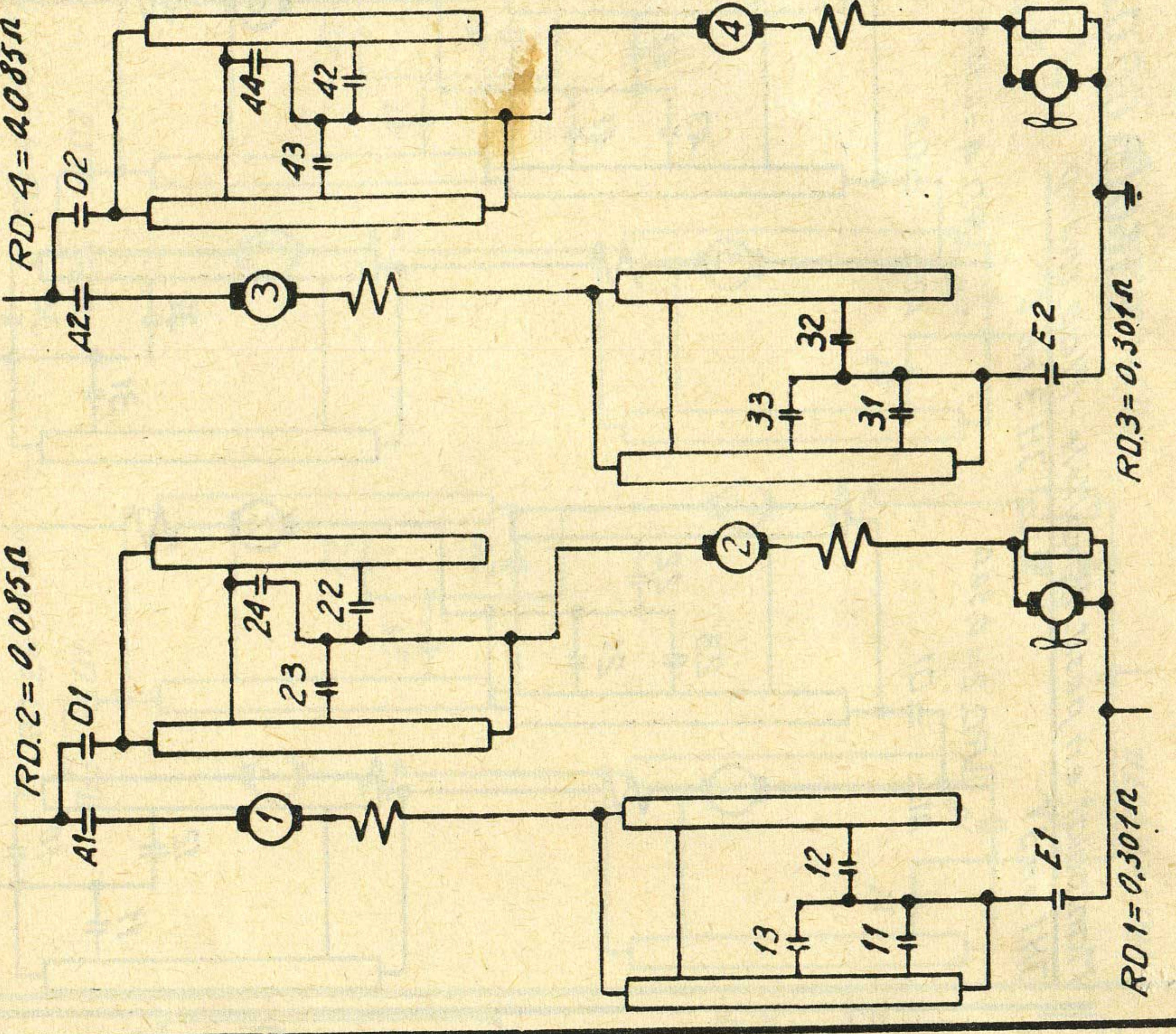
JH.3 en 0



Manipulat. en posit. Parallèle - Plein champ

JH.1 en 39

JH.3 en 0

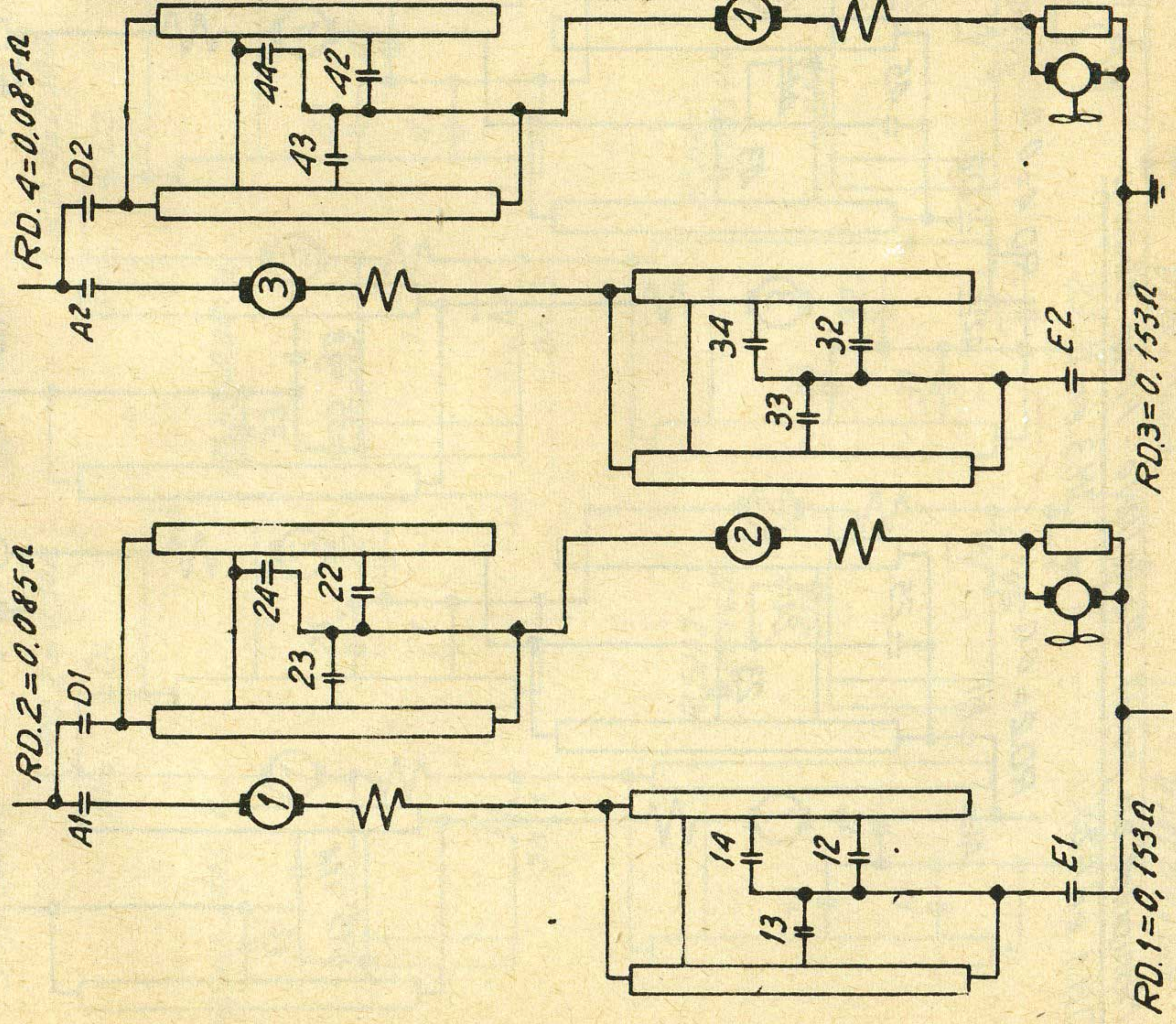


160/B.00.01.02

Manipulat. en posit. Parallèle - Plein champ

JH.1 en 40

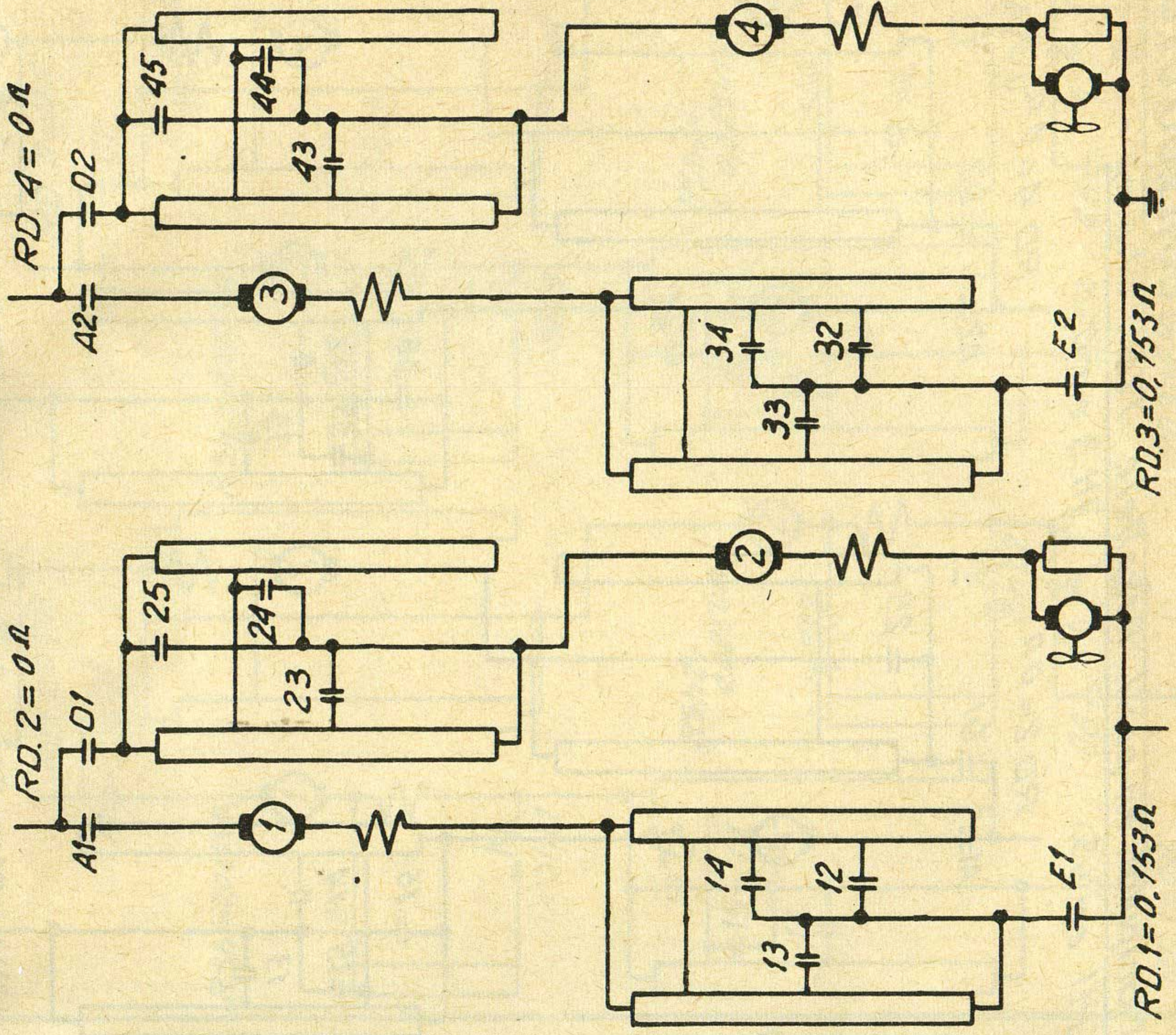
JH.3 en 0



Manipulat. en posit. Parallèle - Plein champ

JH.1 en 41

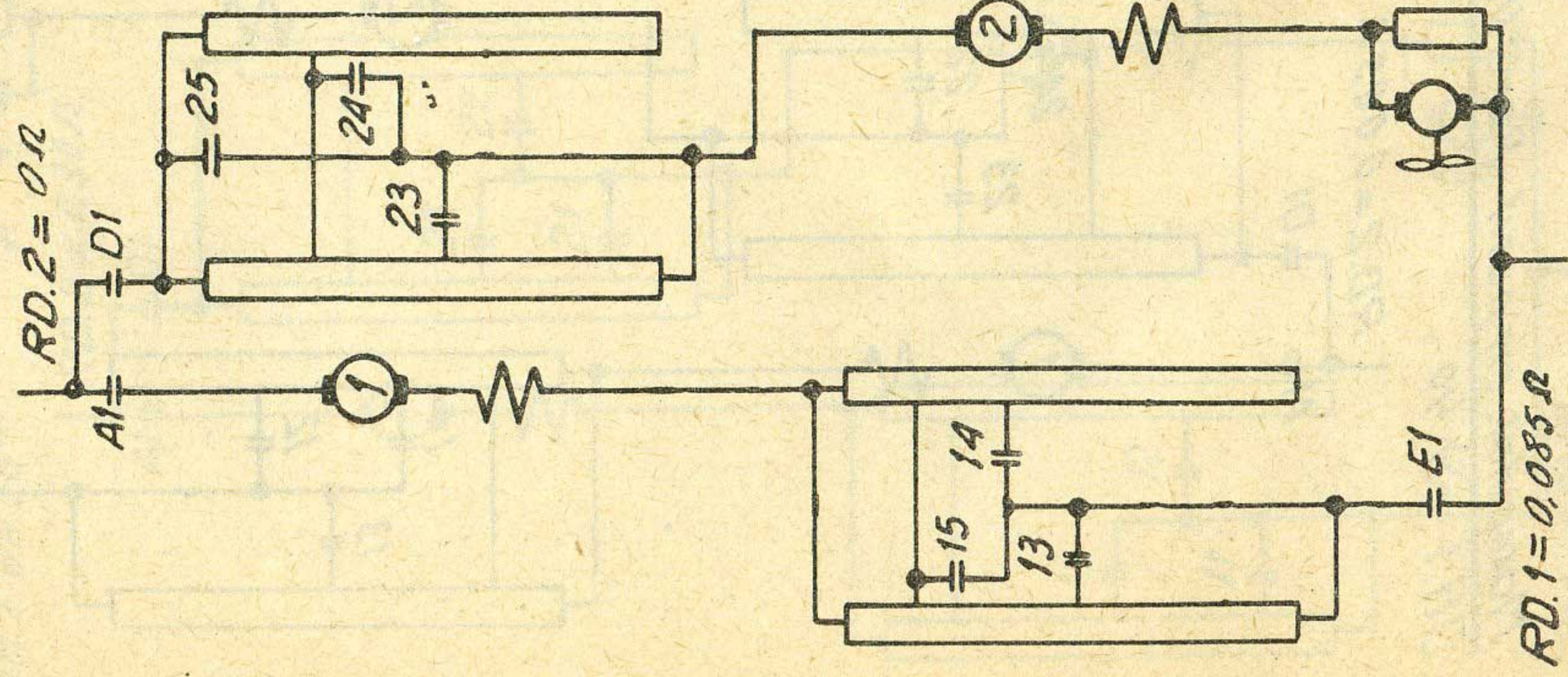
JH.3 en 0



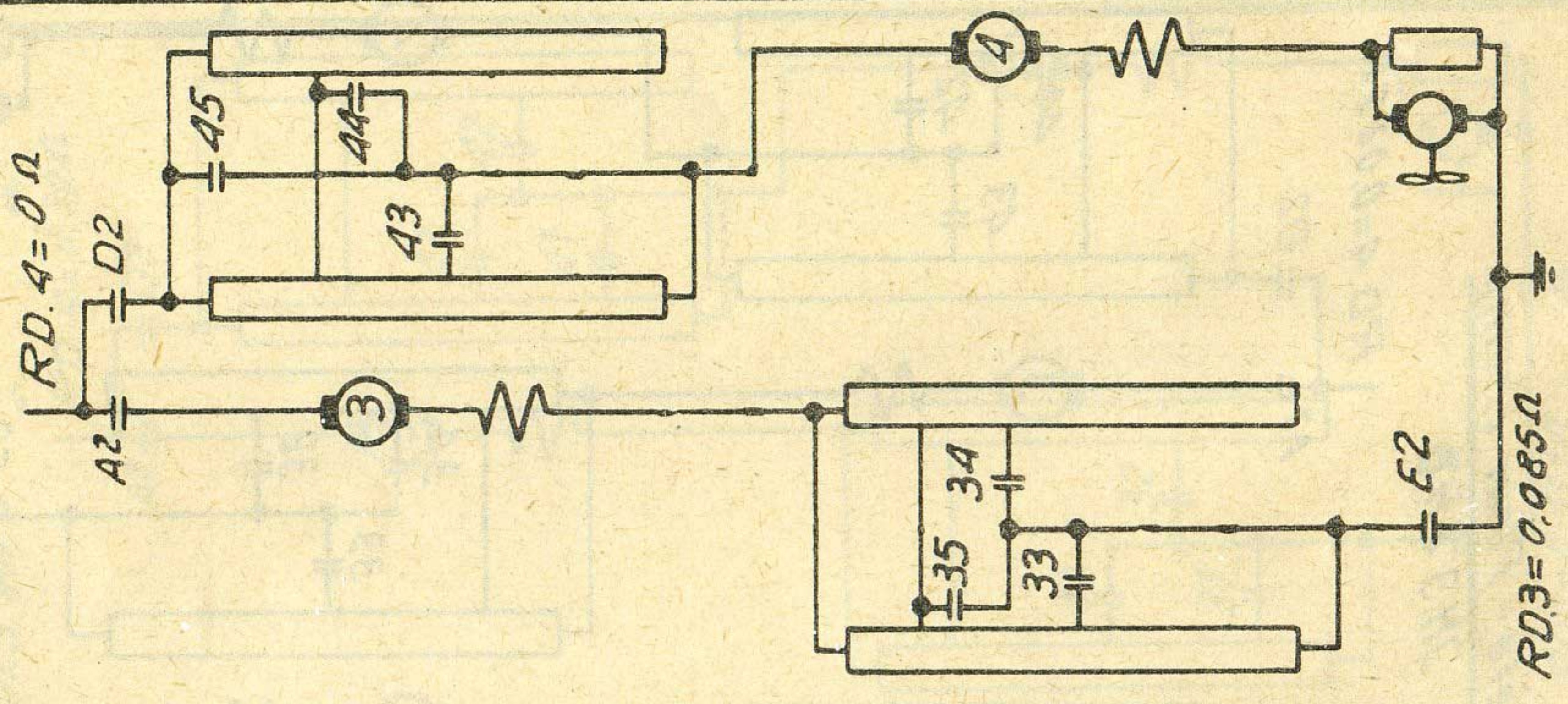
160/B.00.01.02

Manipulat. en posit. Parallele - Plein champ

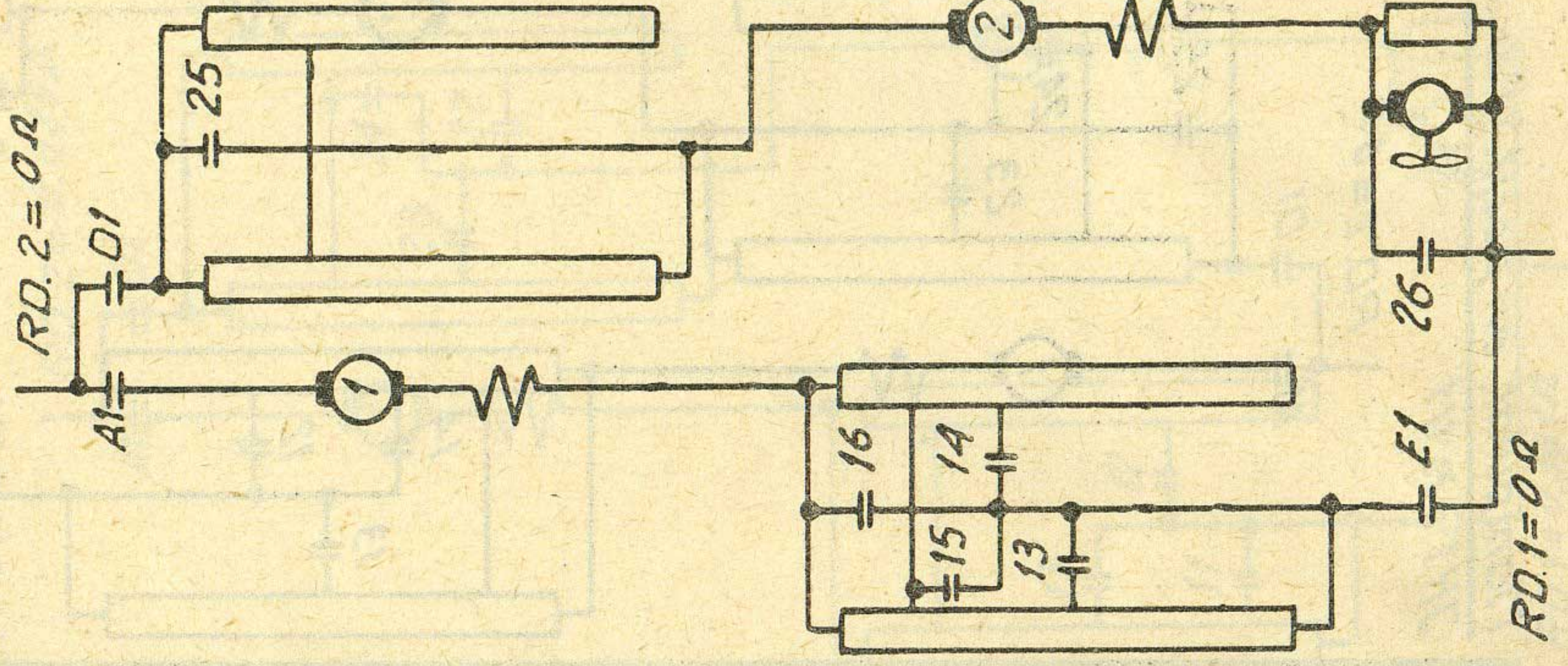
JH.1 en 42



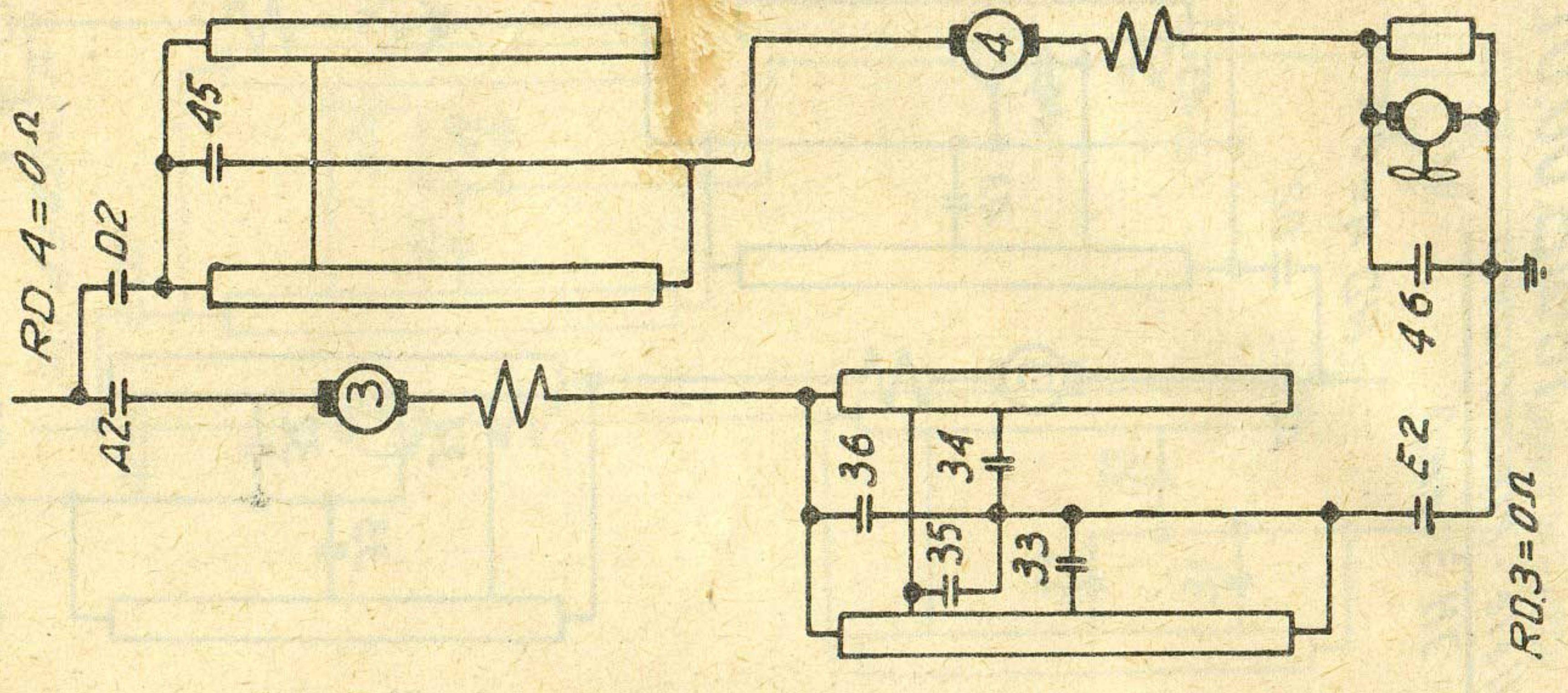
JH.3 en 0



JH.1 en 43



JH.3 en 0

