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Contents

OPERATION

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I. Introduction.

The figure illustrates a section of the machine.