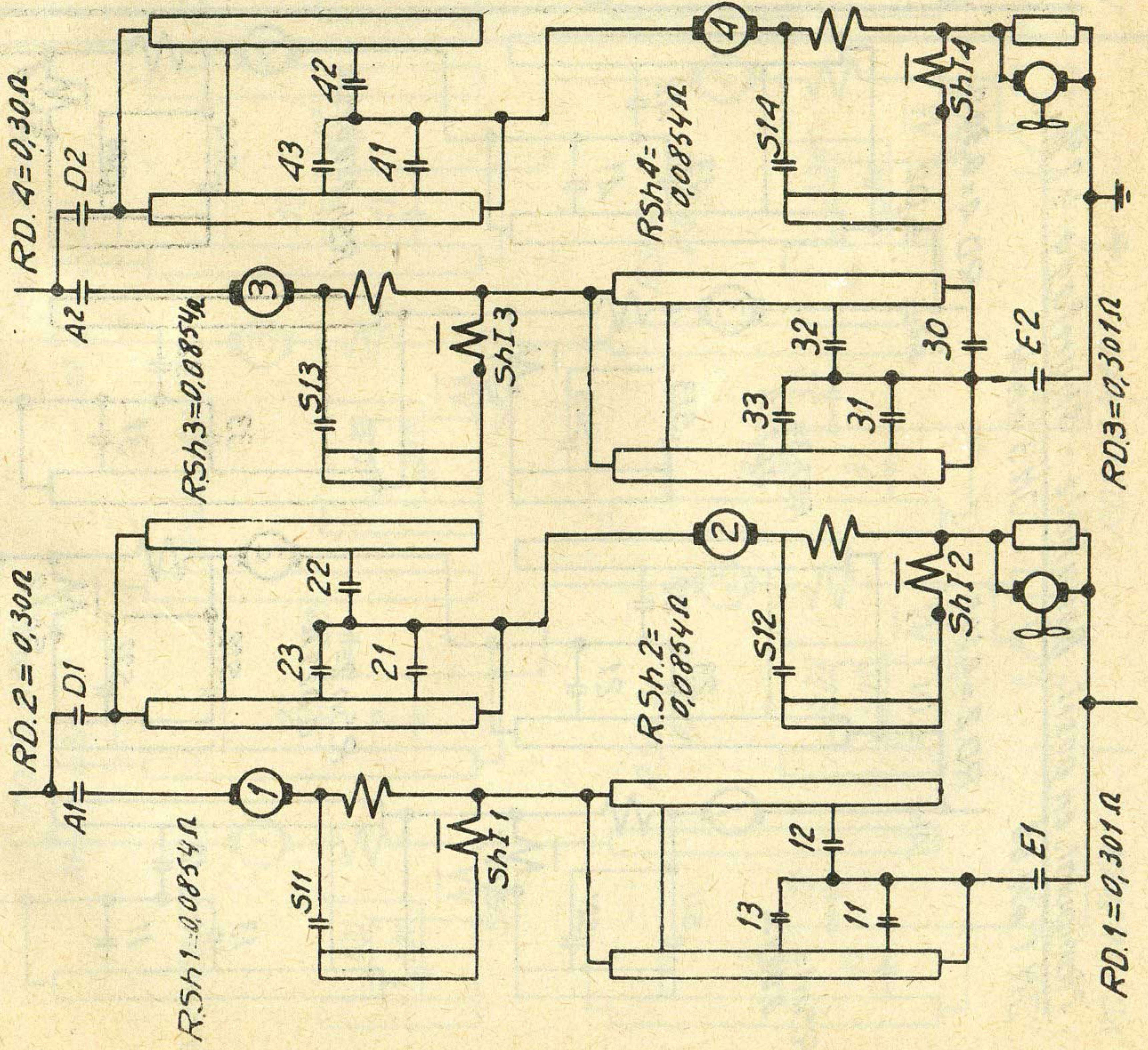


160/B.00.01.028

Manipulat. en posit. - Parallèle - Shuntage 28%

JH 1 en 38

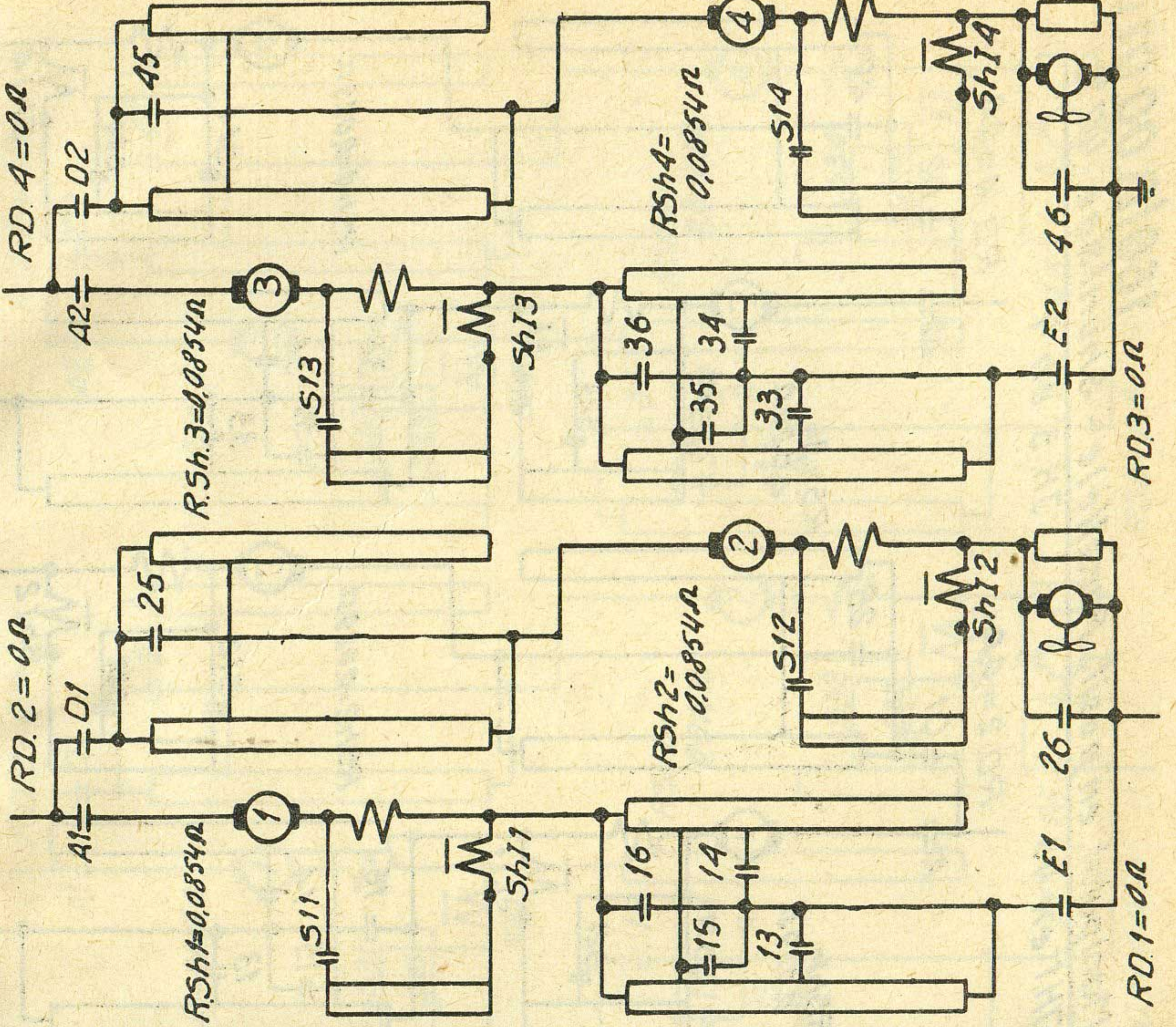
JH 3 en 2



Manipulat. en posit. - Parallèle - Shuntage 28%

JH 1 en 43

JH 3 en 2

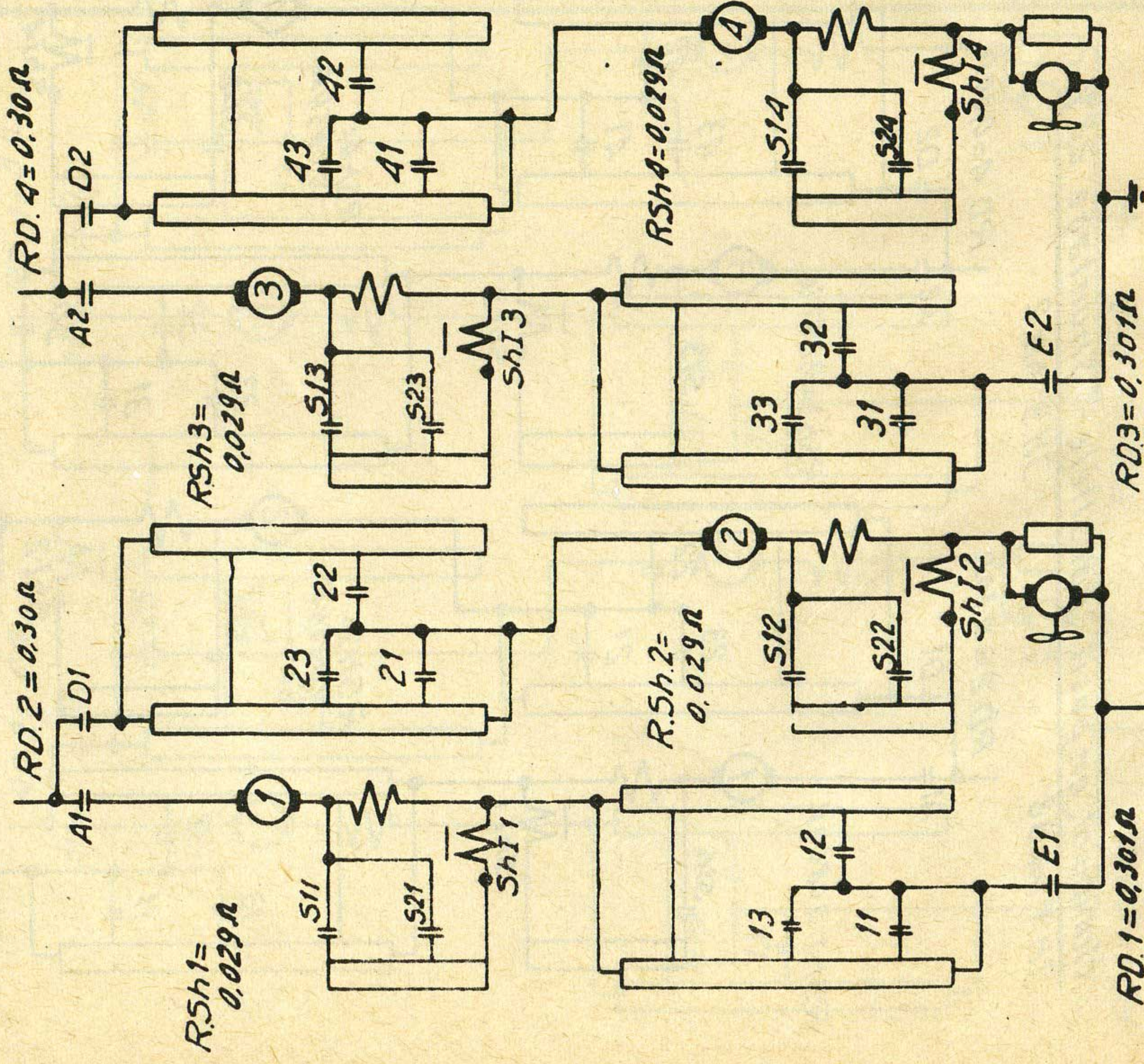


160/B.00.01.02

Manipulat. en posit. Parallele - Shuntage 47%

JH 1 en 38

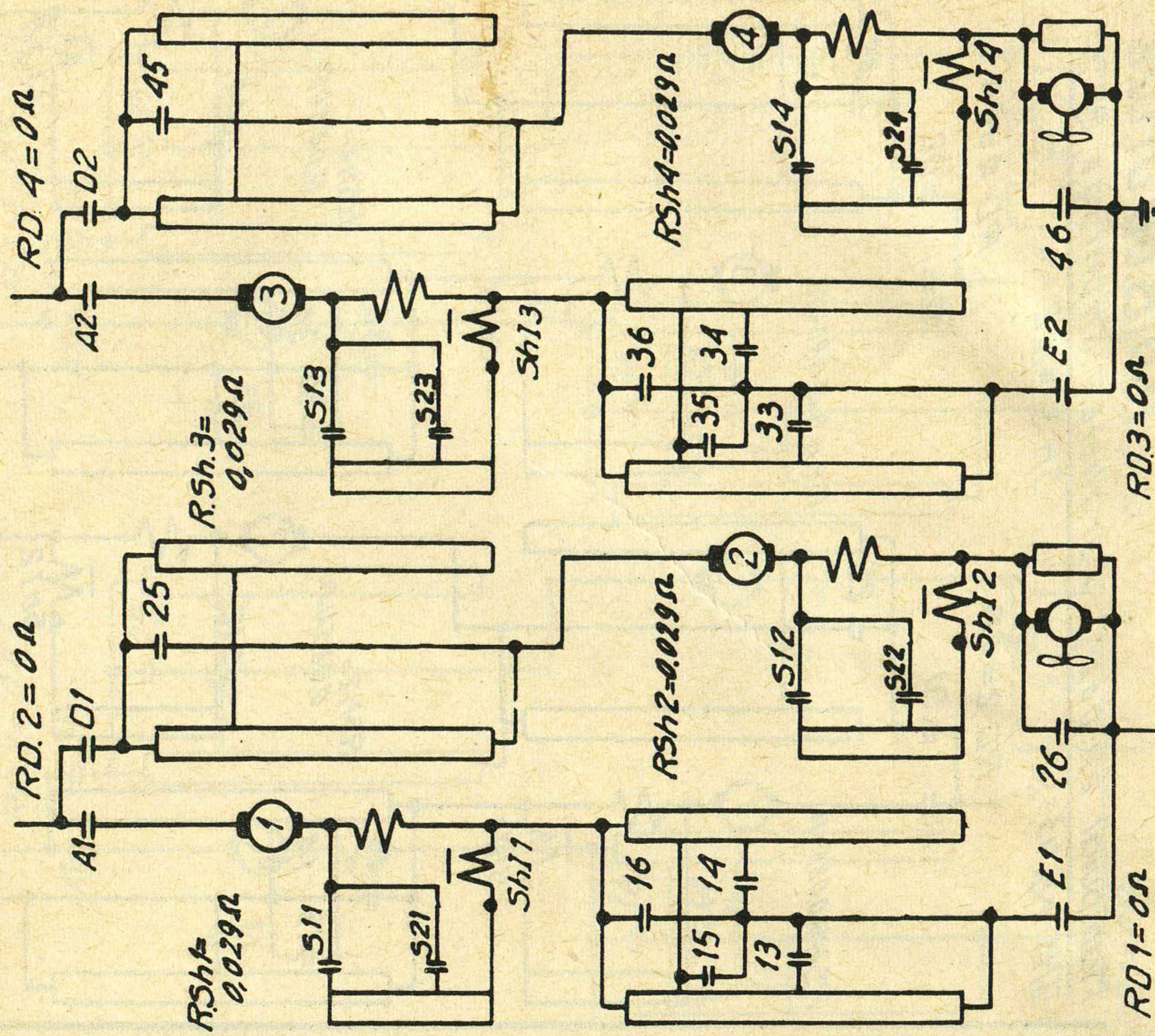
JH 3 en 4



Manipulat. en posit. Parallele - Shuntage 47%

JH 1 en 43

JH 3 en 4

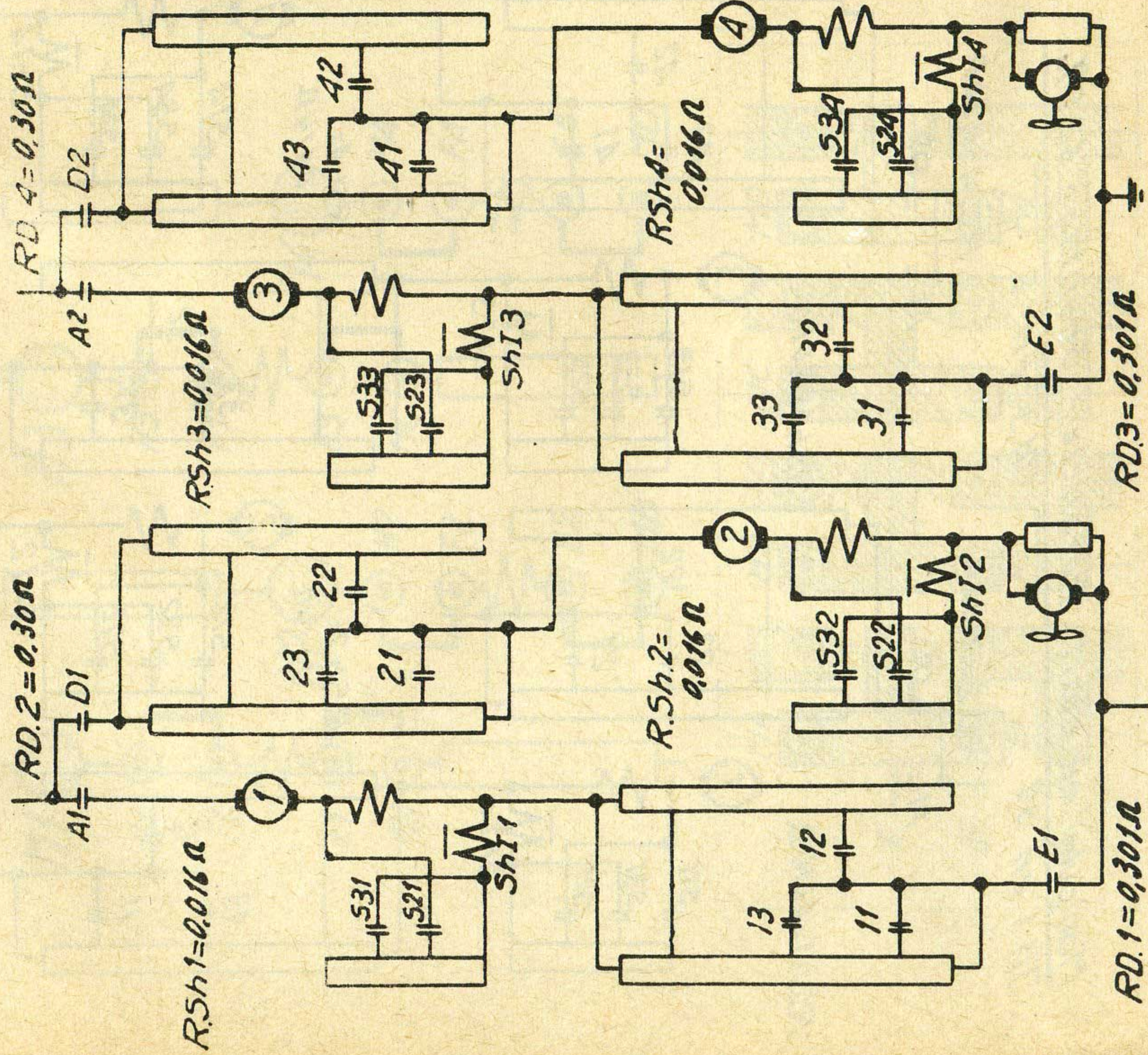


160/B.00.01.030

Manipulat. en posit. Parallele - Shuntage 56%

JH.1 en 38

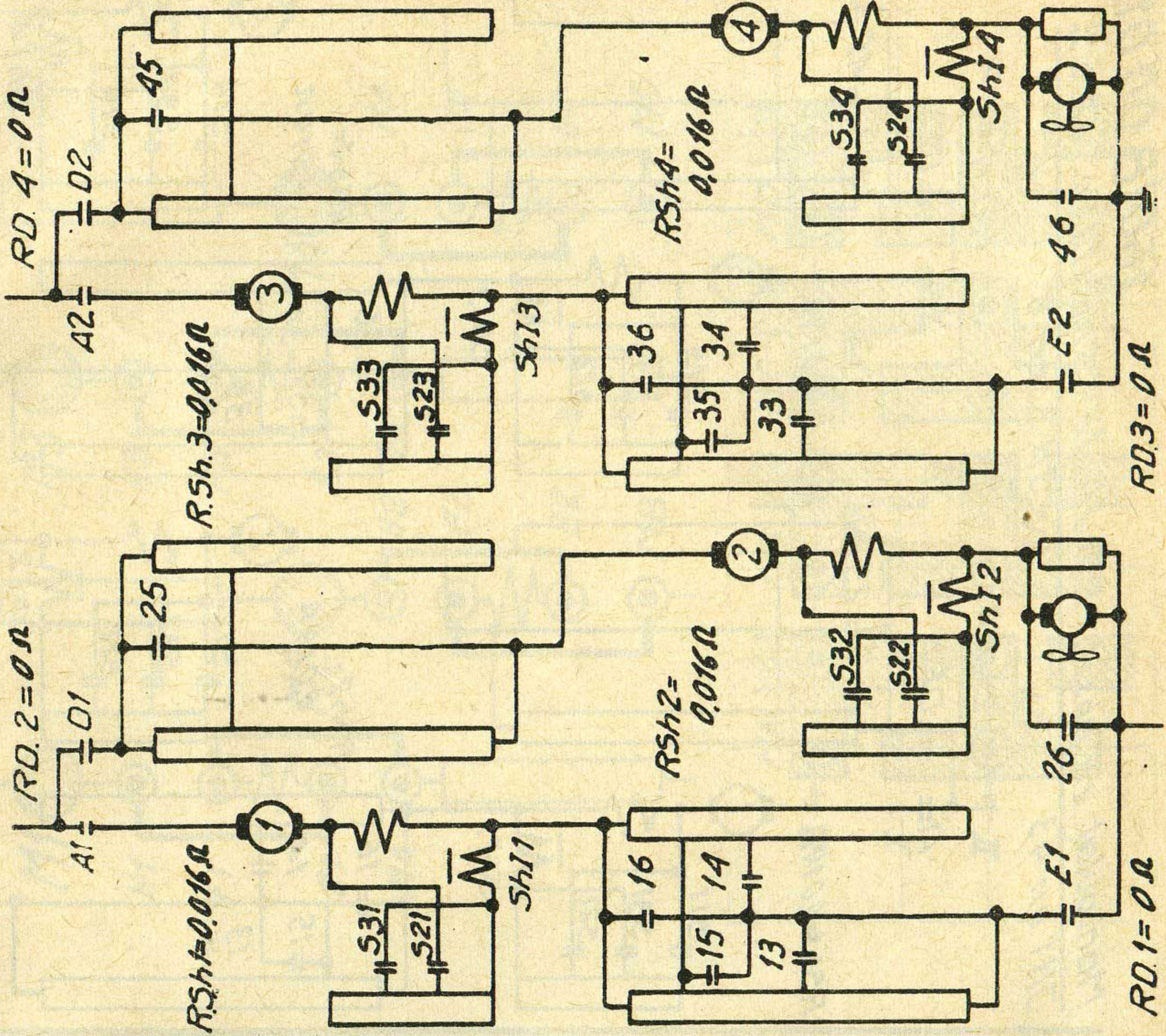
JH.3 en 6



Manipulat. en posit. Parallele - Shuntage 56%

JH.1 en 43

JH.3 en 6

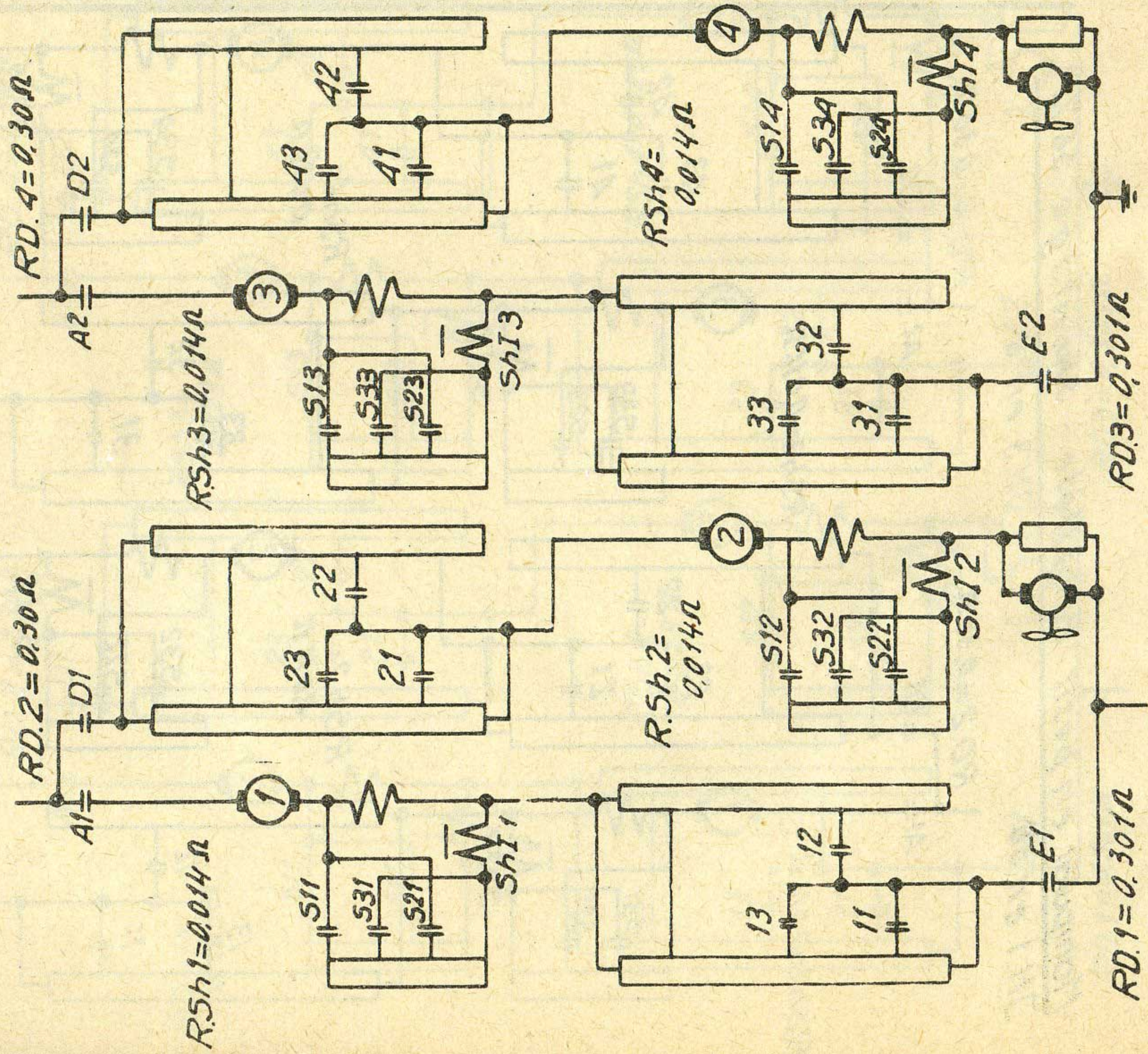


160/B.00.01.03

Manipulat. en posit. Parallele - Shuntage 62.5%

JH.1 en 38

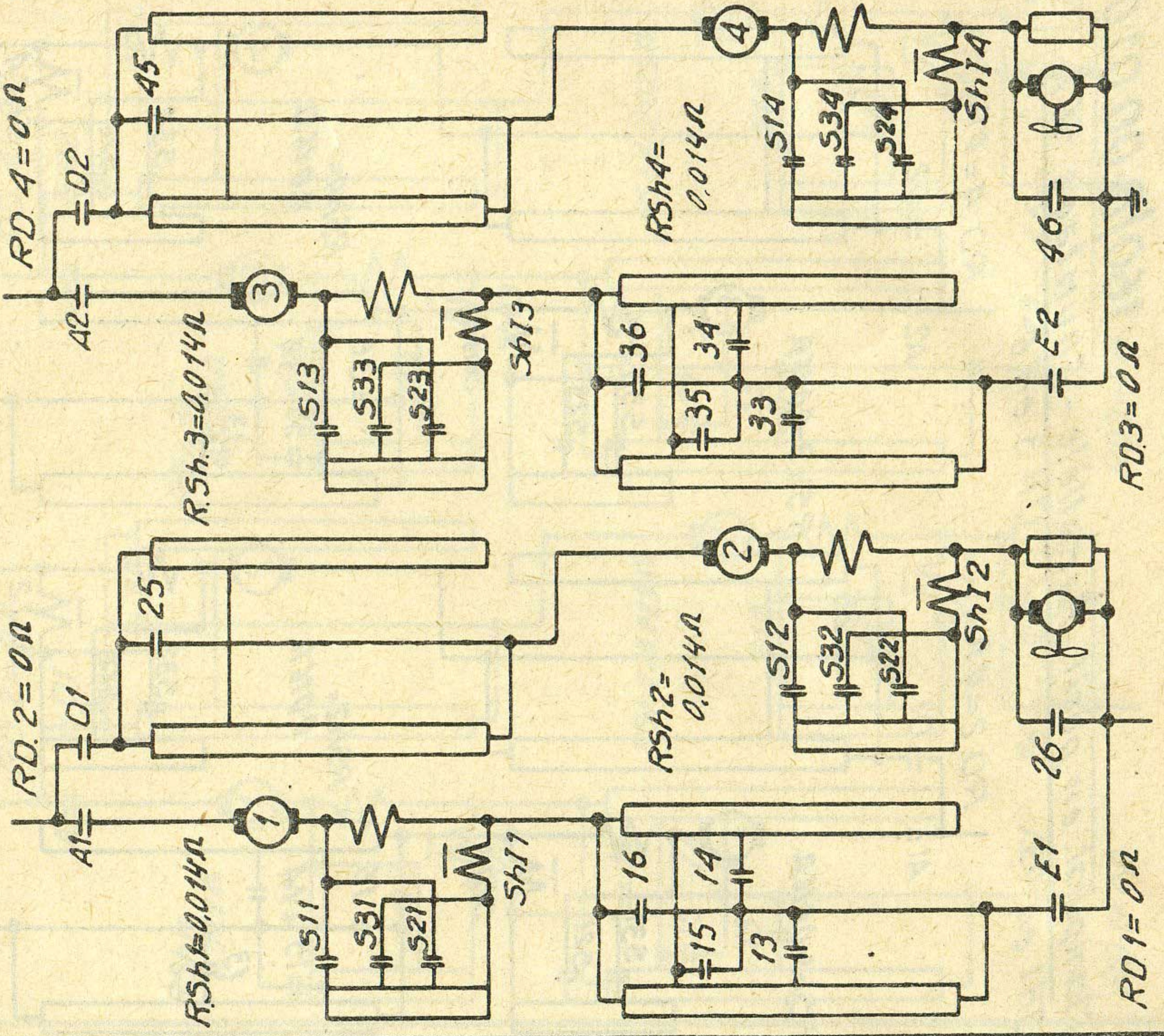
JH.3 en 8



Manipulat. en posit. Parallele - Shuntage 62.5%

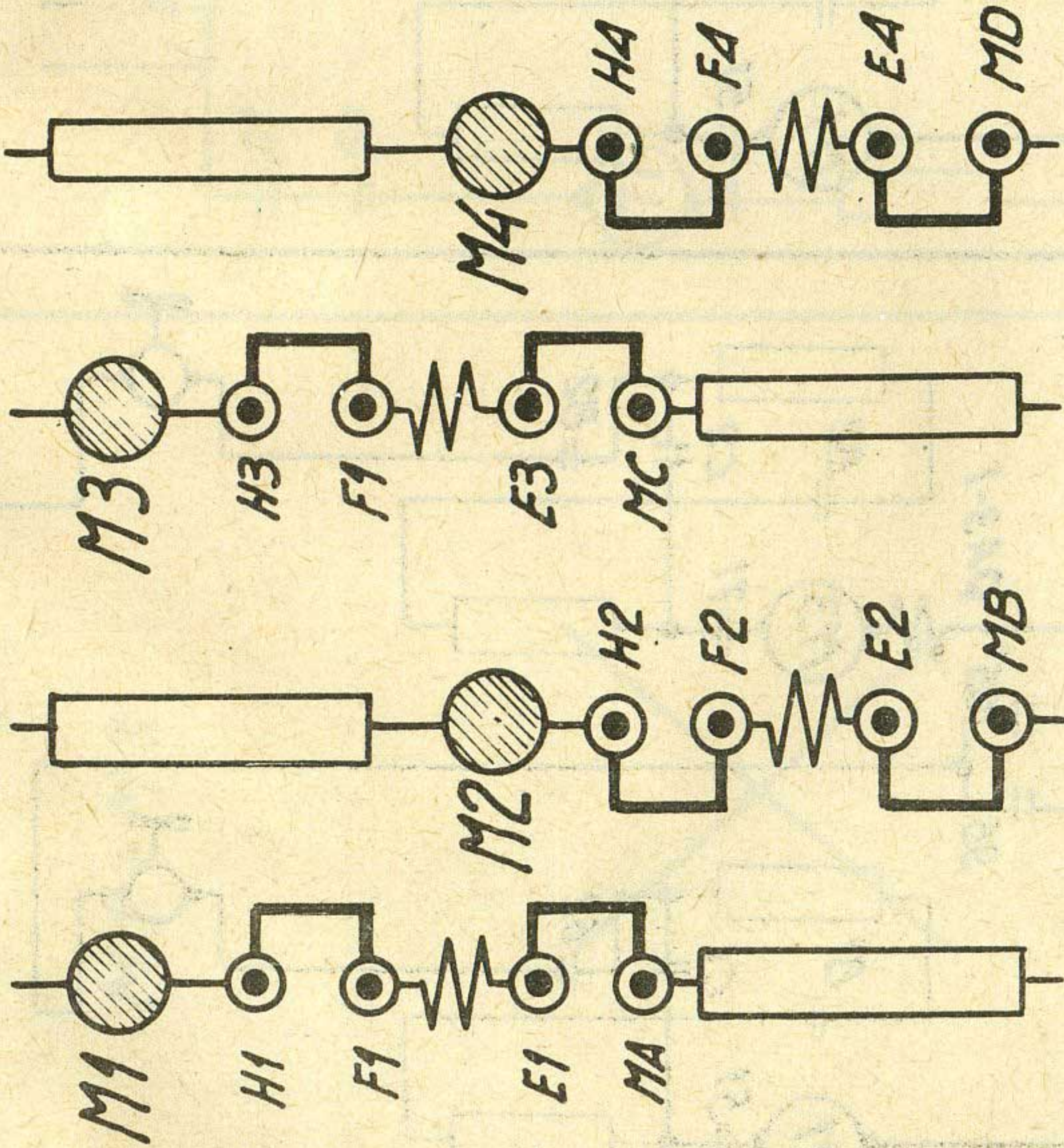
JH.1 en 43

JH.3 en 8

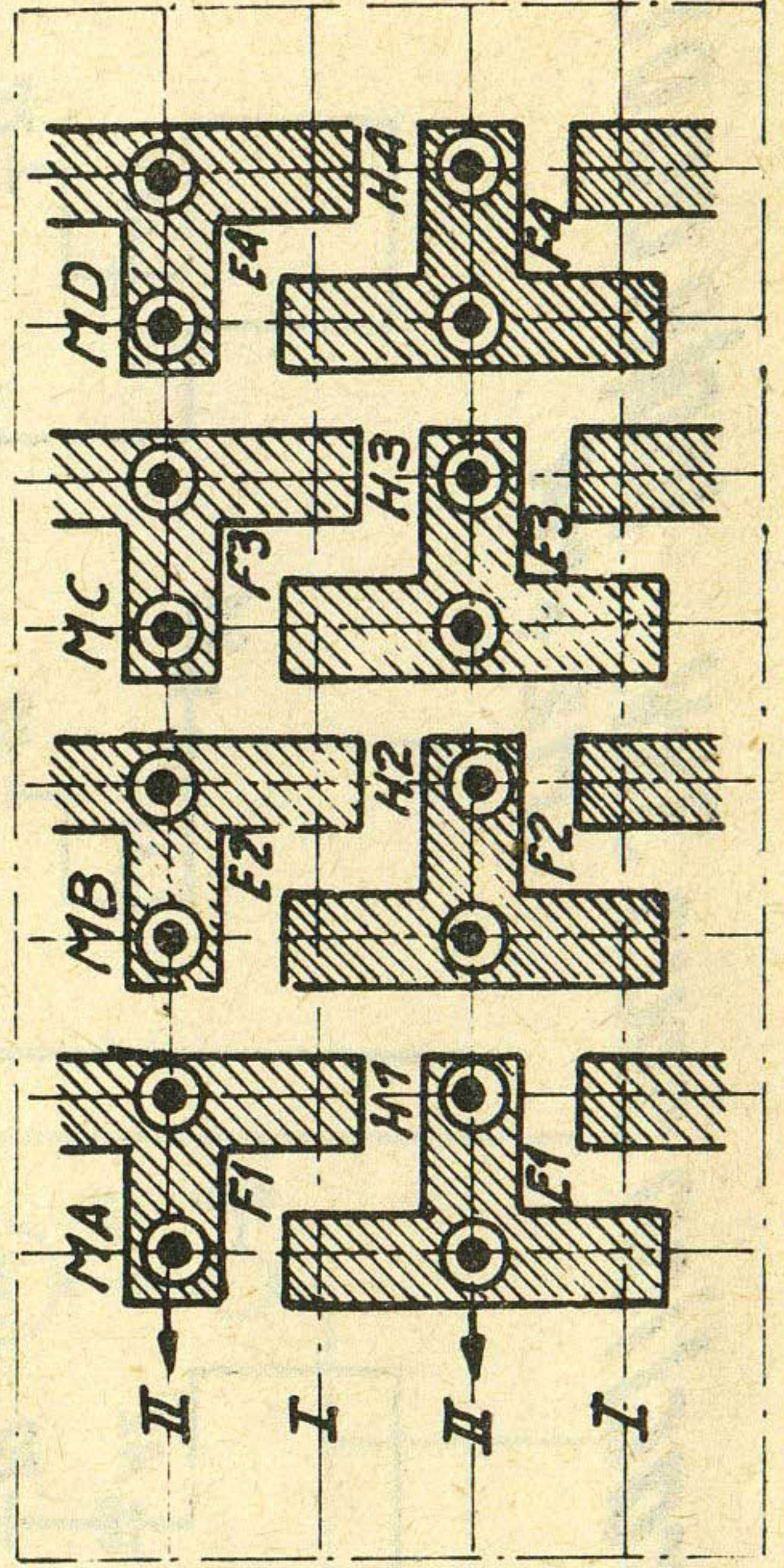
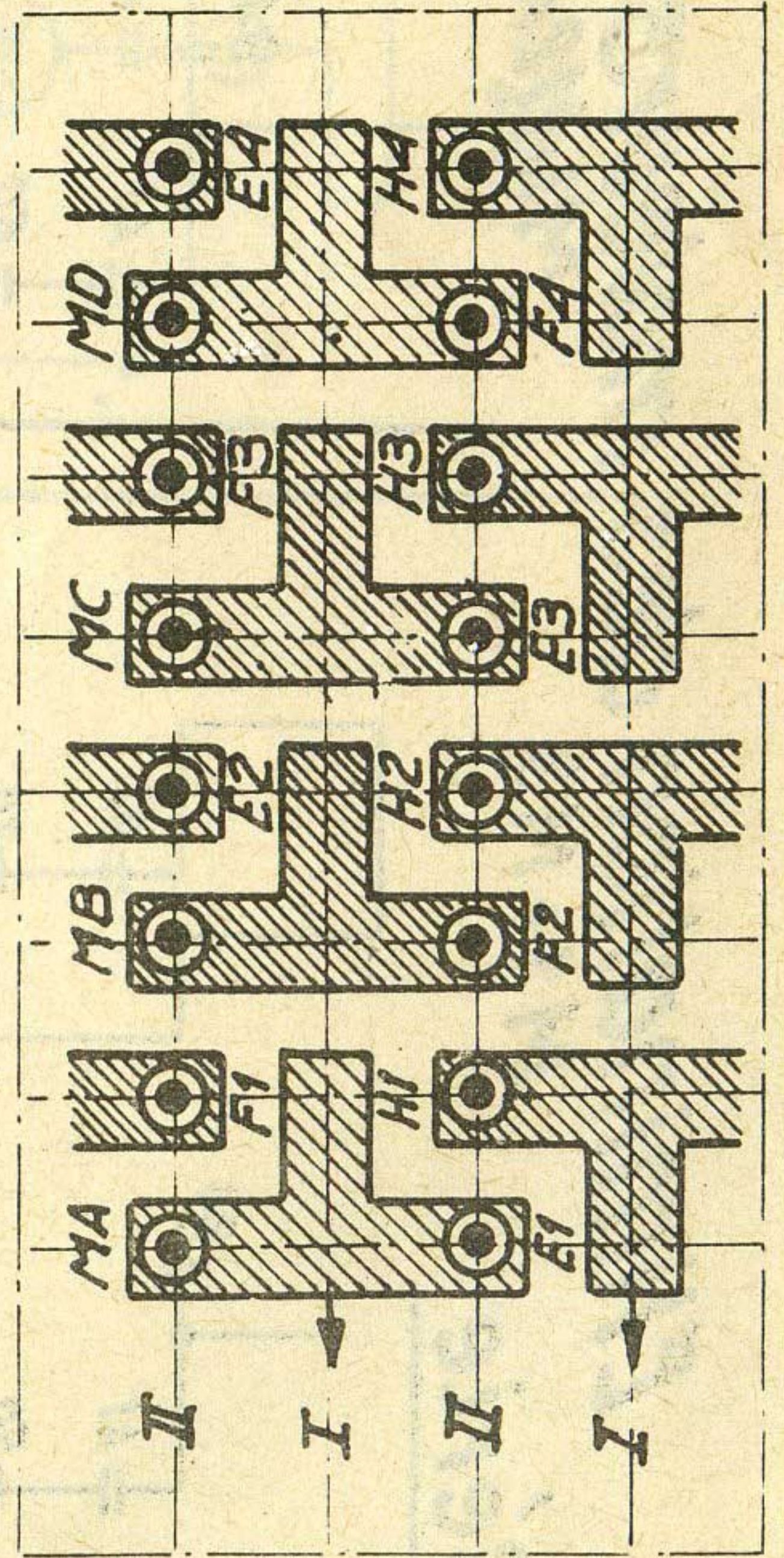
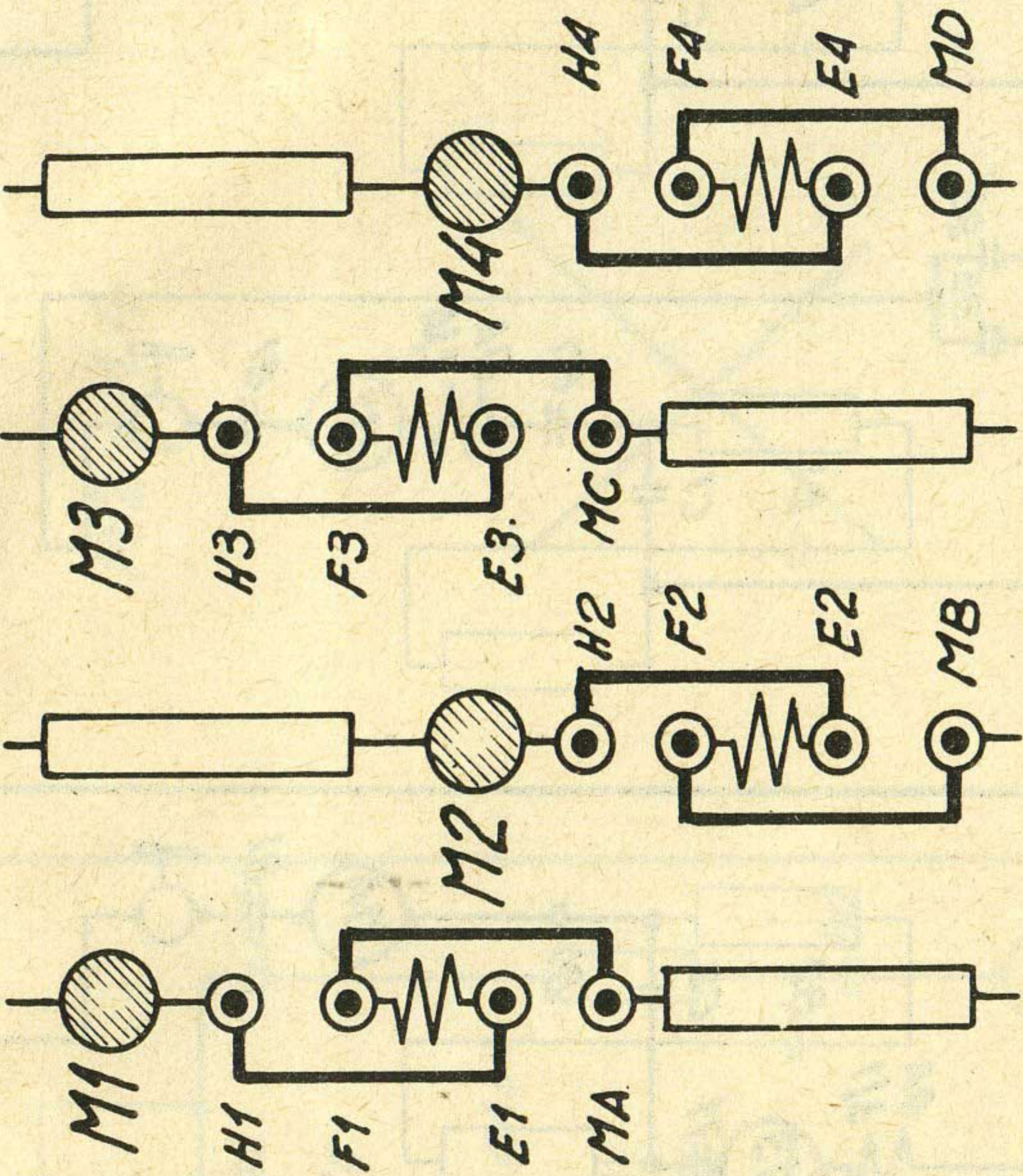


Inverseur de sens de marche 160/B.00.01.032

sens I



sens II



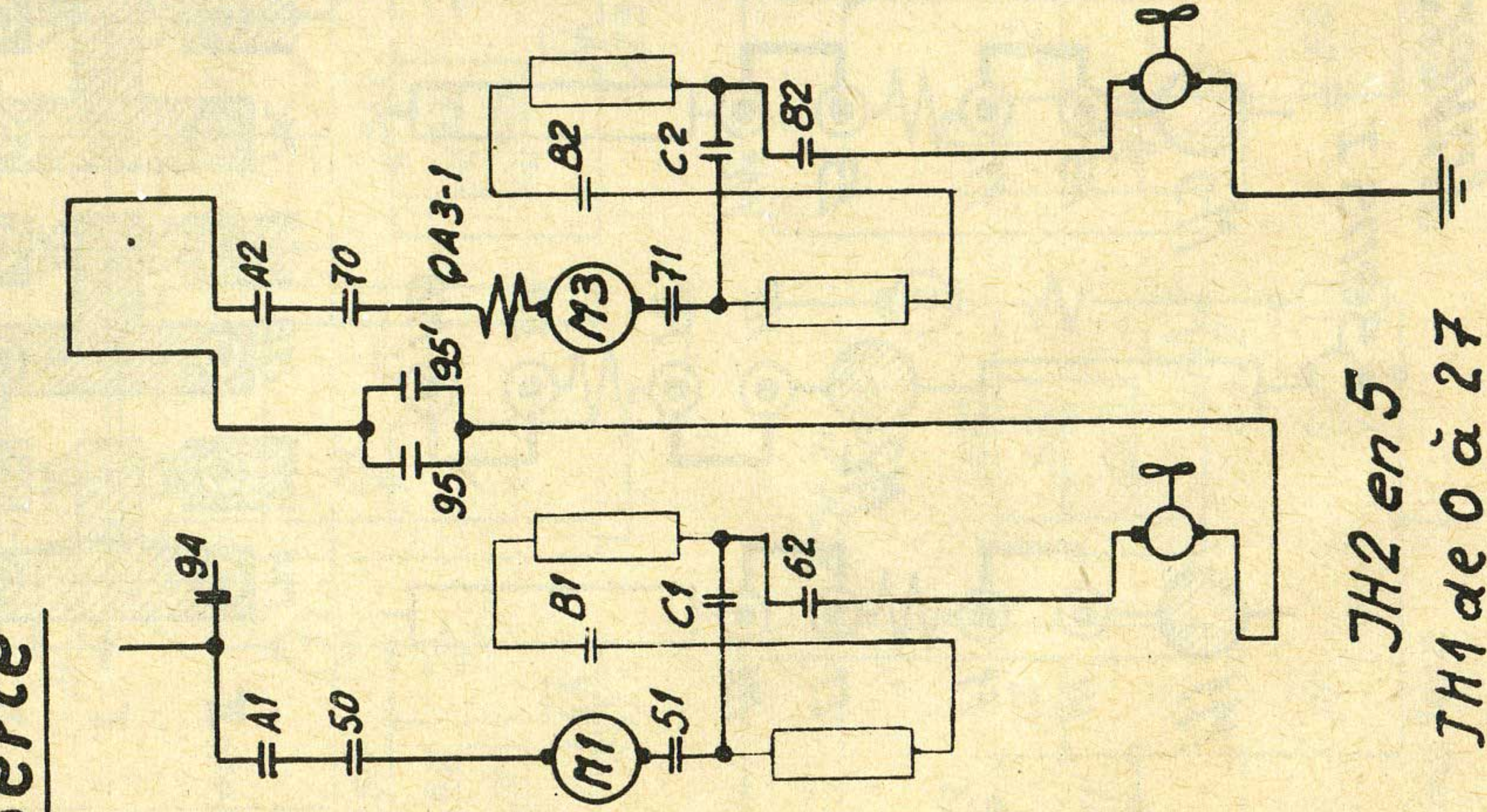
Elimination des moteurs de traction sous 3KV 160/B.00.01.033

Série

M1+M3

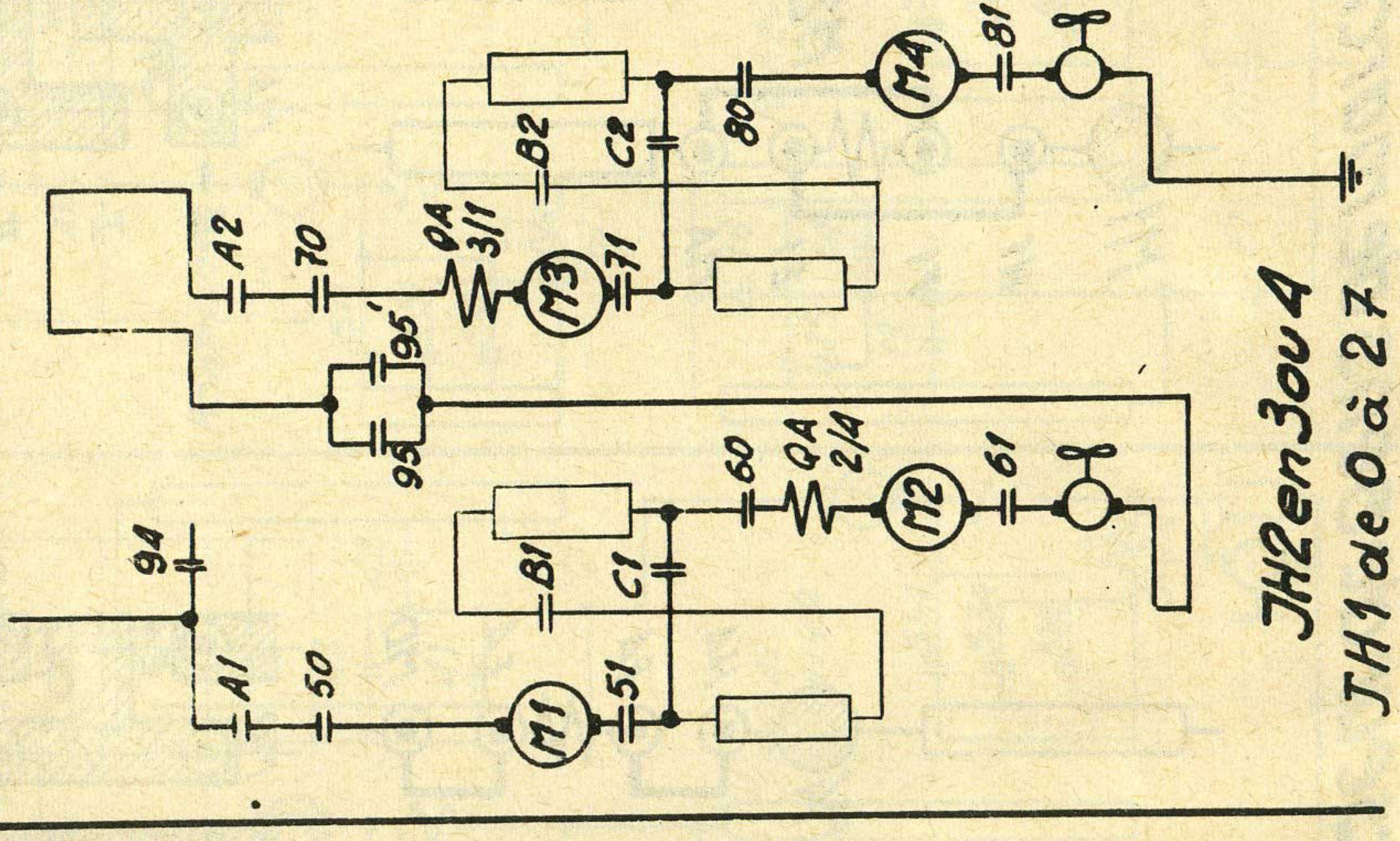
M1+M2+M3+M4

M2+M4



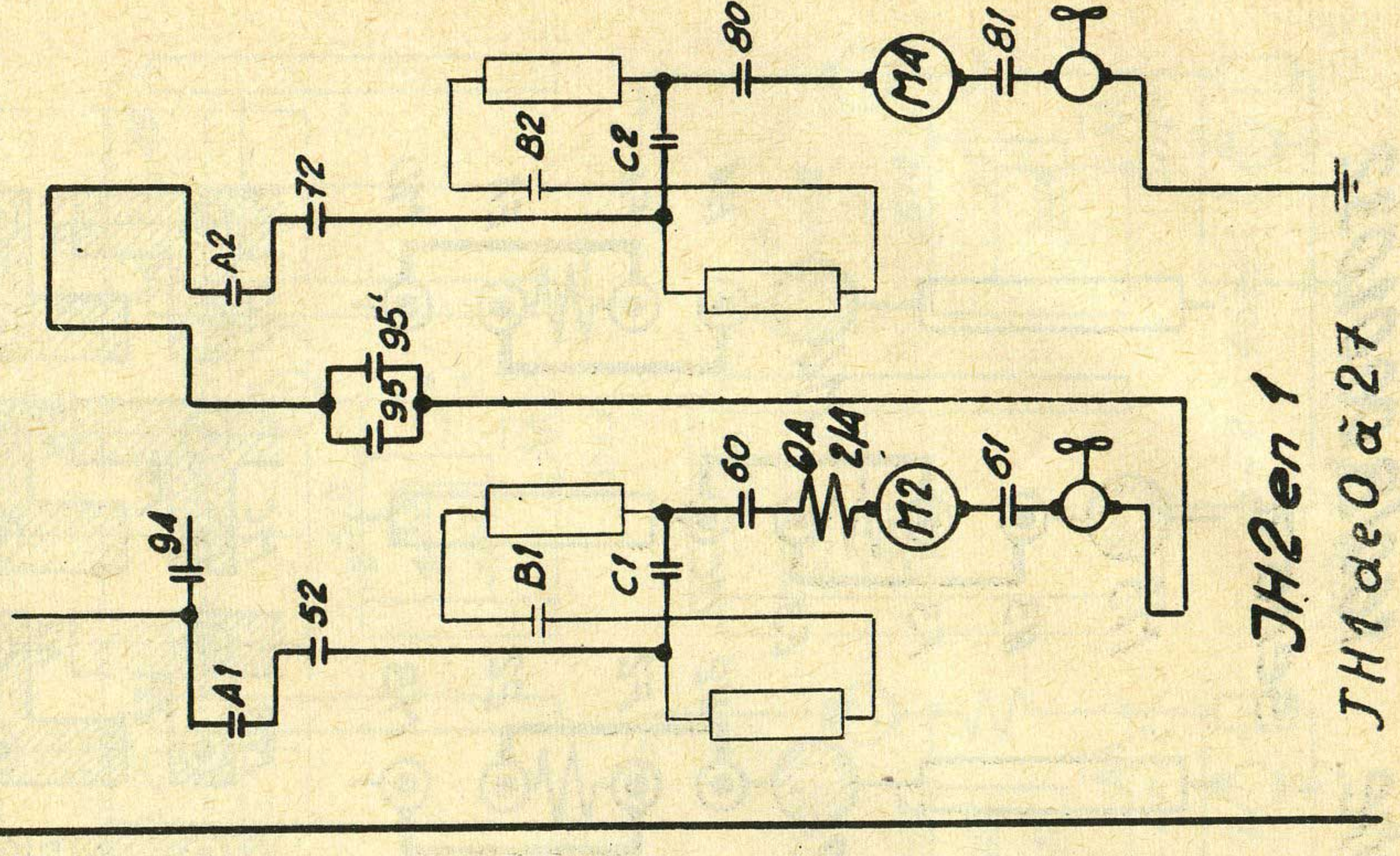
JH2 en 5

JH1 de 0 à 27



JH2 en 3 ou 4

JH1 de 0 à 27



JH2 en 1

JH1 de 0 à 27

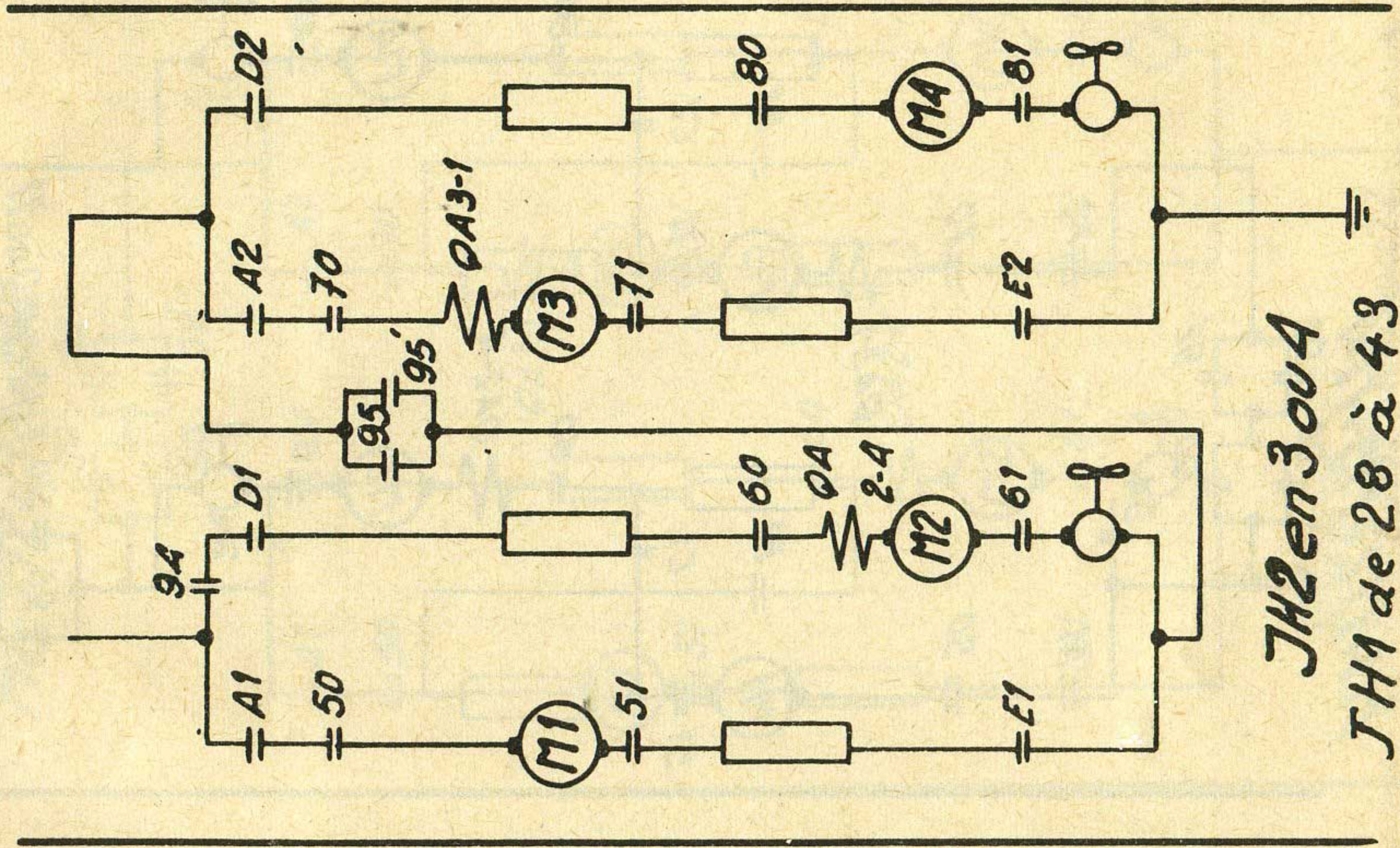
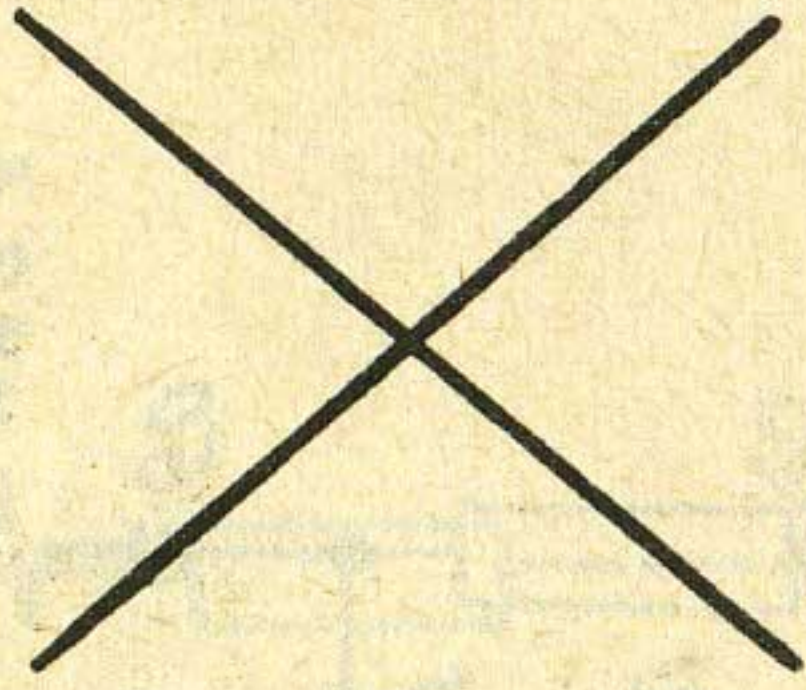
Elimination des moteurs de traction sous 3KV

160/B.00.01.034.

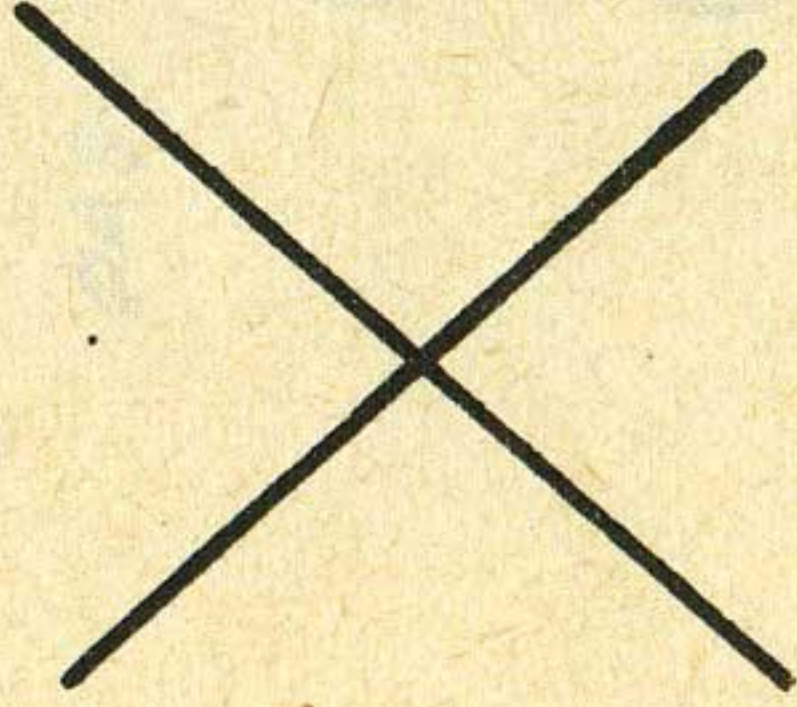
Série - Parall.

M1+M2+M3+M4

M1 + M3



M2 + M4



JH2 en 3 ou 4

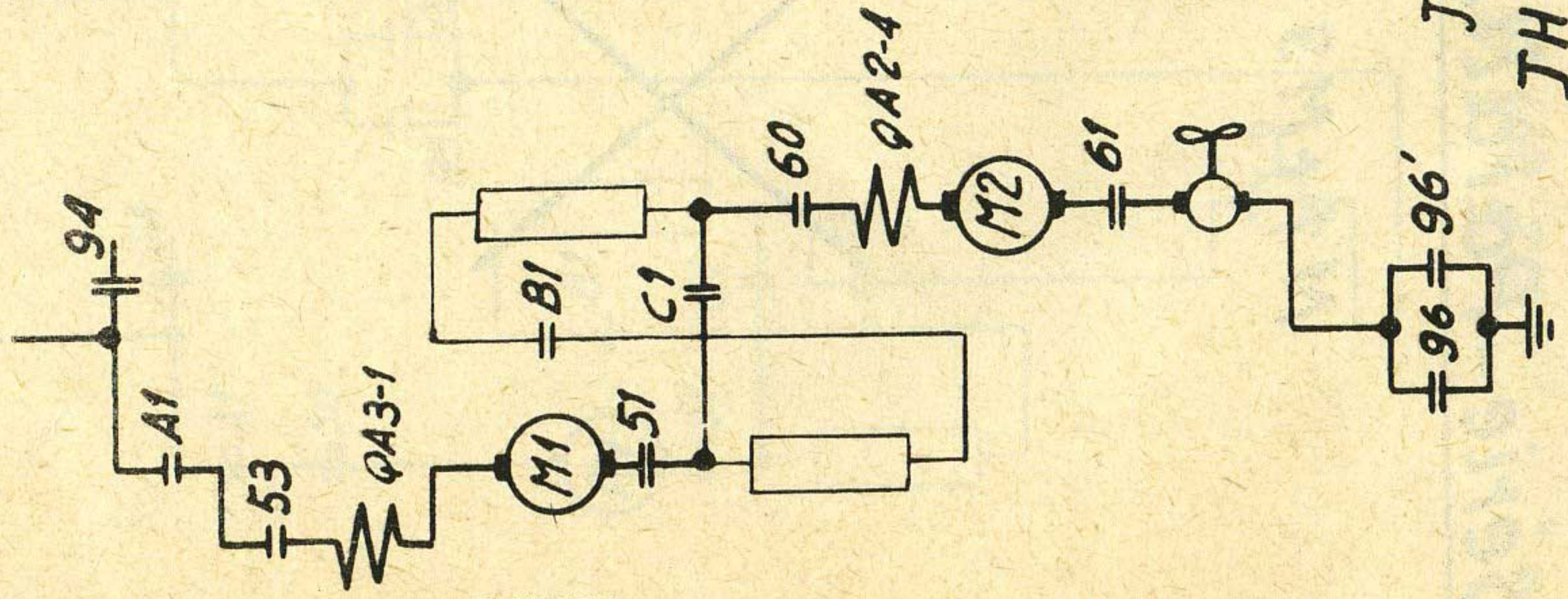
JH1 de 28 à 43

Elimination des moteurs de traction sous 15kV

1601B.00.01.035

M1 + M2

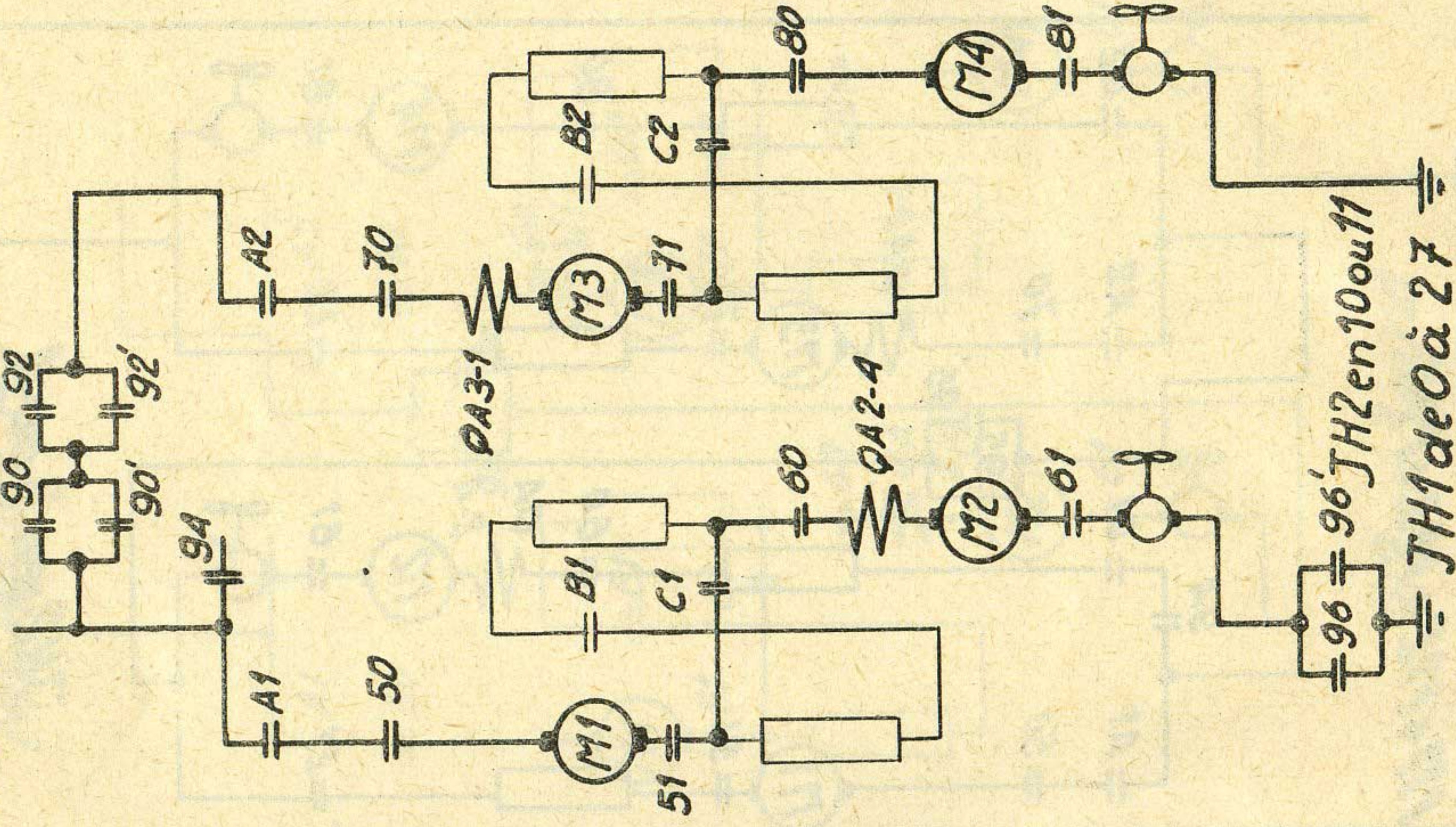
Série



JH2 en 8

JH1 de 0 à 27

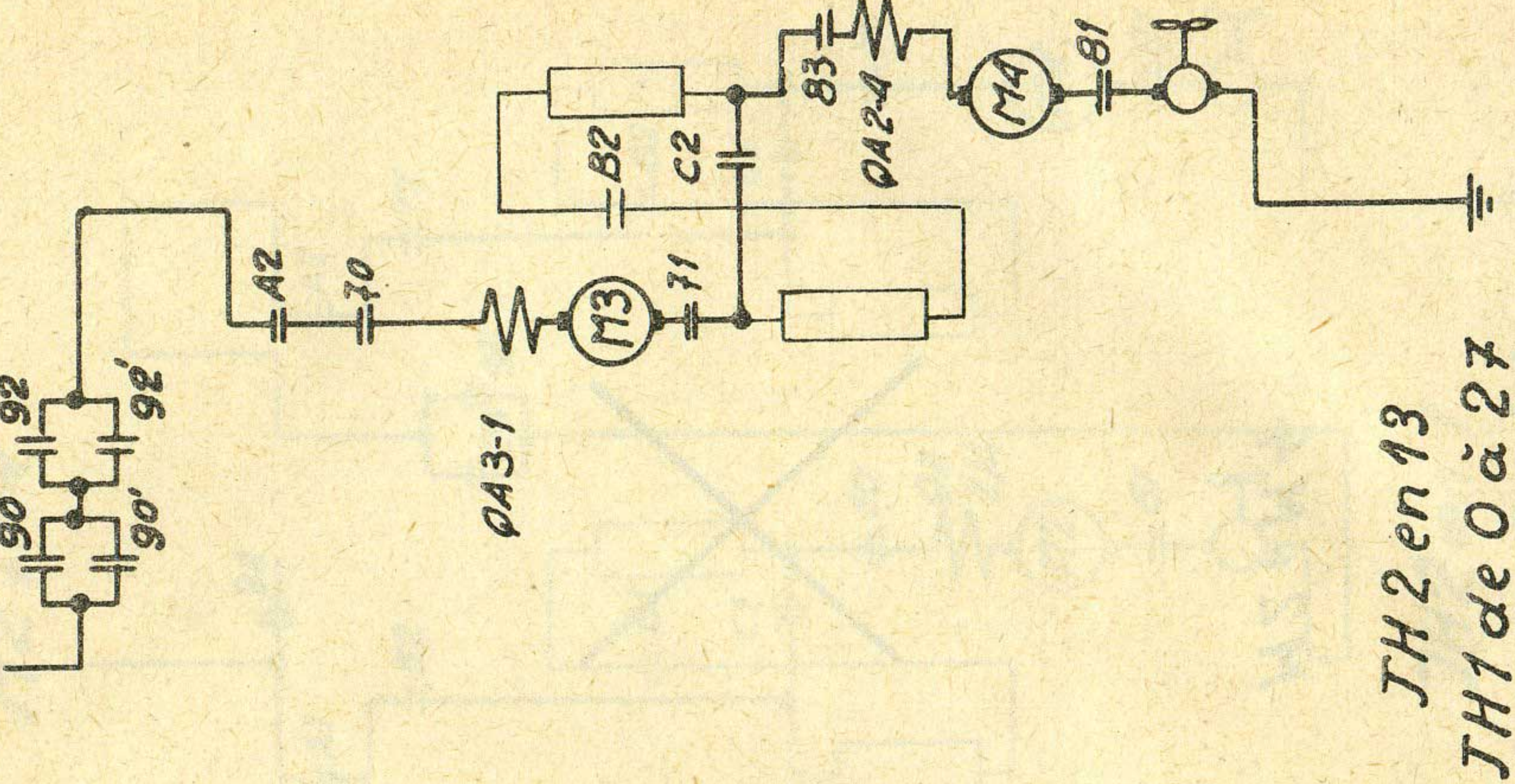
M1 + M2 + M3 + M4



96' JH2 en 10 ou 11

JH1 de 0 à 27

M3 + M4 en



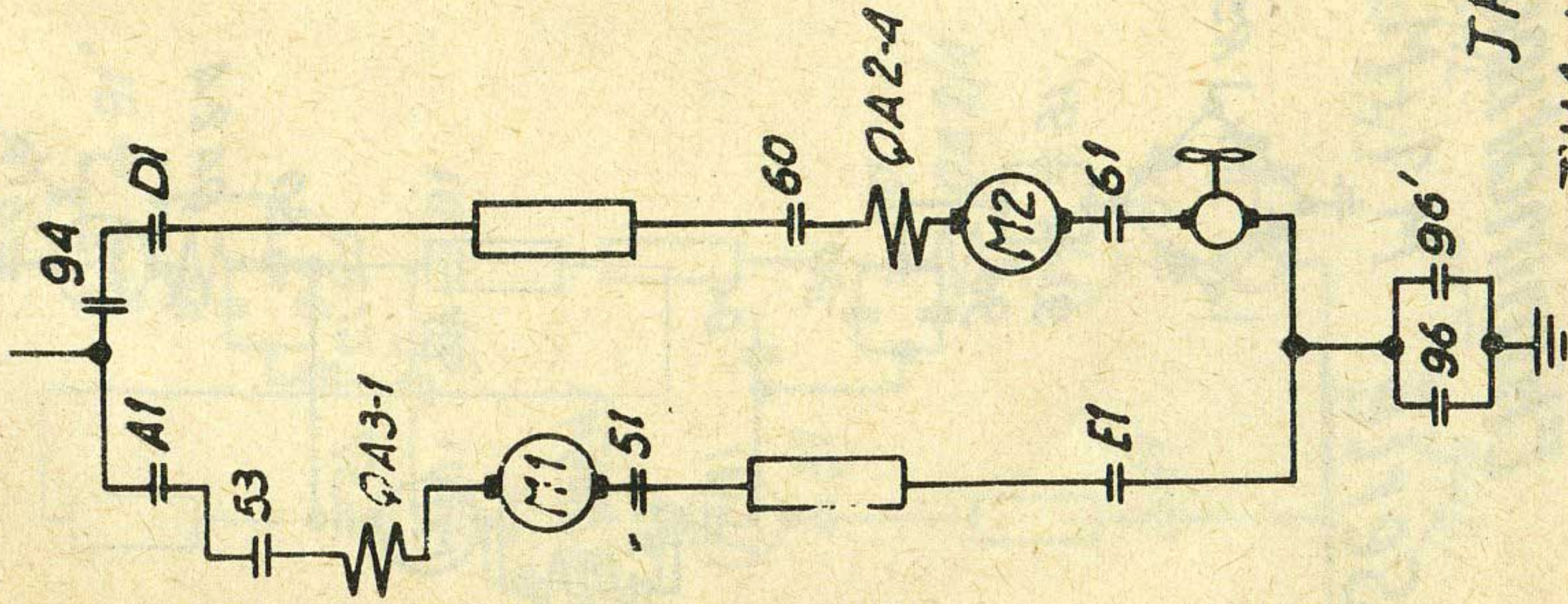
JH2 en 13

JH1 de 0 à 27

Elimination des moteurs de traction sous 15kV

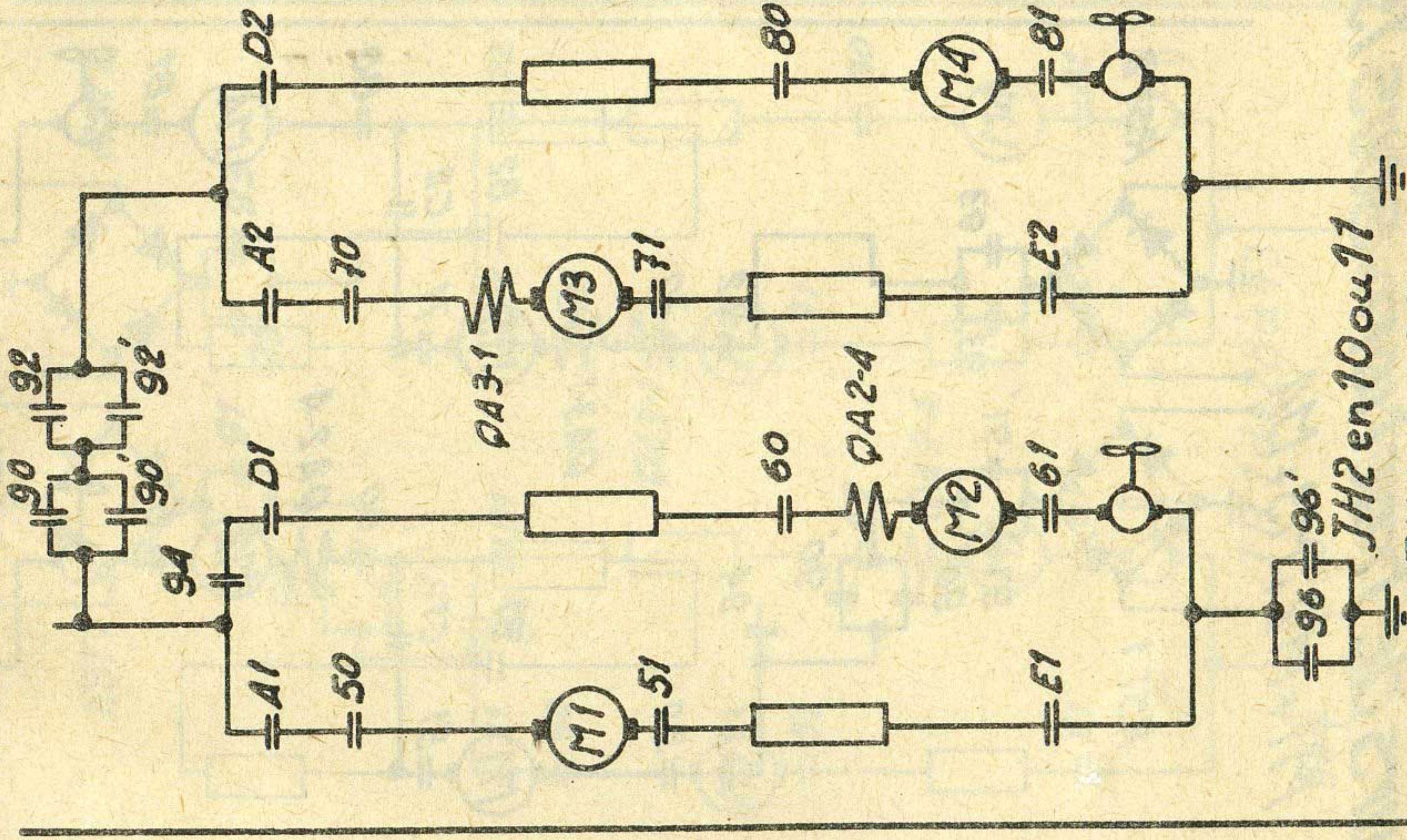
M1 + M2

Parall.



JH2 en 8
JH1 de 28 à 43

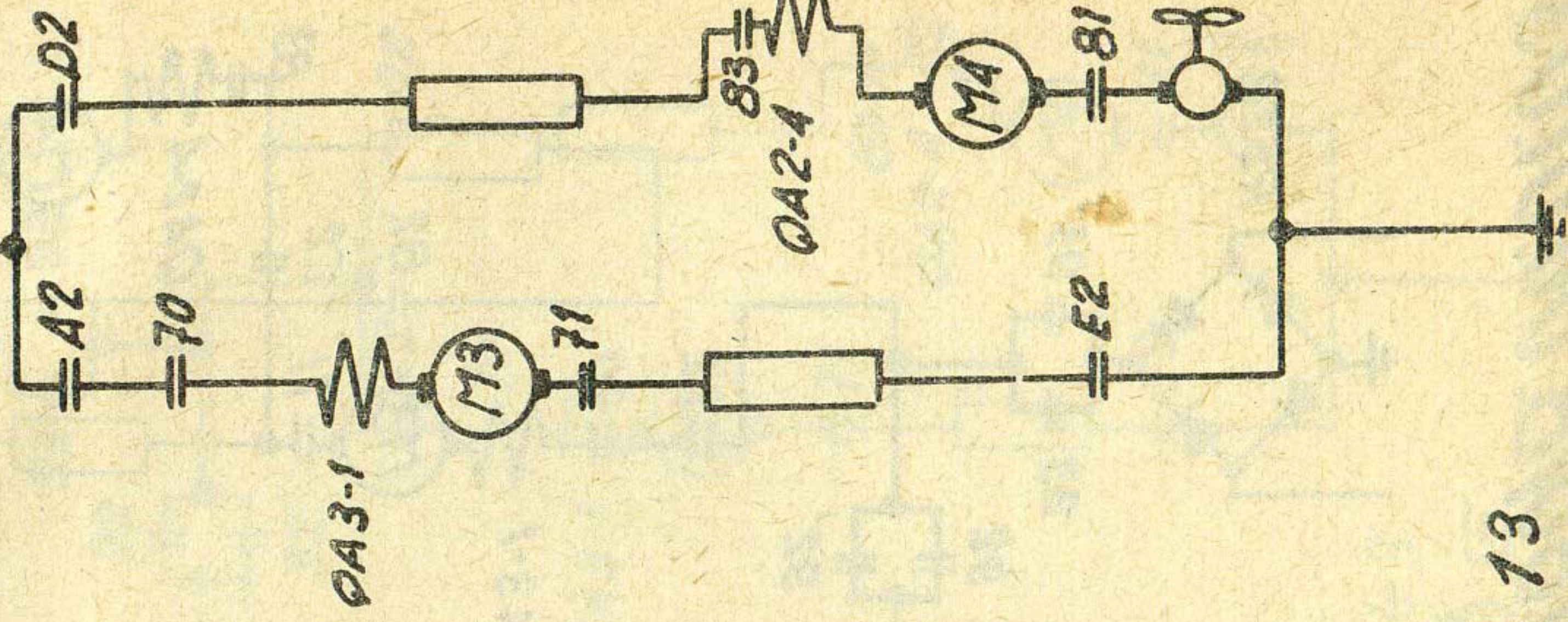
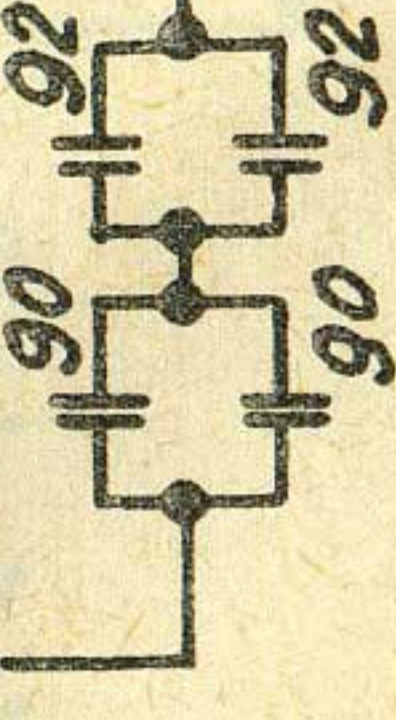
M1 + M2 + M3 + M4



JH2 en 10 ou 11
JH1 de 28 à 43

1601B.00.01.036.

M3 + M4



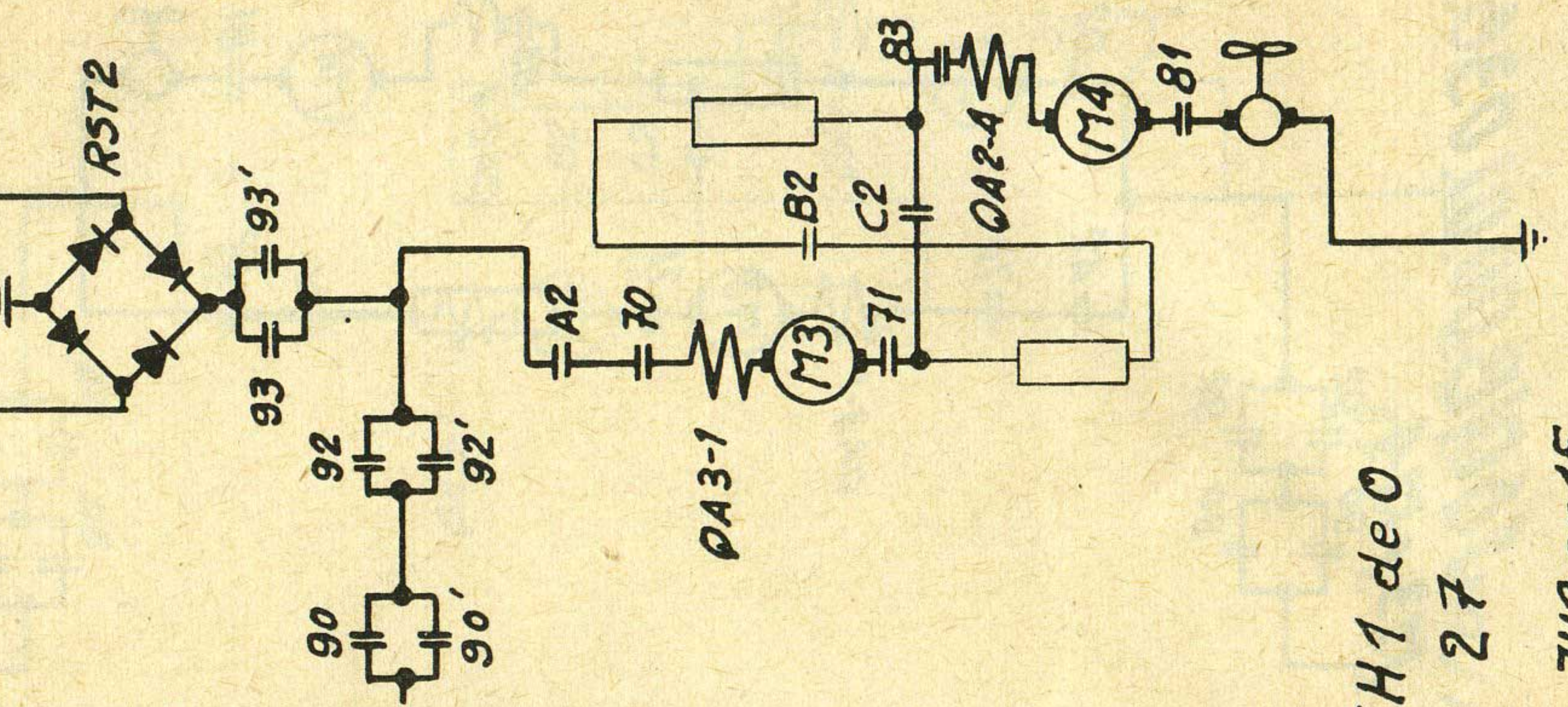
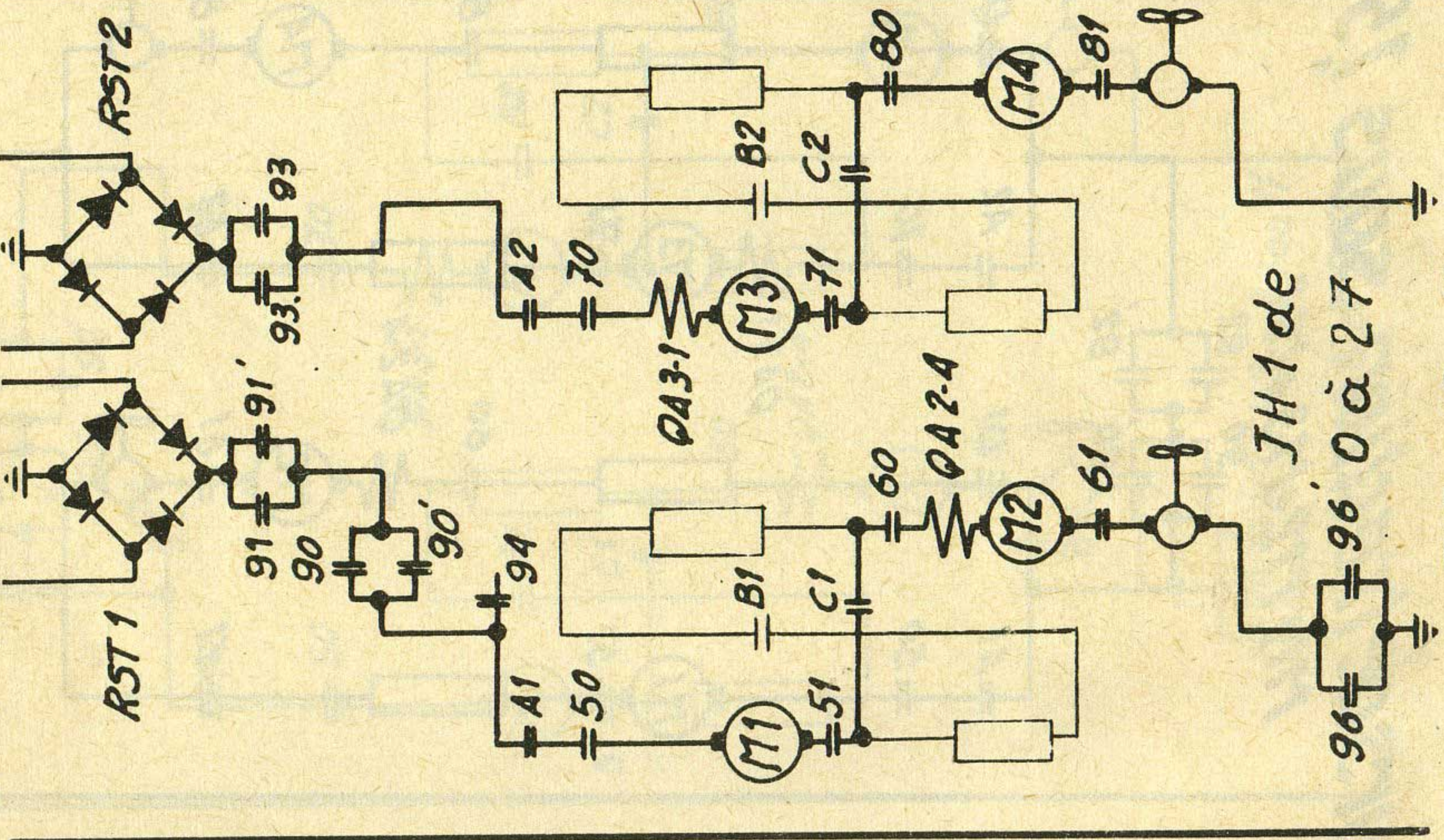
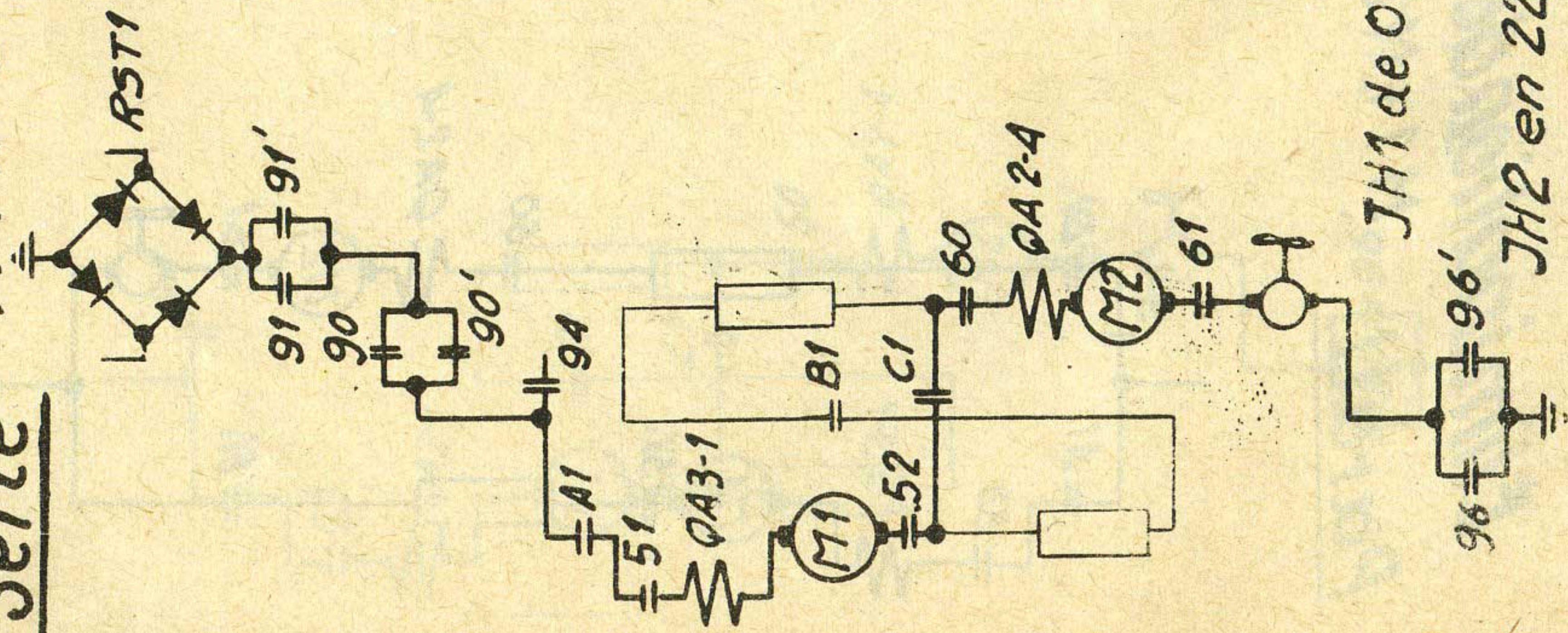
JH2 en 13
JH1 de 28 à 43

Elimination des moteurs de traction sous 15 et 25 kV 160/B.00.01.037

Série M1+M2

M1+M2+M3+M4

M3+M4



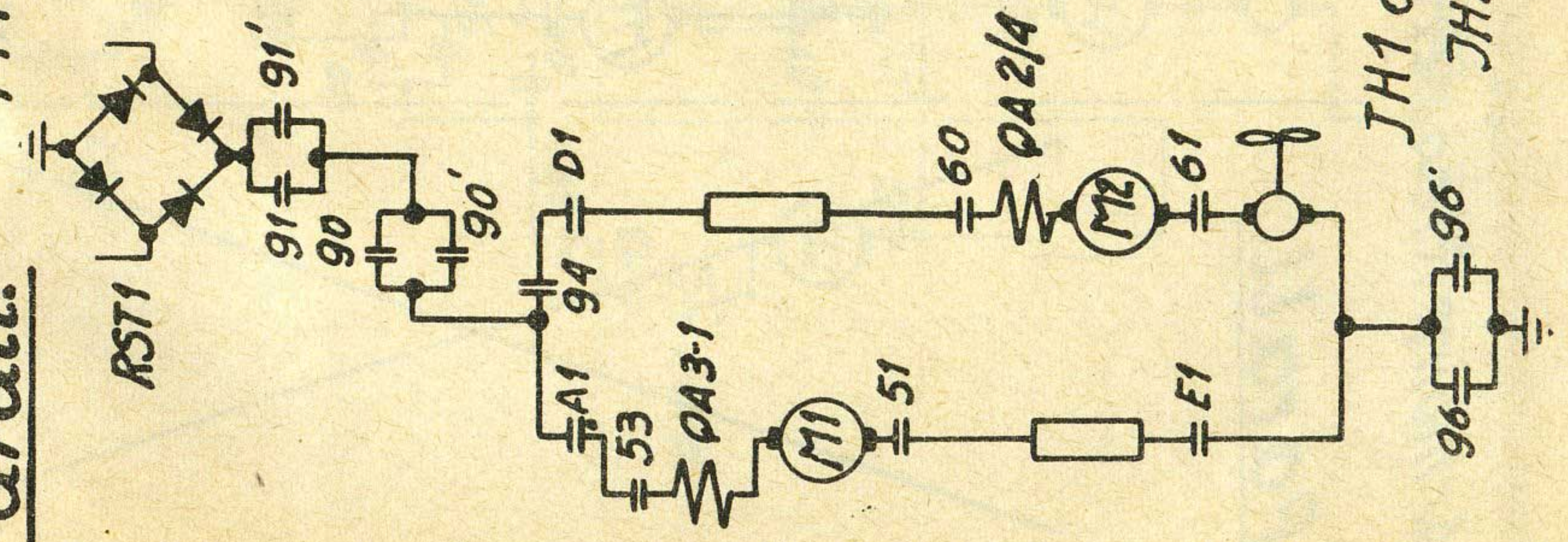
Elimination des moteurs de traction sous 15 et 25 kV 160/B.00.01.038.

Parall.

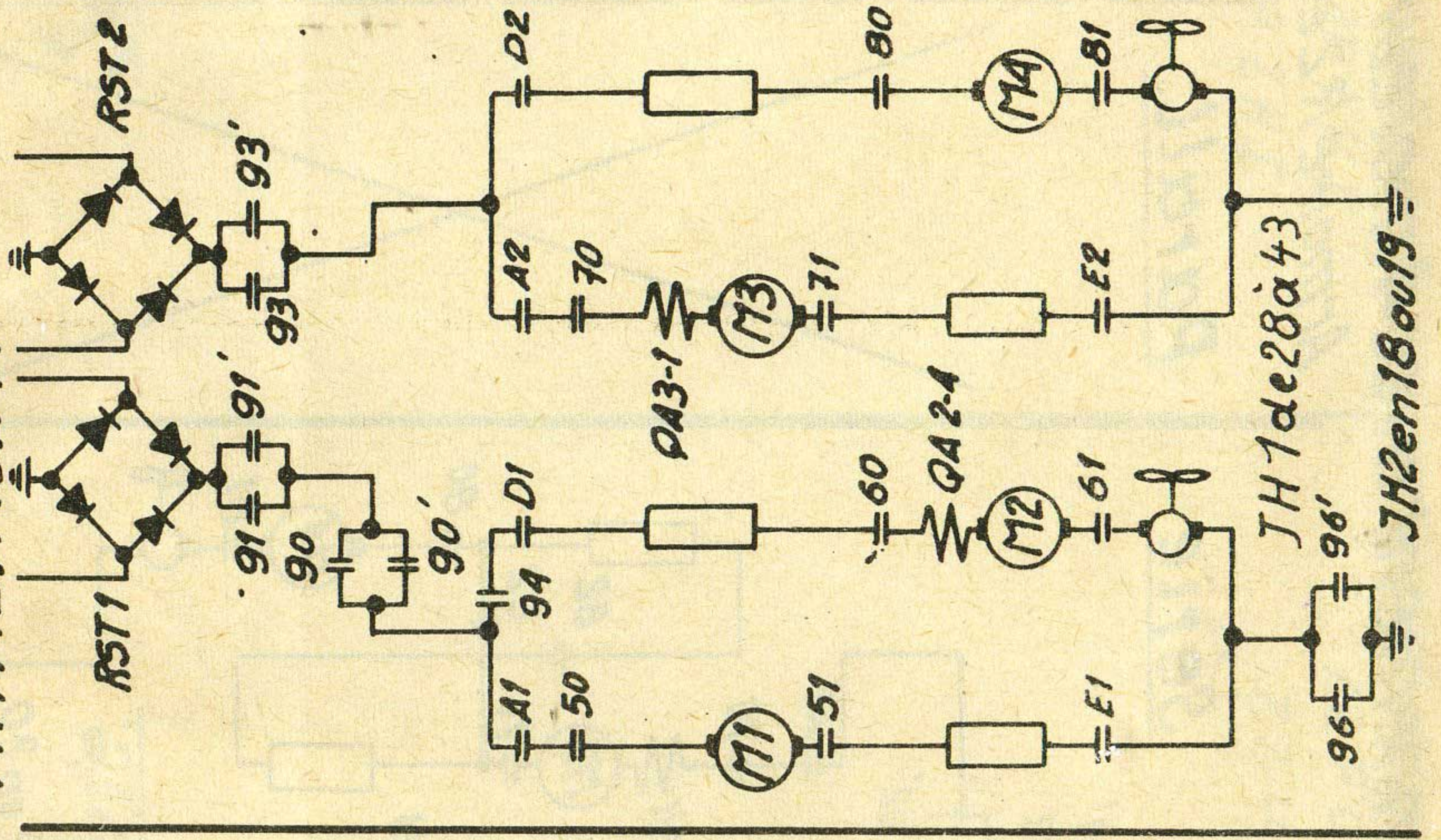
M1 + M2

M1 + M2 + M3 + M4

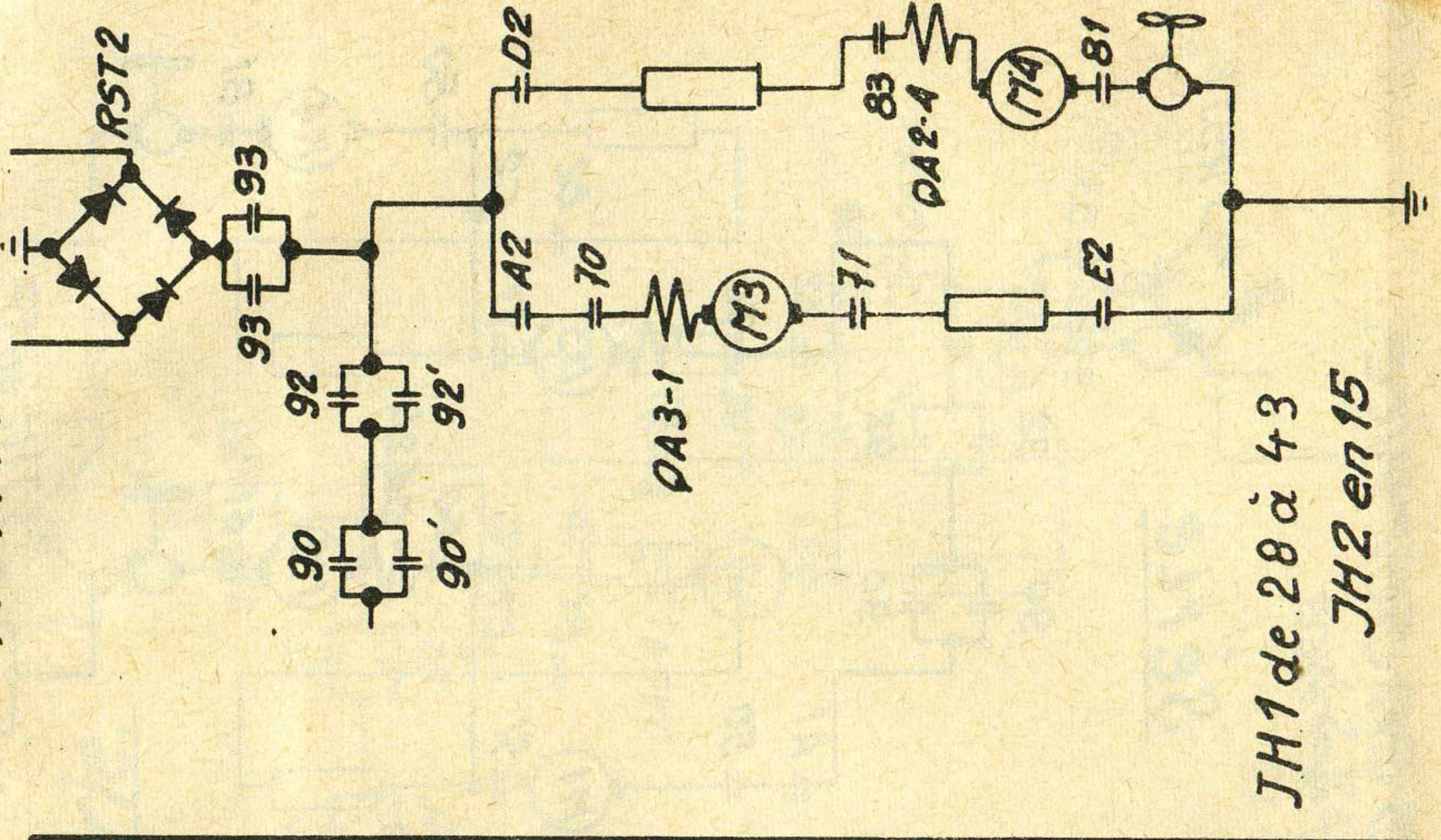
M3 + M4



JH1 de 28 à 43
JH2 en 22



JH1 de 28 à 43
JH2 en 18 ou 19



JH1 de 28 à 43
JH2 en 15

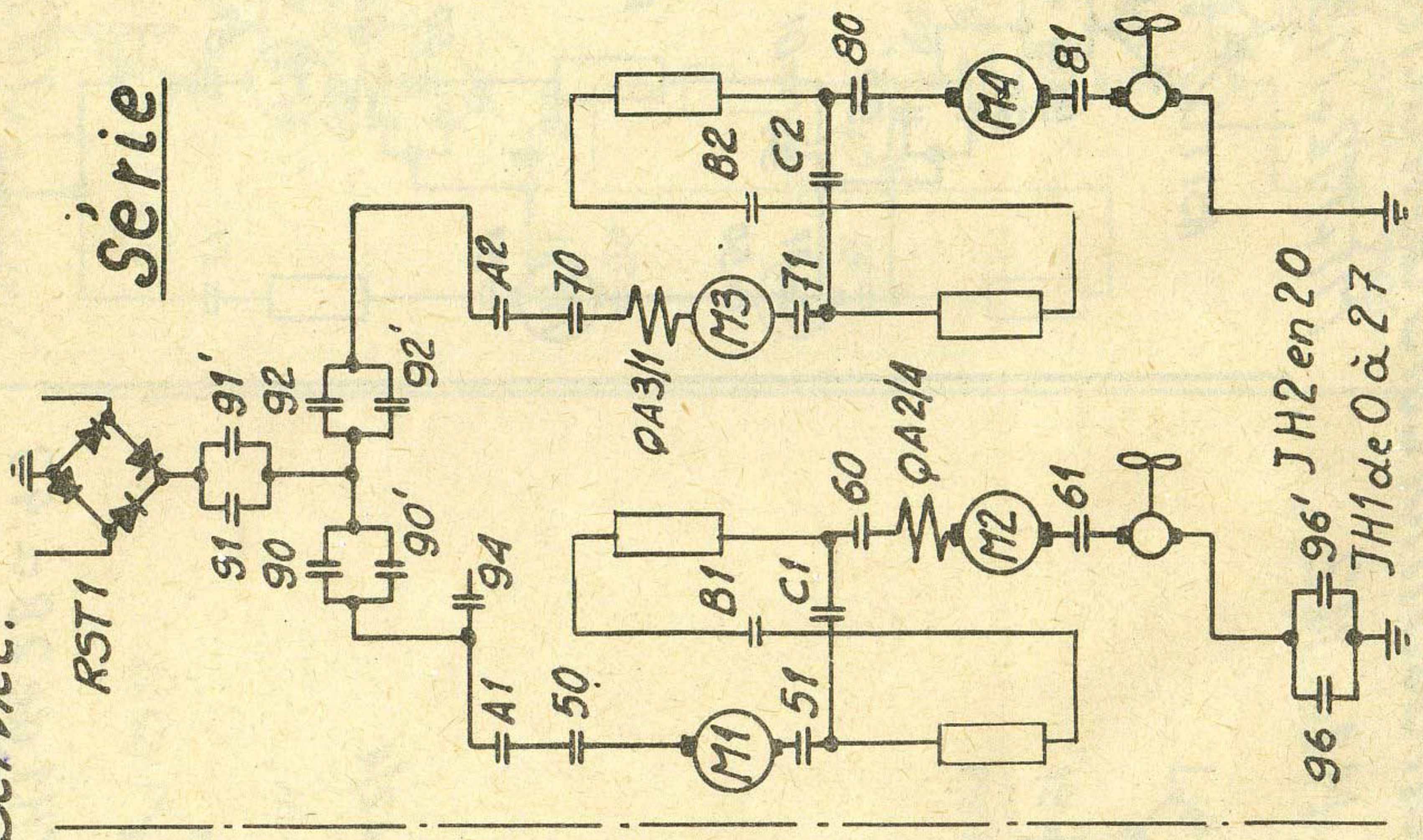
Elimination de redresseurs sous 15 et 25 kV

160/B.00.01.039

Fonctionnement avec 4 moteurs en service.

Armoire R1 en service.

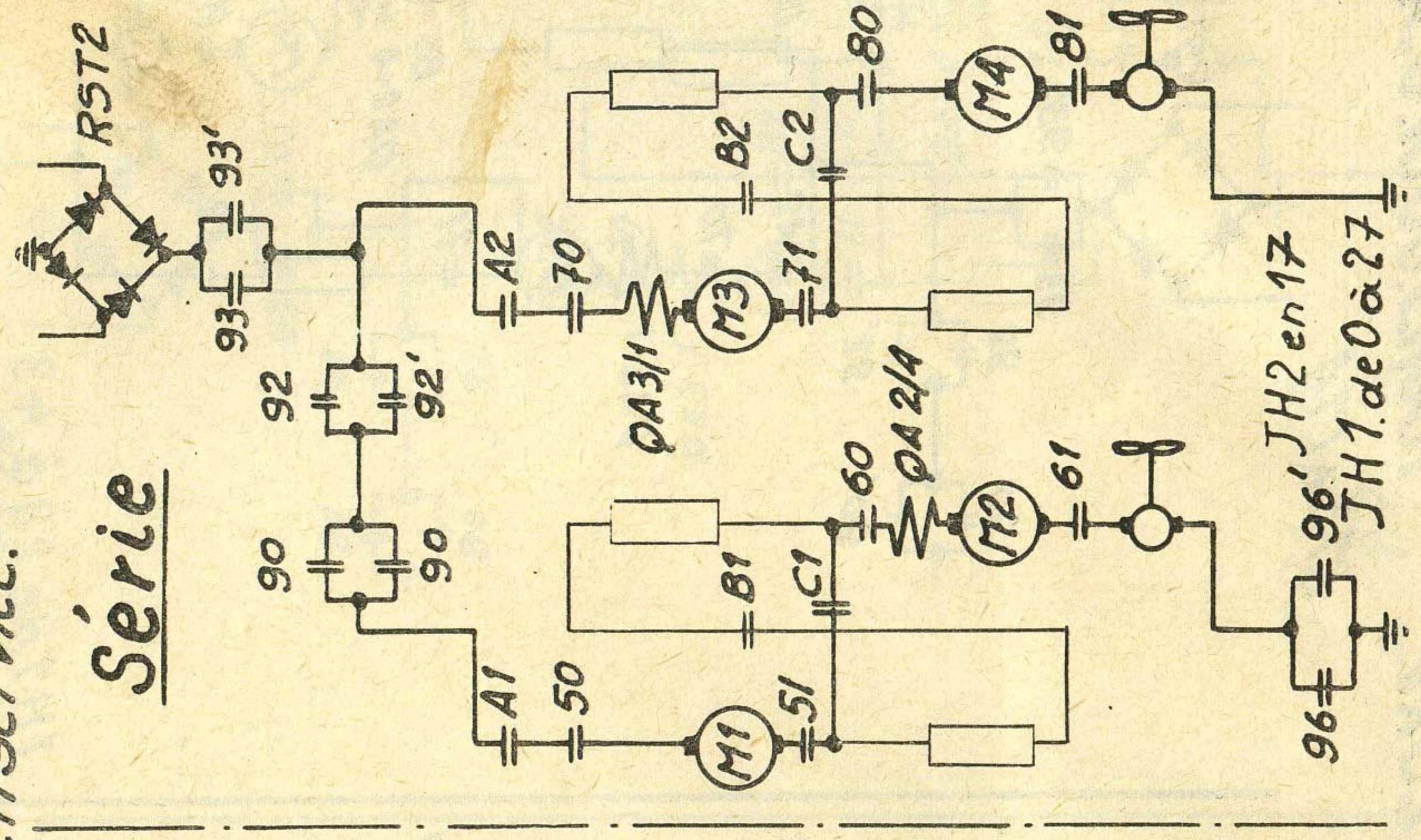
Parall.



Série

Armoire R2 en service.

Parall.

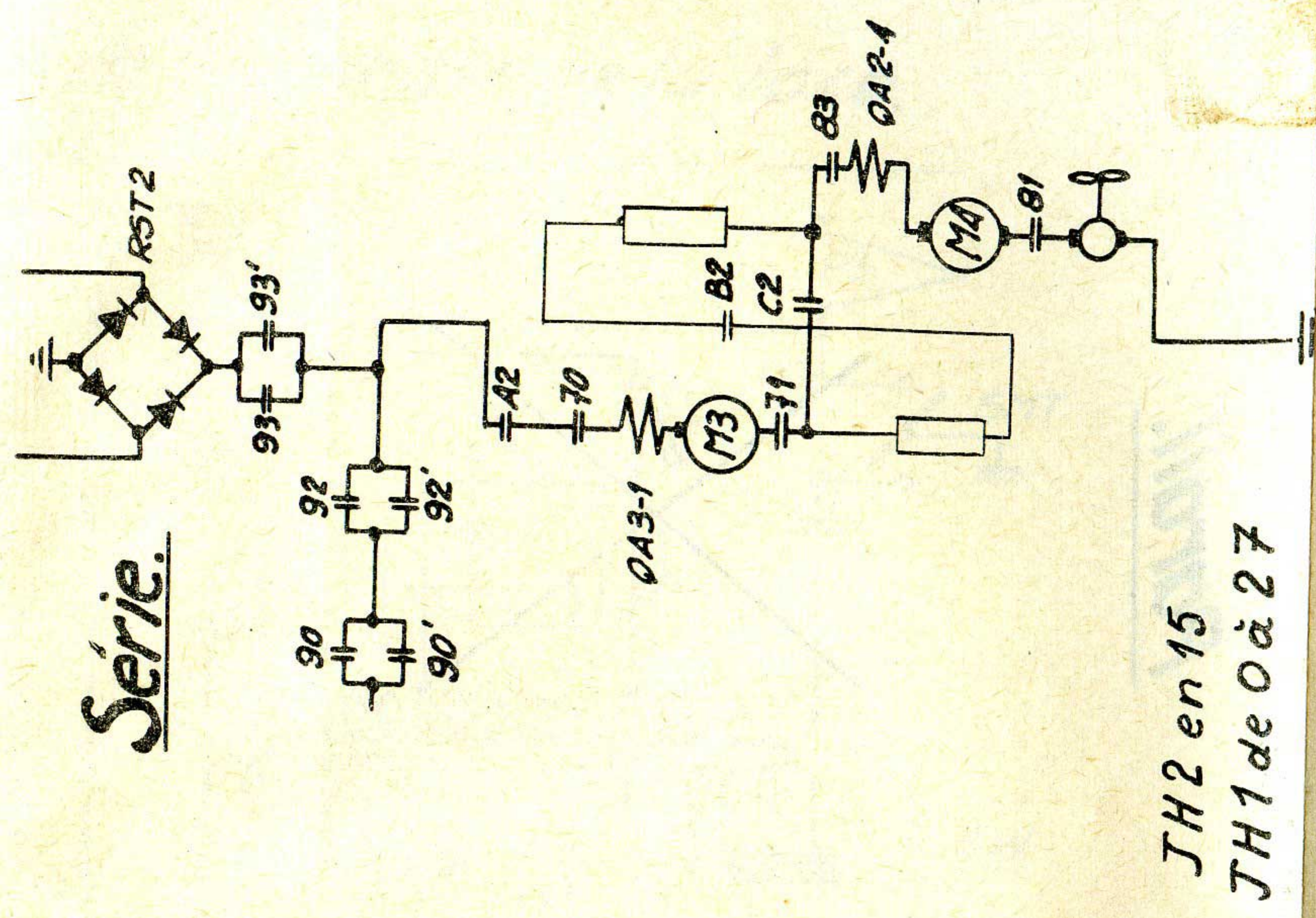
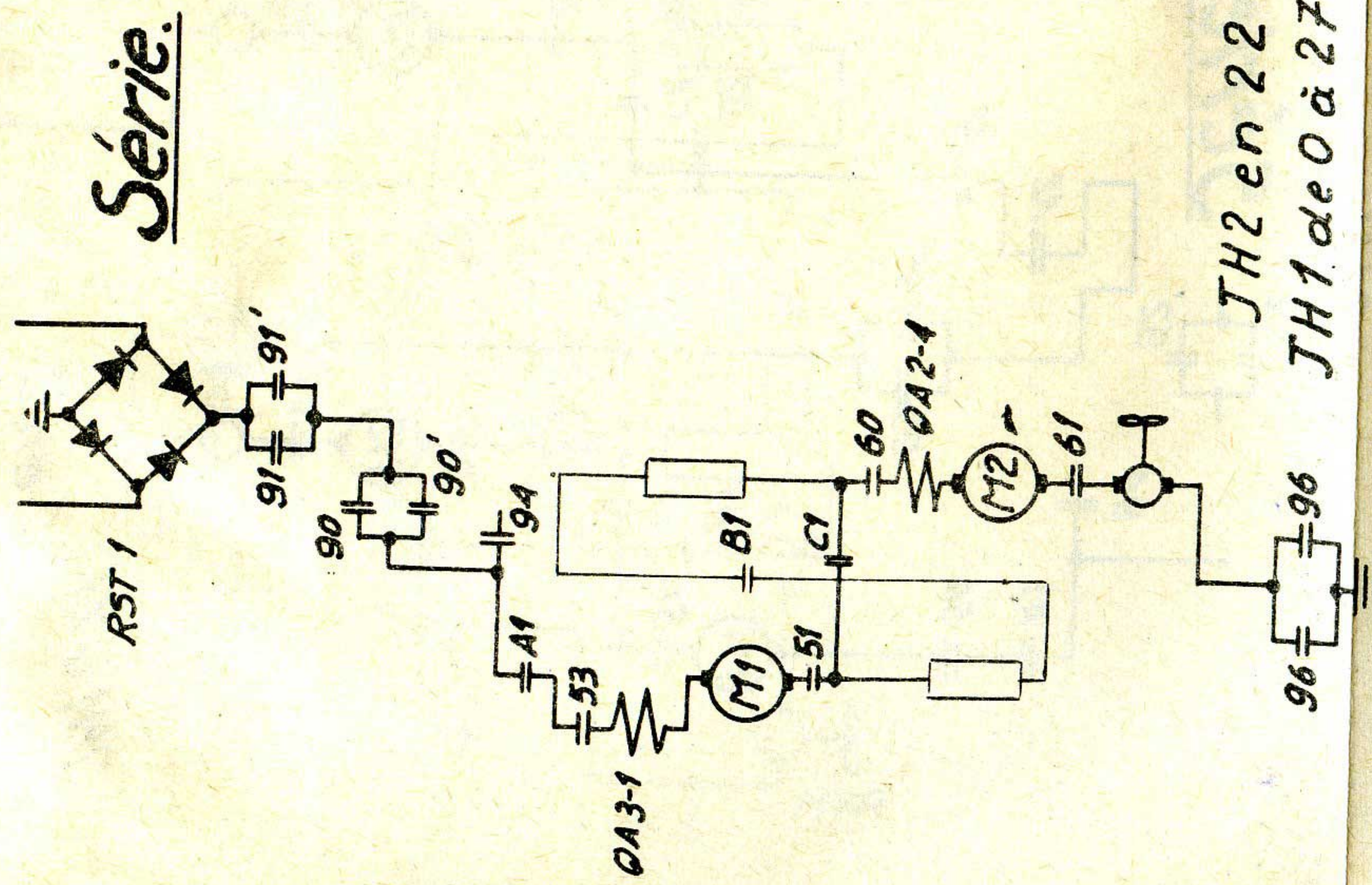


Série

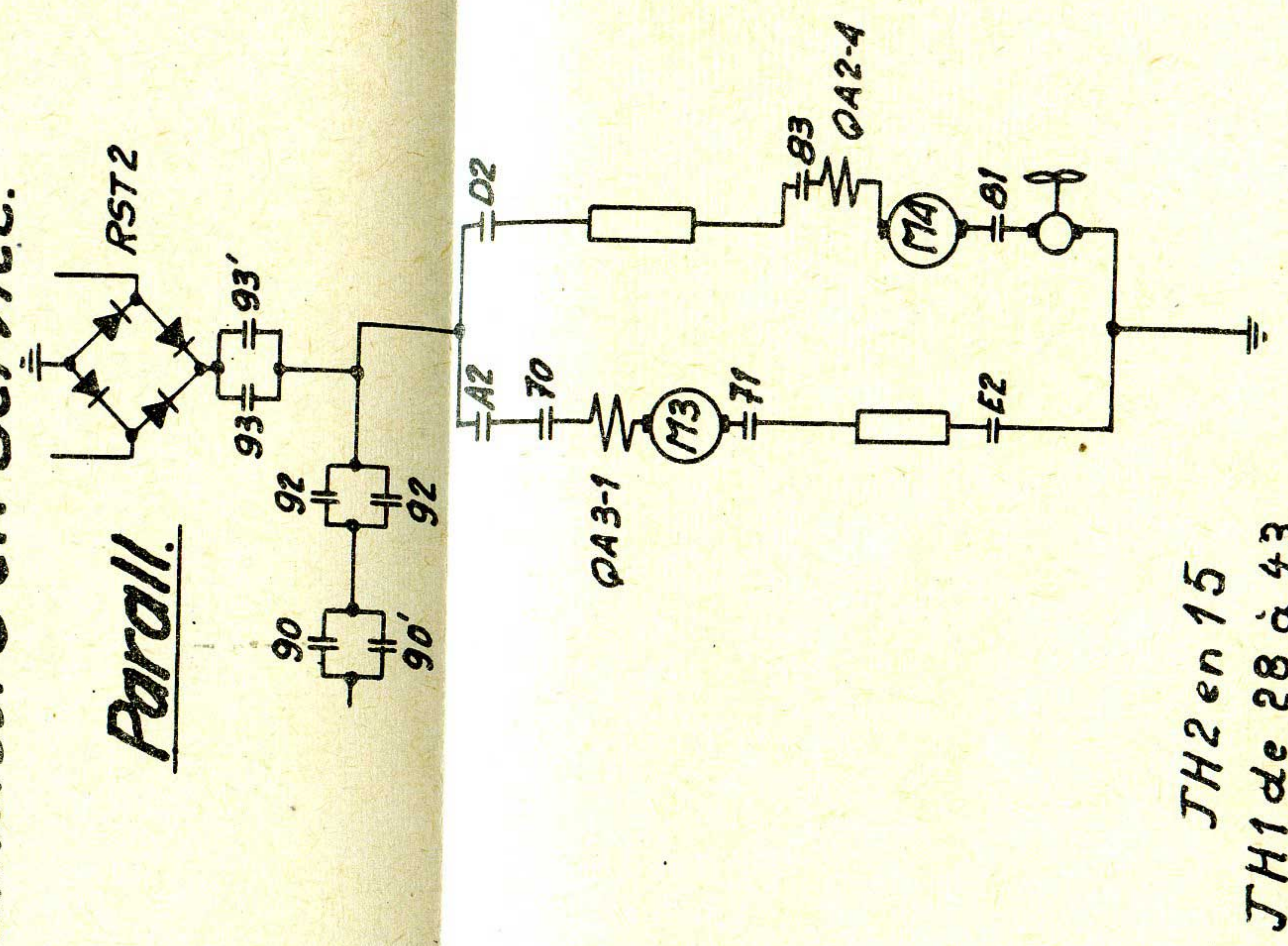
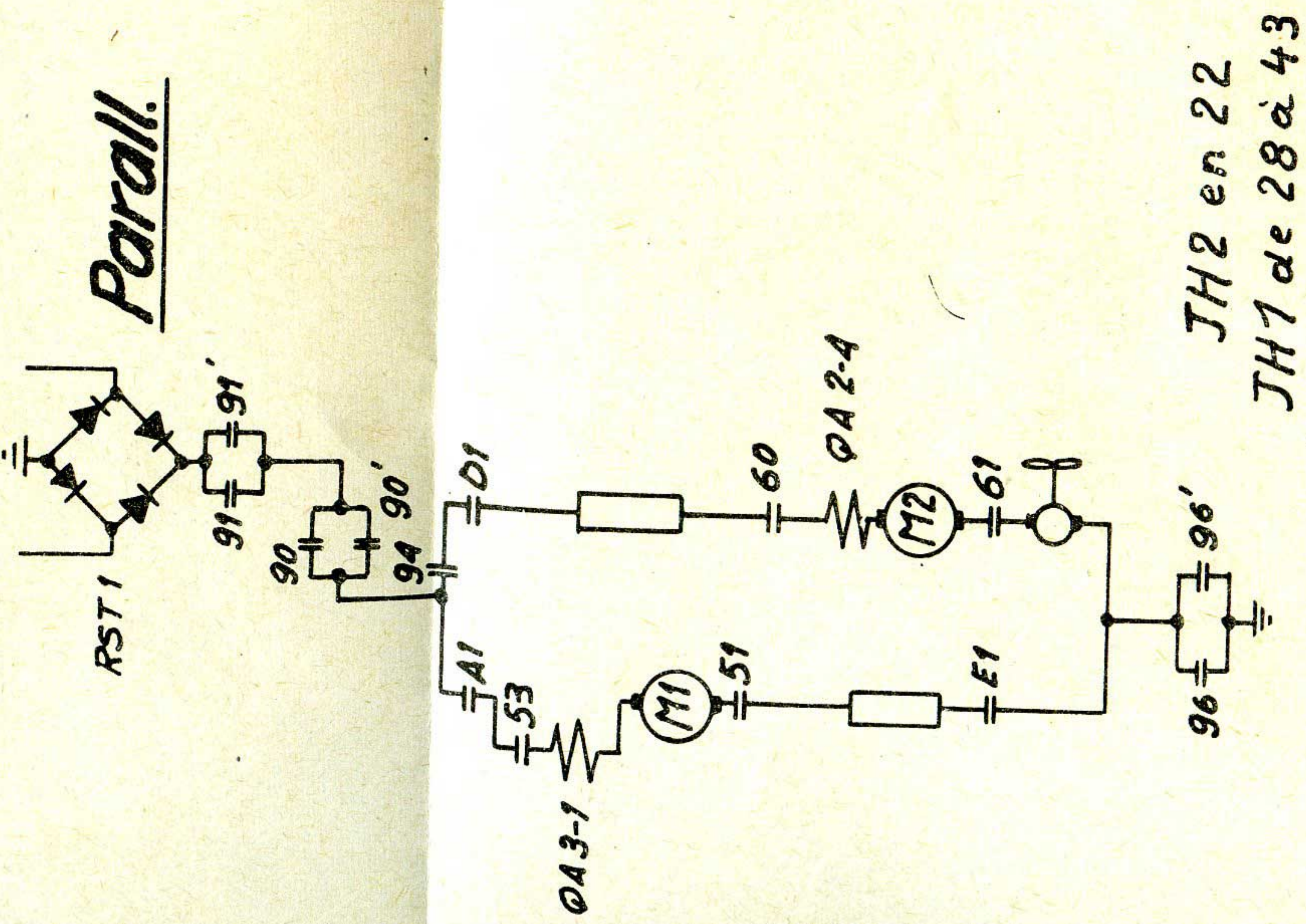
96 = JH2 en 20
JH1 de 0 à 27

96 = JH2 en 17
JH1 de 0 à 27

Fonctionnement avec 2 moteurs en service. 160/B.00.01.040.



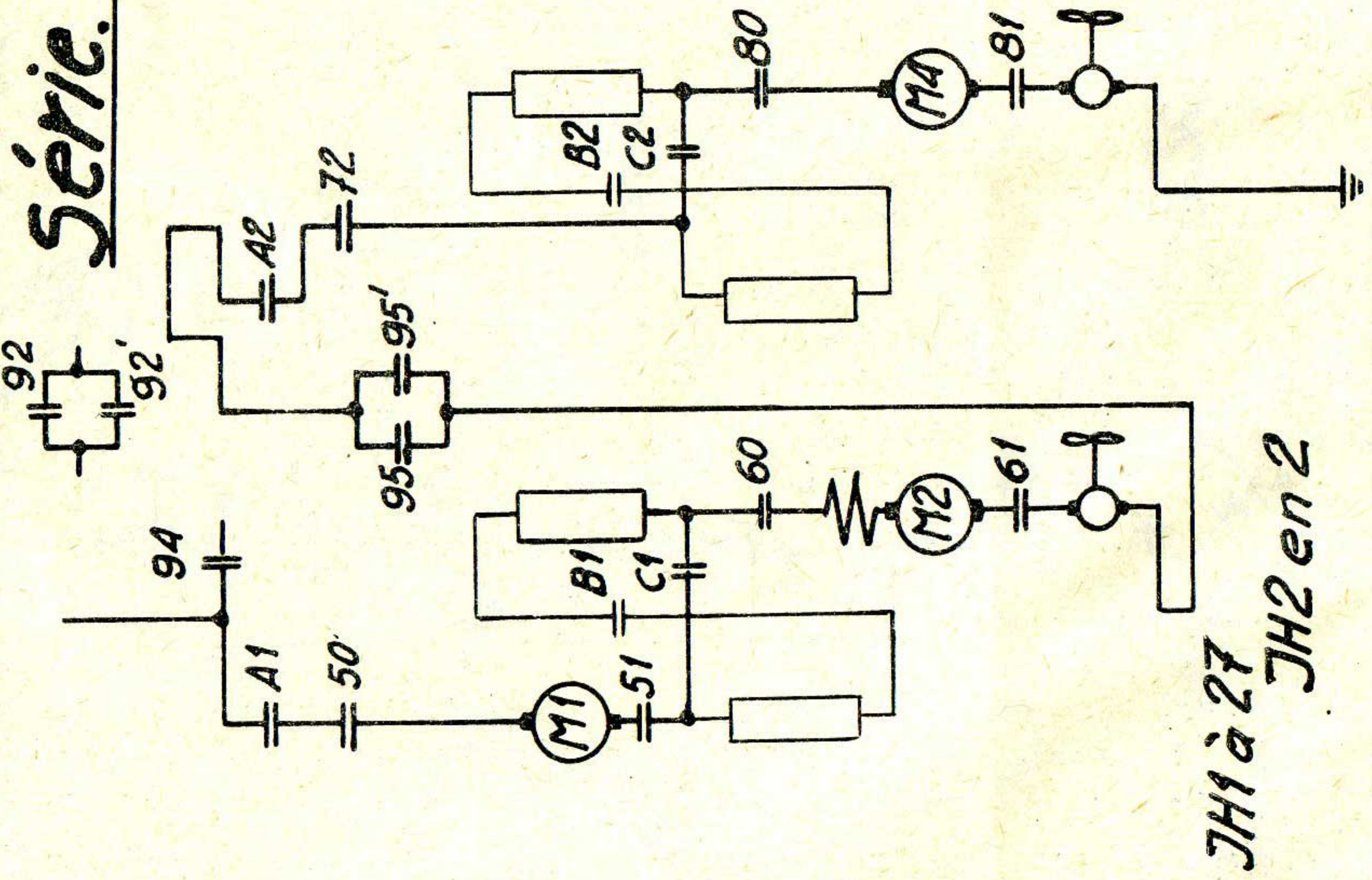
Fonctionnement avec 2 moteurs en service. 160/B.00.01.041



160/B00.01.042

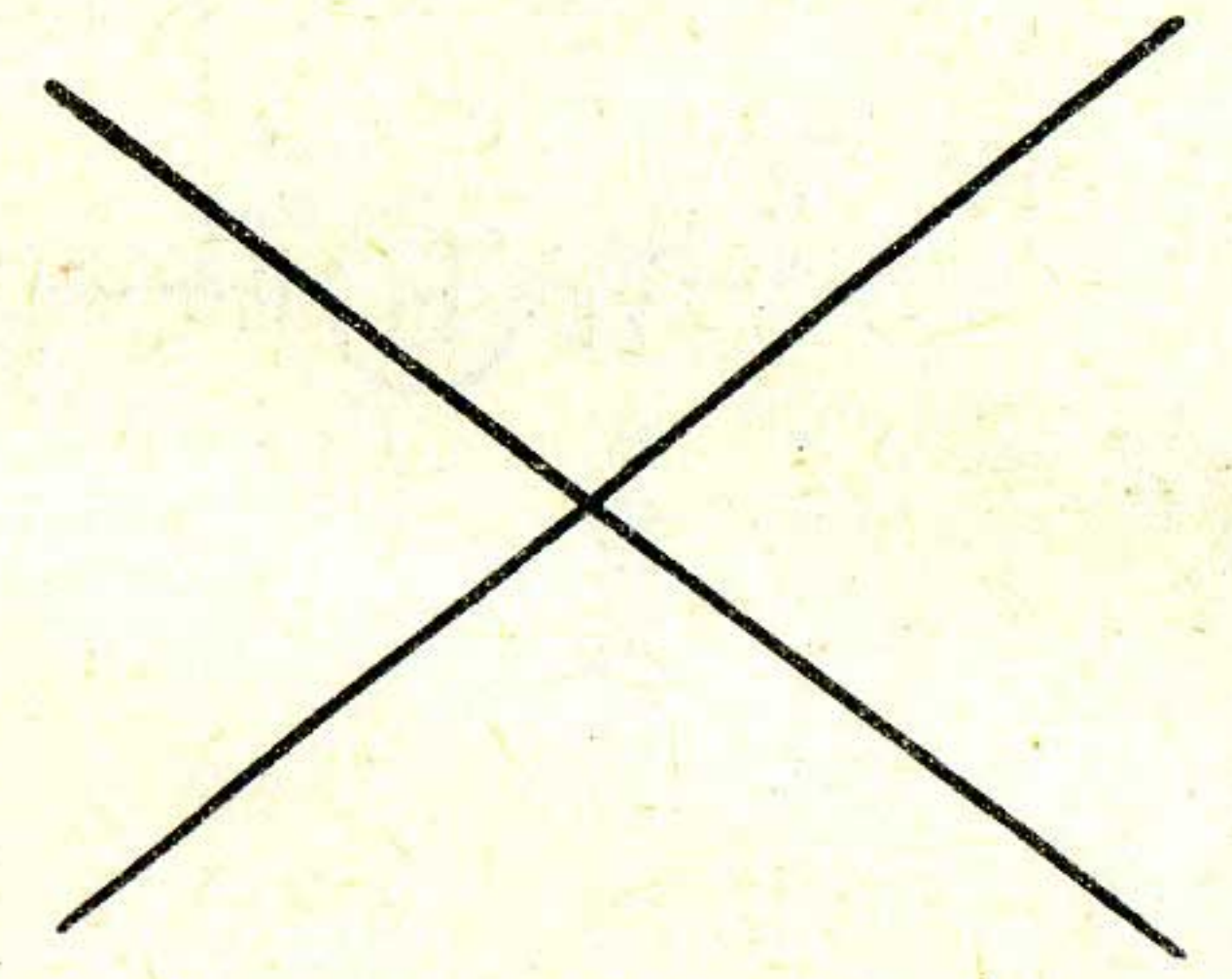
Fonctionnement en 3kV avec 3 mot. en service

Série.

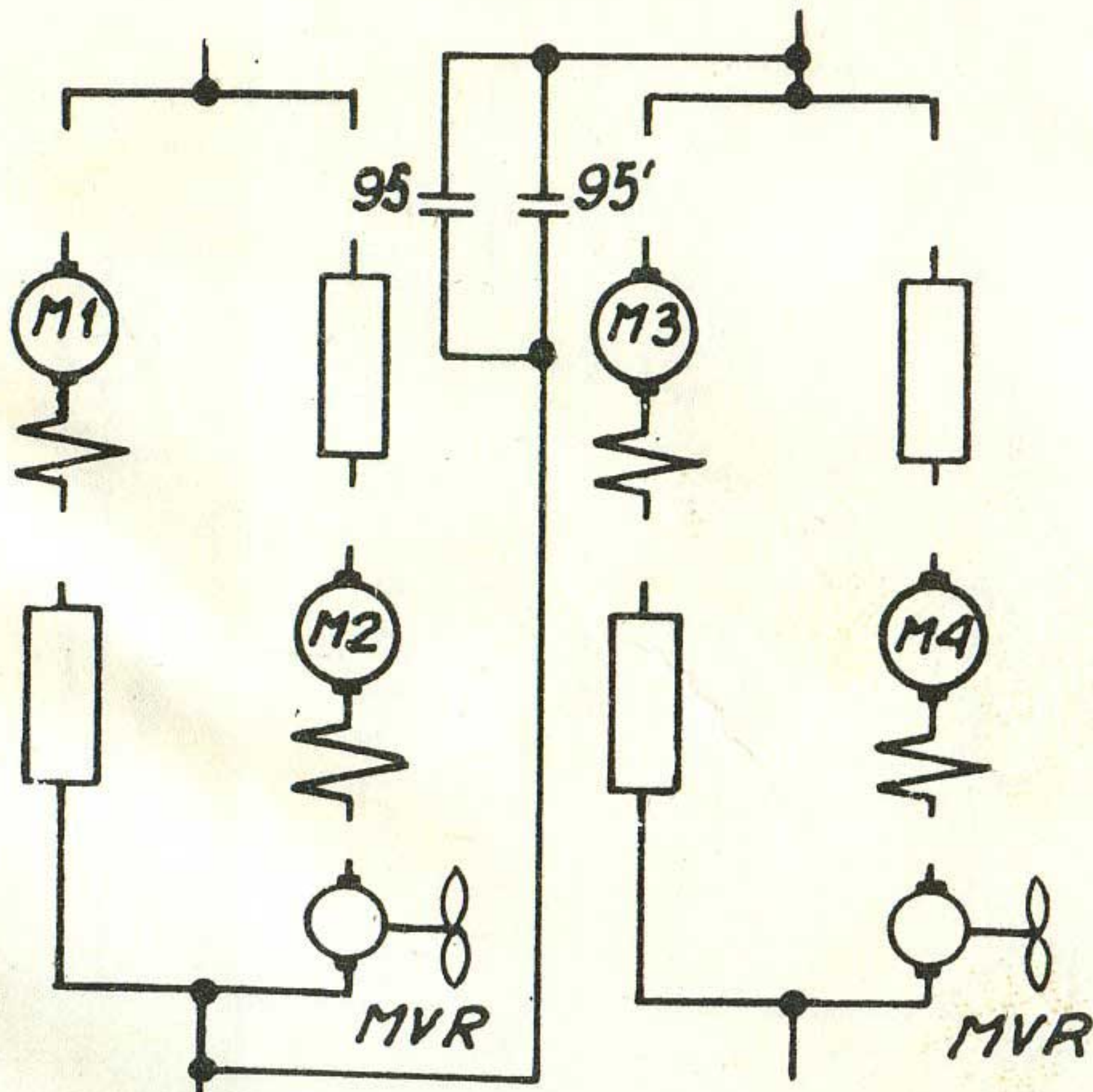
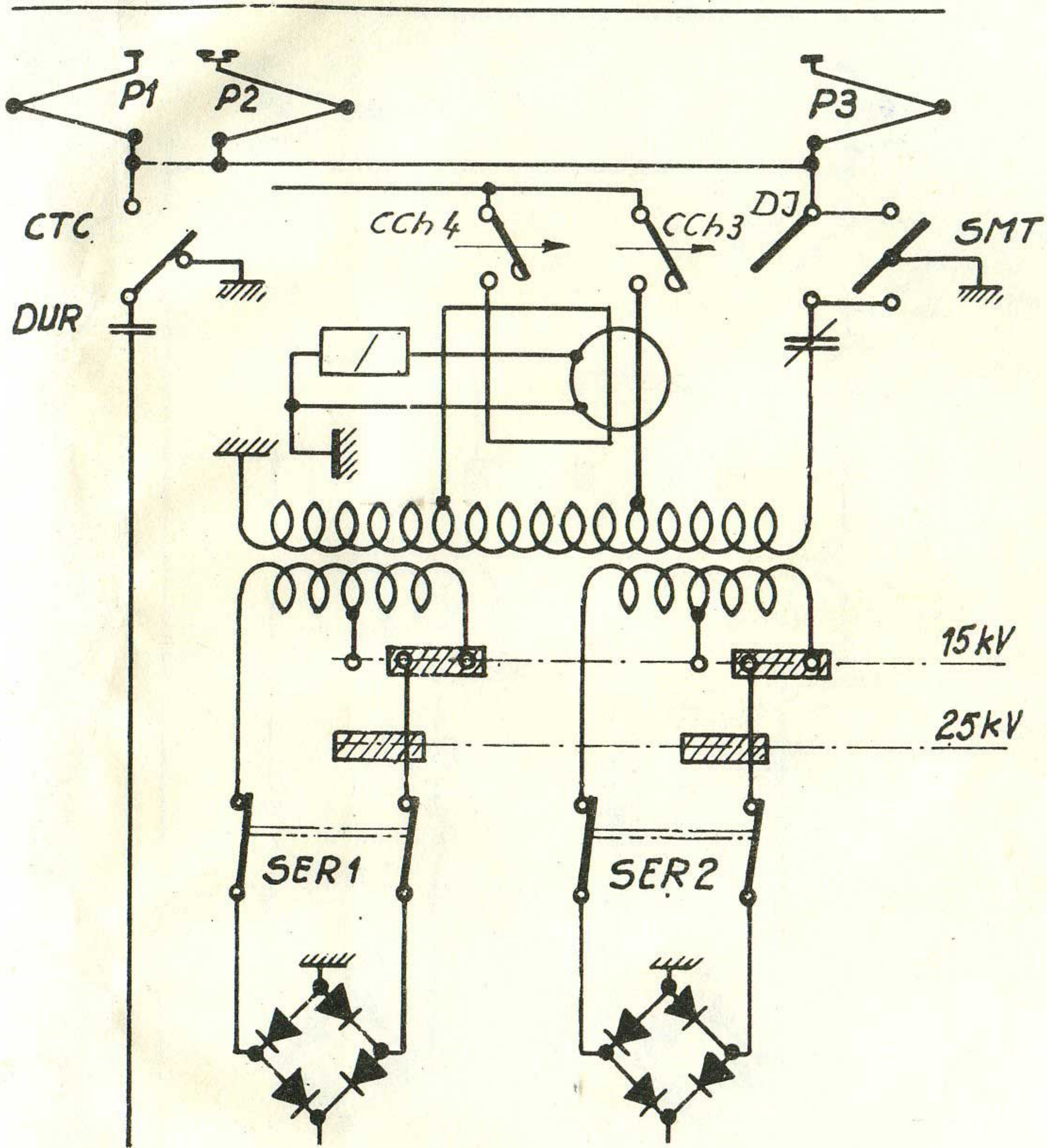


JH1 à 27
JH2 en 2

Parall.



Position de remorque de la loco.

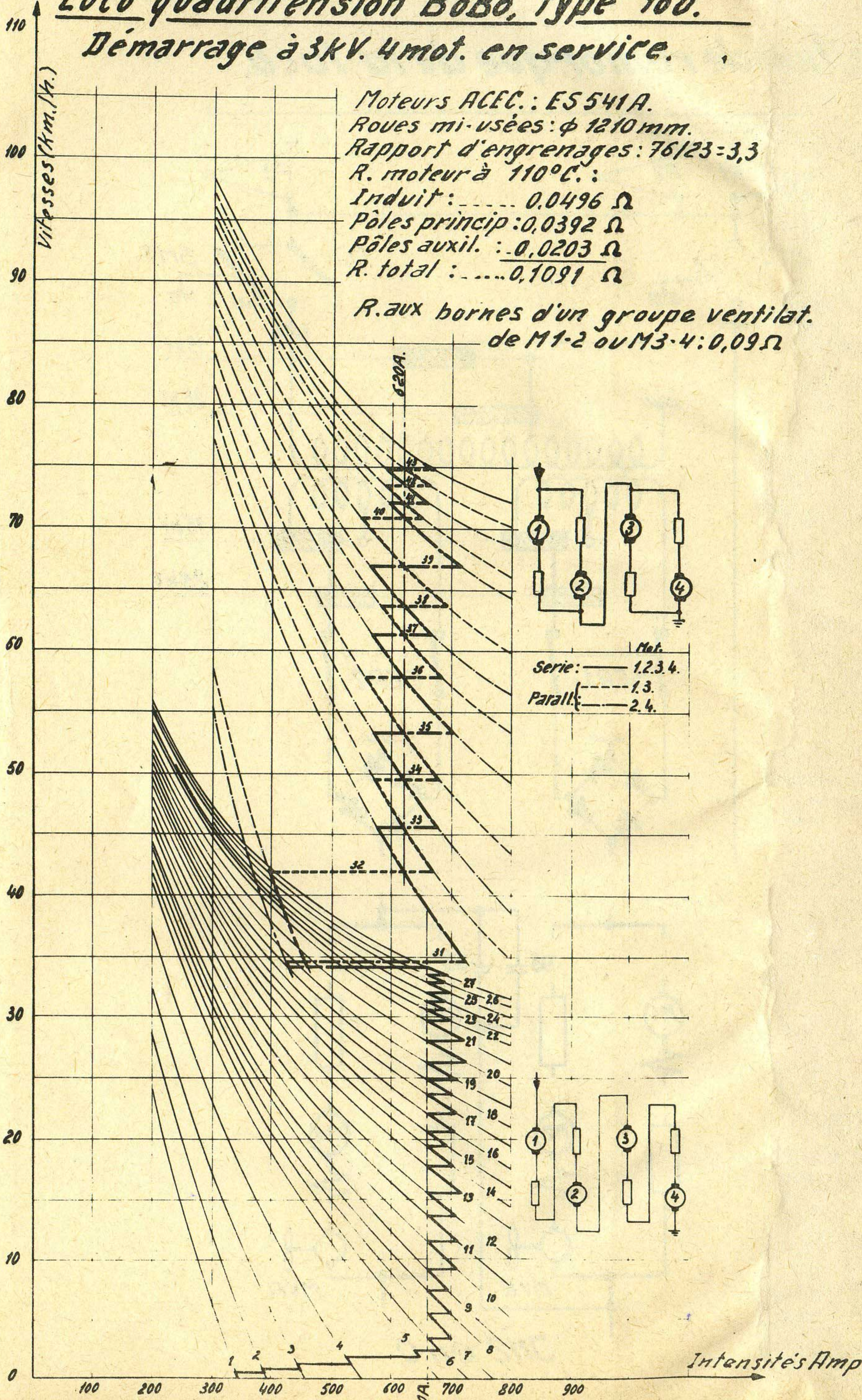


JH2 en 0

160/F02.01.1.11

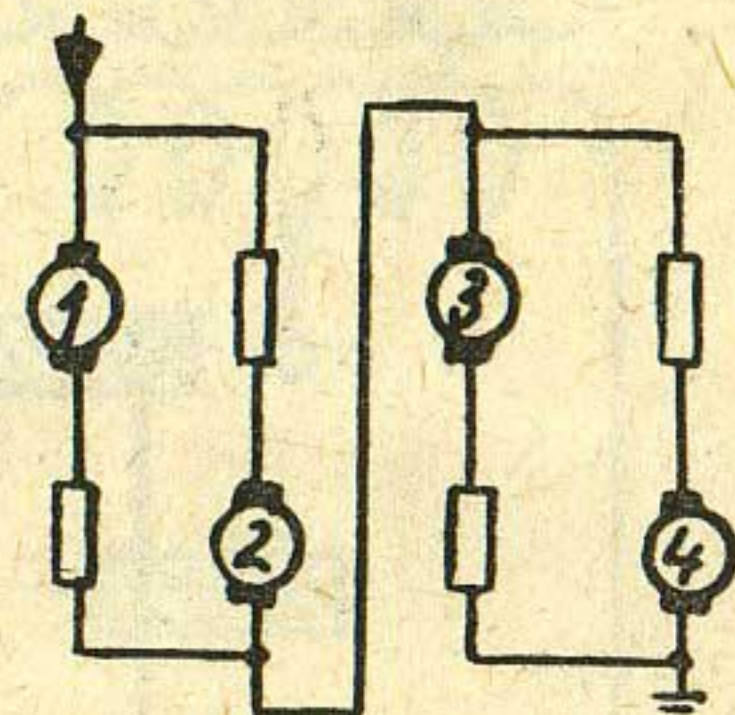
Loco quadritension BoBo, type 160.

Démarrage à 3kV. 4mot. en service.

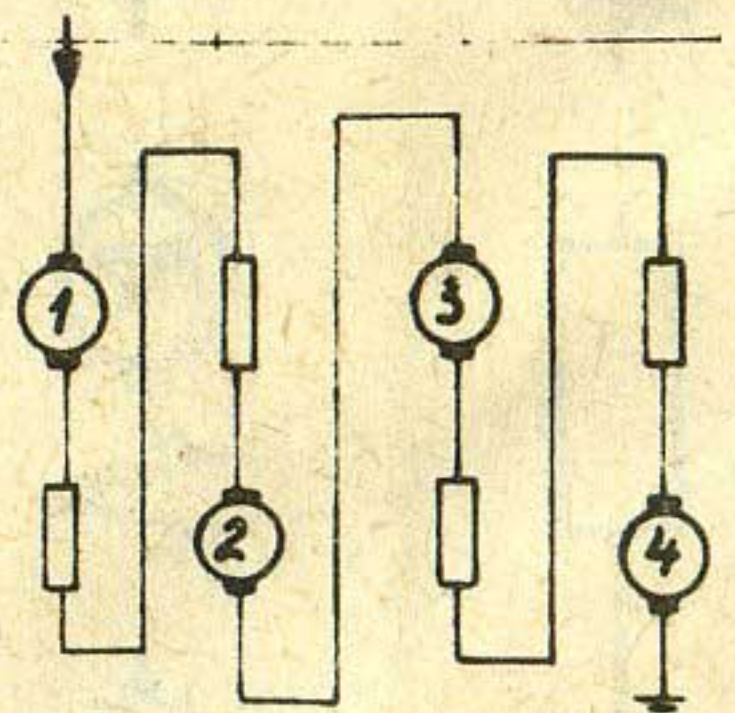


Moteurs ACEC.: ES 541 A.
 Roues mi-usées: ϕ 1210 mm.
 Rapport d'engrenages: $76/23=3,3$
 R. moteur à 110°C.:
 Induit: 0,0496 Ω
 Pôles princip: 0,0392 Ω
 Pôles auxil. : 0,0203 Ω
 R. total : 0,1091 Ω

R. aux bornes d'un groupe ventilat.
 de M1-2 ou M3-4: 0,09 Ω



Mat. |
 Serie: ——— 1.2.3.4.
 Parall: - - - 1.3.
 - - - 2.4.



Intensité's Amp.

160/F.02.01.12

Loco quadritension BoBo, type 160

Shuntage à 3kV.

4 mot. en service

Moteurs ACEC: ES 541-A.

Roues mi-usées: ϕ 1210 mm.

Rapport d'engrenages: $76/23 = 3,3$

R. Moteur à 110° C:

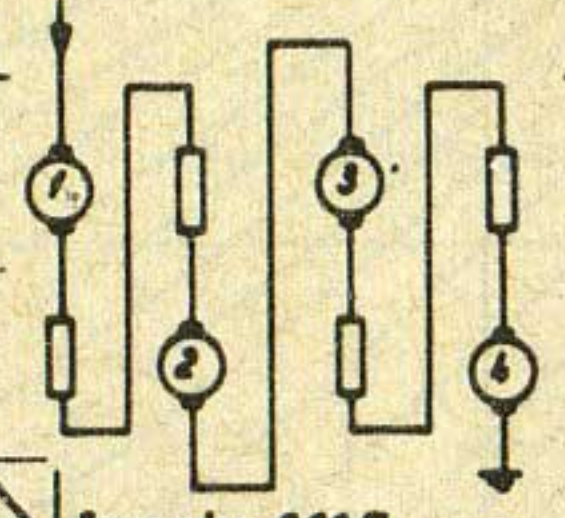
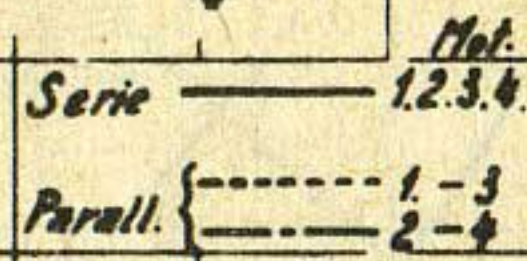
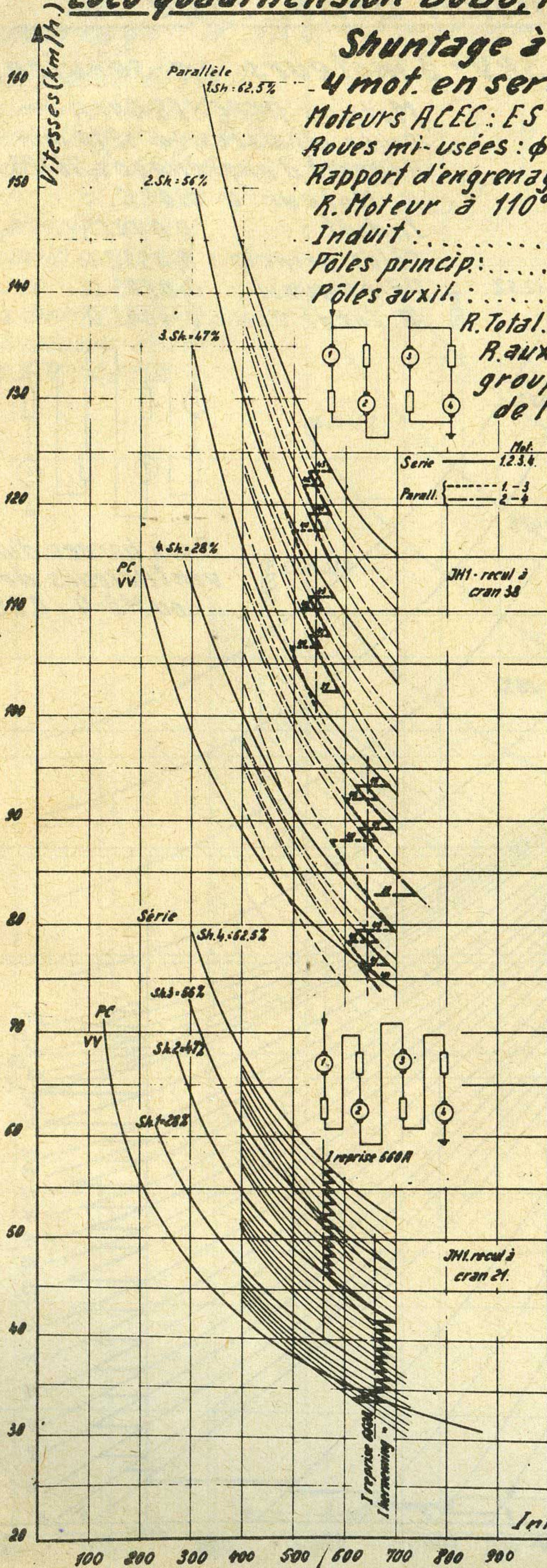
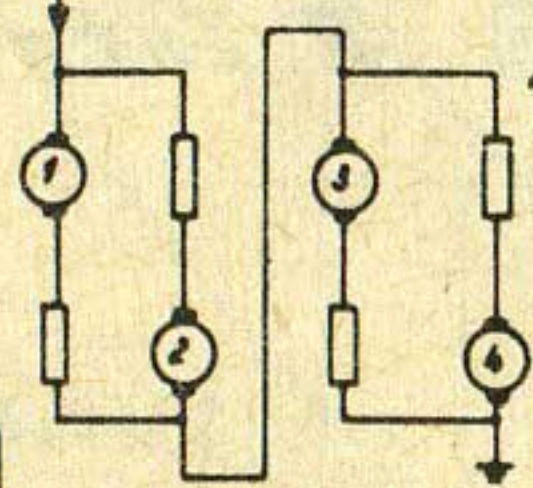
Induit: 0,0496 Ω

Pôles princip.: 0,0392 Ω

Pôles auxil.: 0,0203 Ω

R. Total: 0,1091 Ω

R. aux bornes d'un
groupe ventilateurs
de M1-2 ou M3-4:
0,09 Ω



Intensité Amp

160/F02.01.1.13

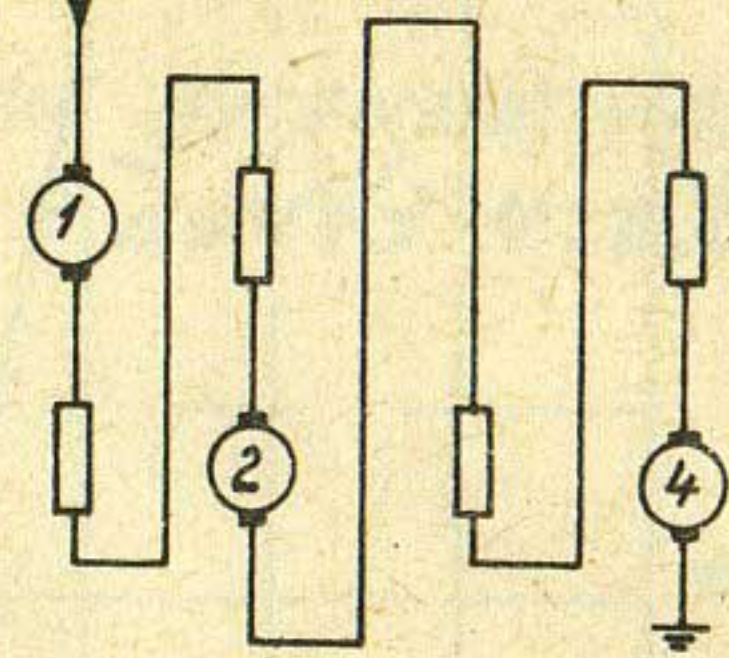
Loco quadritension BoBo, type 160

Démarrage à 3kV - 3 moteurs en service.

Vitesse (km/h.)

120
110
100
90
80
70
60
50
40
30
20
10
0

Moteurs ACEC : ES 541 A.
 Roues mi-usées : ϕ 1210 mm.
 Rapport d'engrenages 76/23 = 3,3
 R. Moteur à 110°C. :
 Induit : 0,0496 Ω
 Pôles princip : 0,0392 Ω
 Pôles auxil : .. 0,0203 Ω
 R. Total : 0,1091 Ω



R. aux bornes d'un groupe ventilateurs de M1-2 ou M3-4 : 0,09 Ω

Sh4=62,5%
 Sh3=56%
 Sh2=47%
 Sh1=28%

560A.

PC
VV

27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6

Intensités Amp.

100 200 300 400 500 600 660A. 700 800

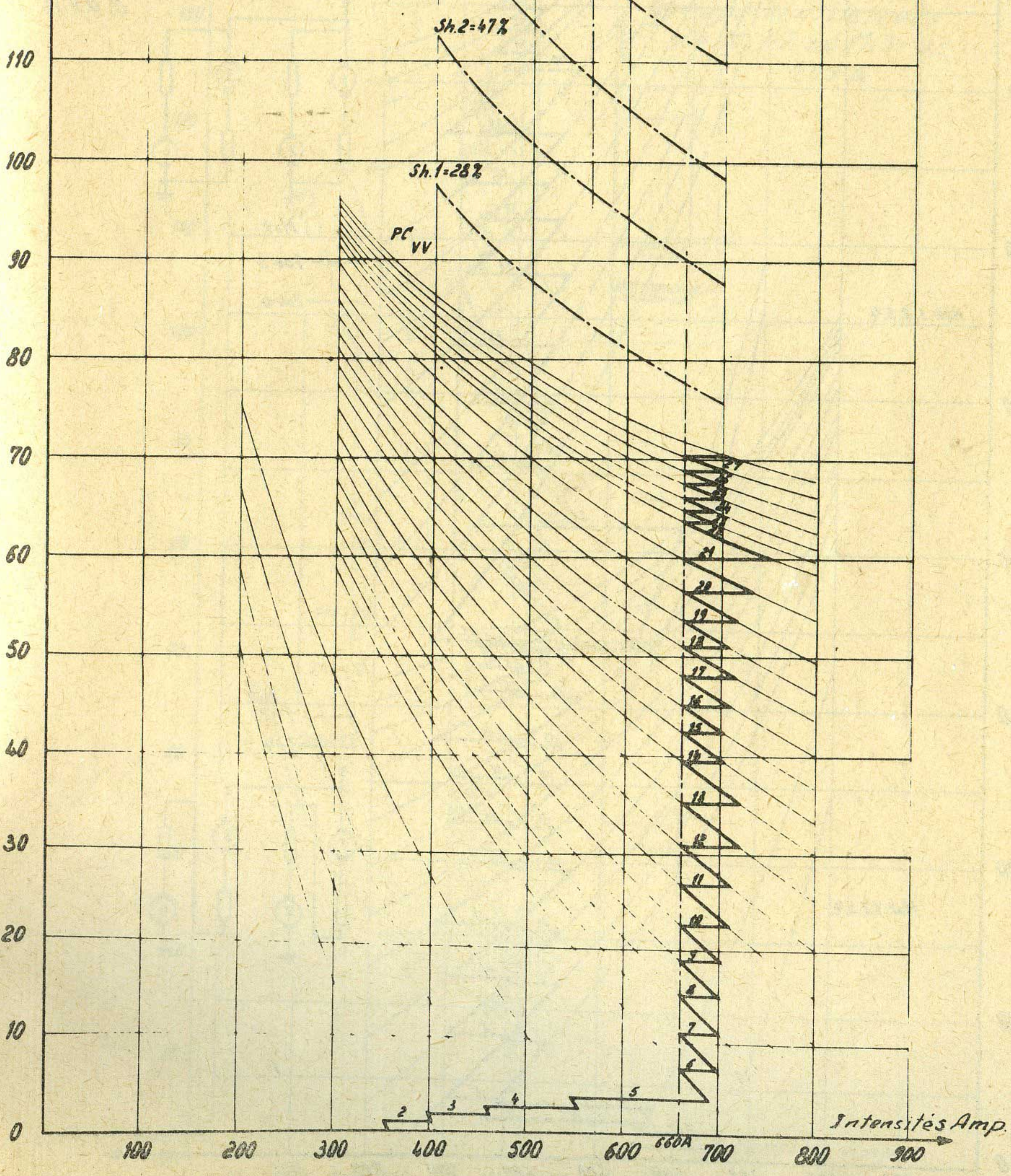
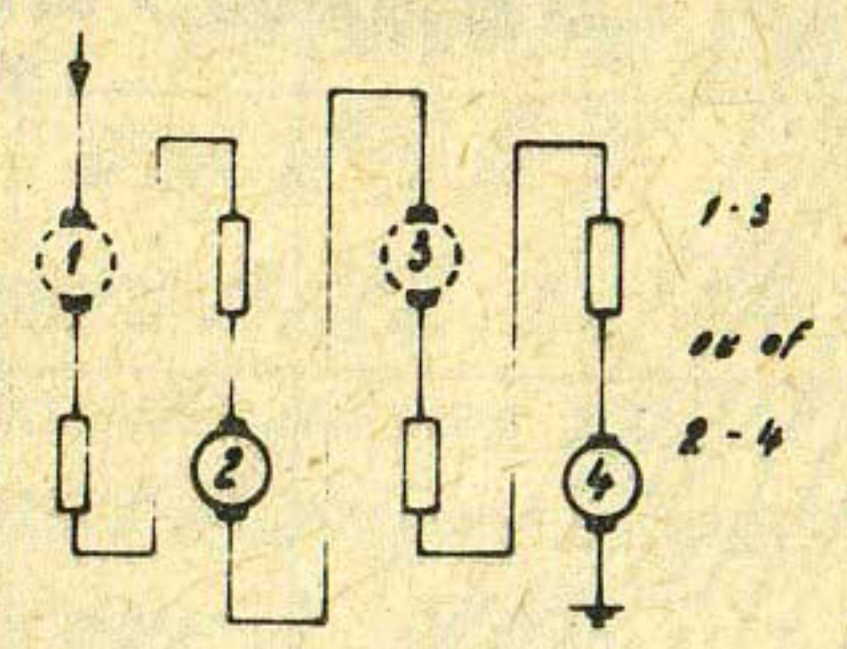
1 2 3 4 5 6

Loco quadritension BoBo, type 160

Démarrage à 3kV. - 2 moteurs en service

Vitesse (km/h)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

Moteurs ACEC: ES541 A.
Roues mi-usées ϕ 1210 mm
Rapport d'engrenage 76/23=3.3
R. moteur à 110° C. :
Induit: 0.0496
Pôles princip: 0.0392
Pôles auxil: ... 0.0203
R. Total: ... 0.1091
R. Aux bornes d'un groupe ventilateurs de M7-2 ou M3-4: 0.09 Ω



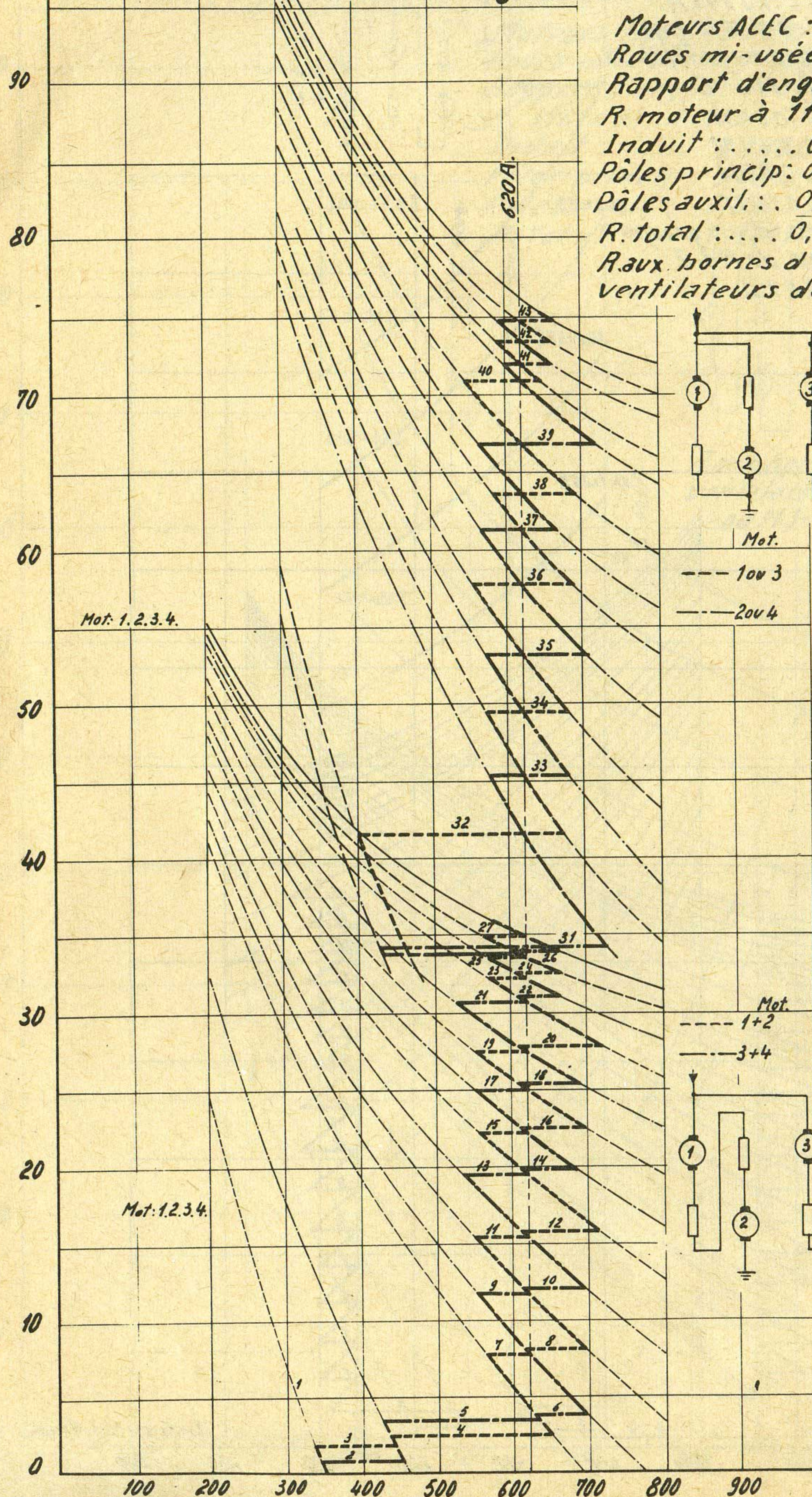
Intensités Amp.

160/F 02.01.1.1.15

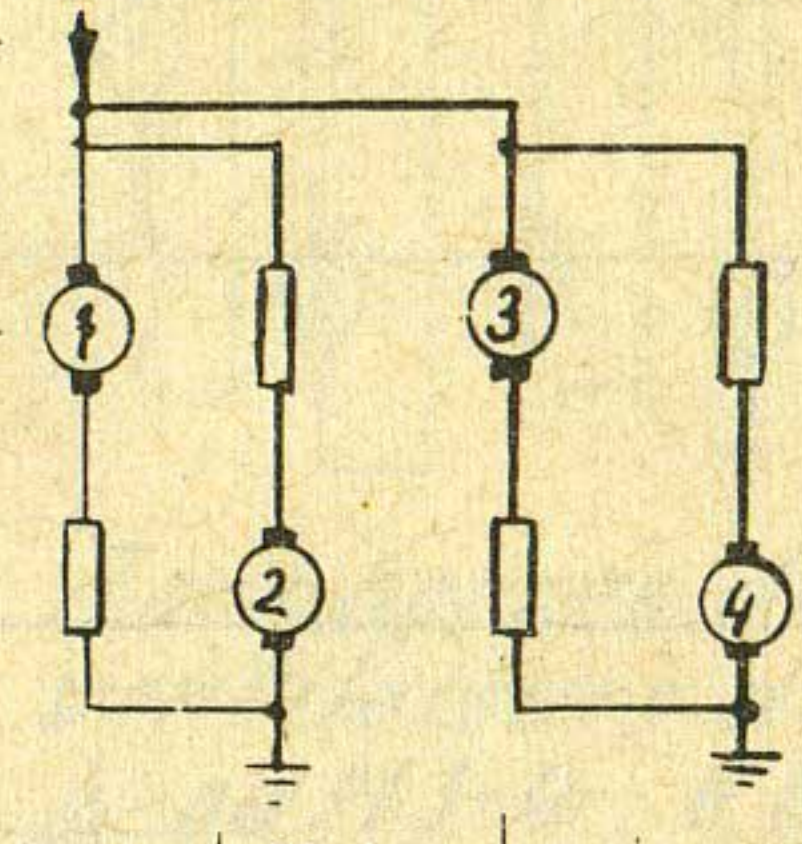
Loco quadritension BoBo, type 160

Démarrage à 1.5, 15 ou 25 kV.

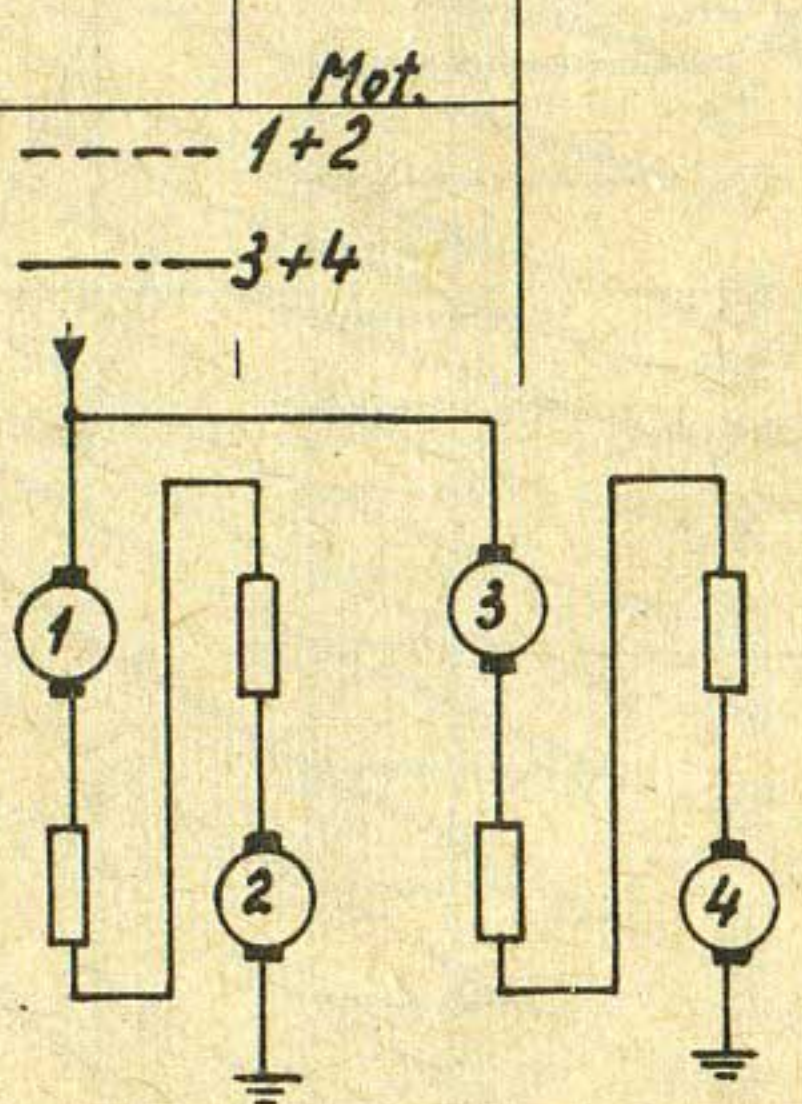
Vitesse (km/h)



Moteurs ACEC : E5541 A.
 Roues mi-usées : ϕ 1210 mm.
 Rapport d'engrenages : 76/23 = 3.3
 R. moteur à 110°C :
 Induit : 0,0496 Ω
 Pôles princip : 0,0392 Ω
 Pôles auxil. : . 0,0203 Ω
 R. total : 0,1091 Ω
 R. aux bornes d'un groupe ventilateurs de M. 1-2 ou 3-4 : 0,09 Ω



Mot.
 --- 1 ou 3
 --- 2 ou 4



Mot.
 --- 1+2
 --- 3+4

Intensités Amp

160/F 02.01.1.16

Loco quadritension BoBo type 160

Shuntage à 1.5.15 ou 25 kV

Moteurs ACEC: ES 541 A.

Rowes mi-usées: ϕ 1210 mm.

Rapport d'engrenages: $76/23 = 3,3$

R. moteur à 110°C

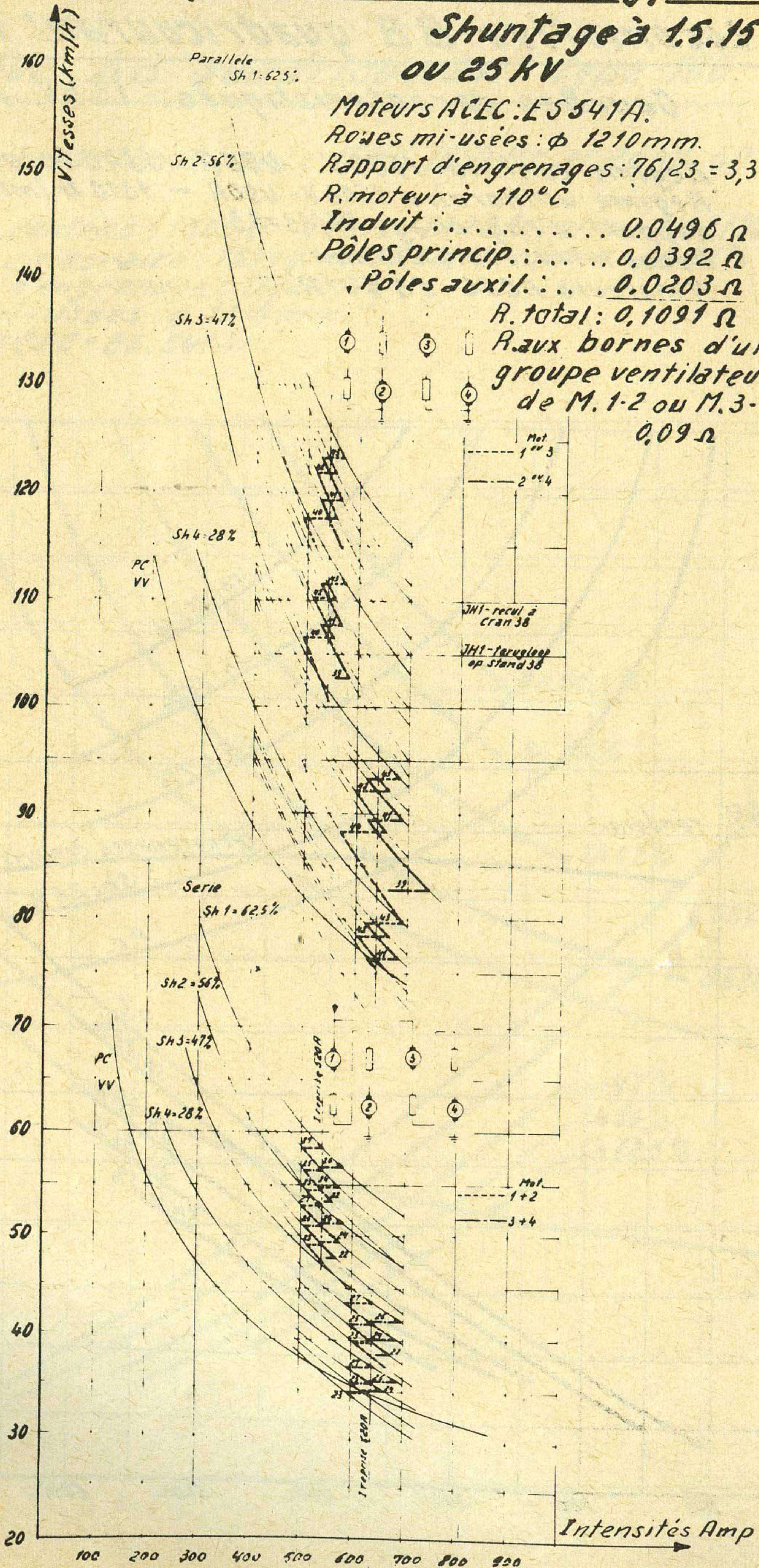
Induit: 0,0496 Ω

Pôles princip.: 0,0392 Ω

Pôles auxil.: ... 0,0203 Ω

R. total: 0,1091 Ω

R. aux bornes d'un groupe ventilateurs de M.1-2 ou M.3-4: 0,09 Ω



160/F.02.02.1.12.

Locomotive BB quadricourant type 160.

Courbes caractéristiques : 15 kV, 16 $\frac{2}{3}$ Hz. et 25 kV, 50 Hz. ~.

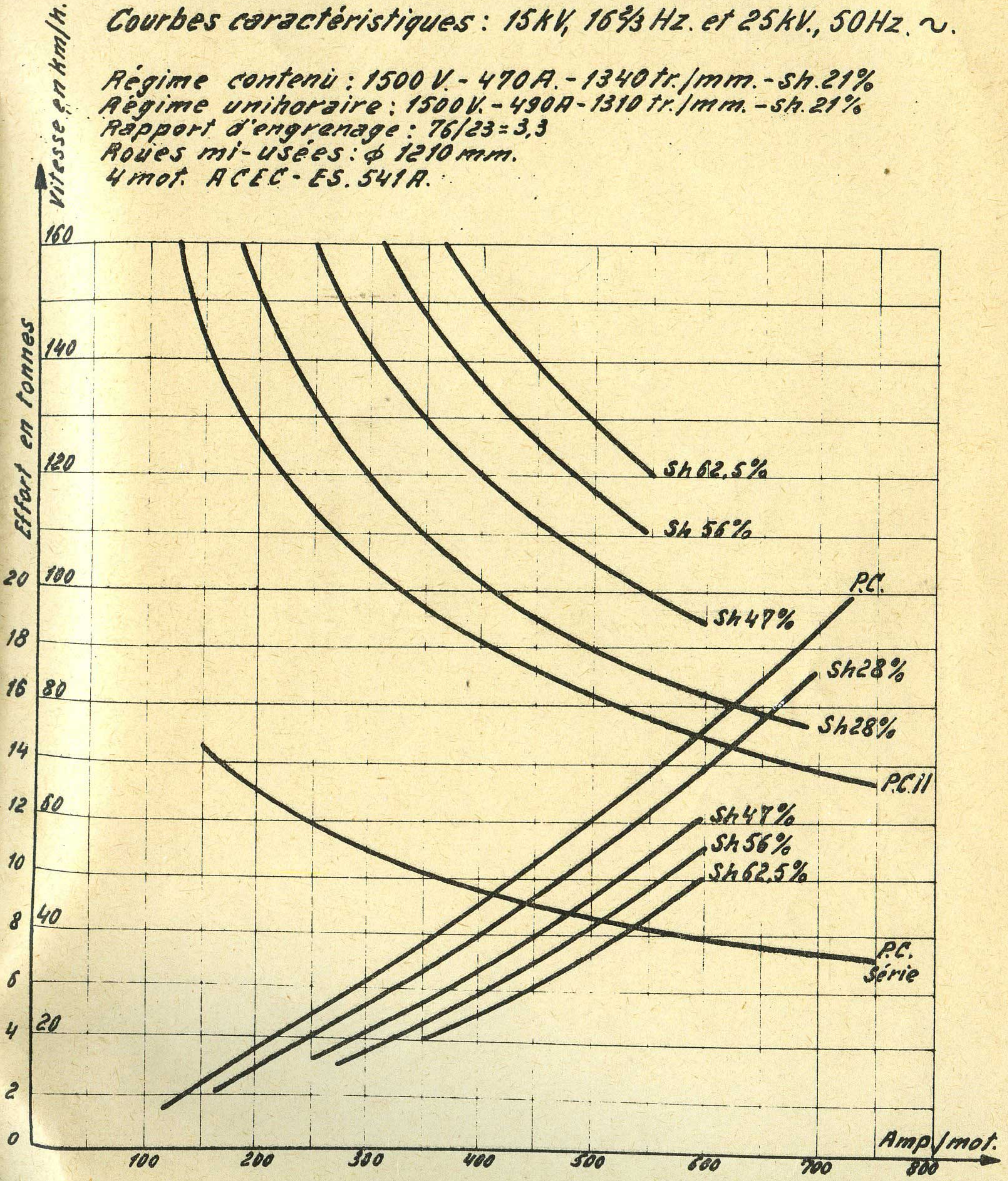
Régime contenu : 1500 V. - 470 A. - 1340 tr./mm. - sh. 21%

Régime unihoraire : 1500 V. - 490 A. - 1310 tr./mm. - sh. 21%

Rapport d'engrenage : 76/23 = 3,3

Roues mi-usées : ϕ 1210 mm.

4 mot. ACEC - ES. 541 A.



Q

W
/

W
/

W
/

W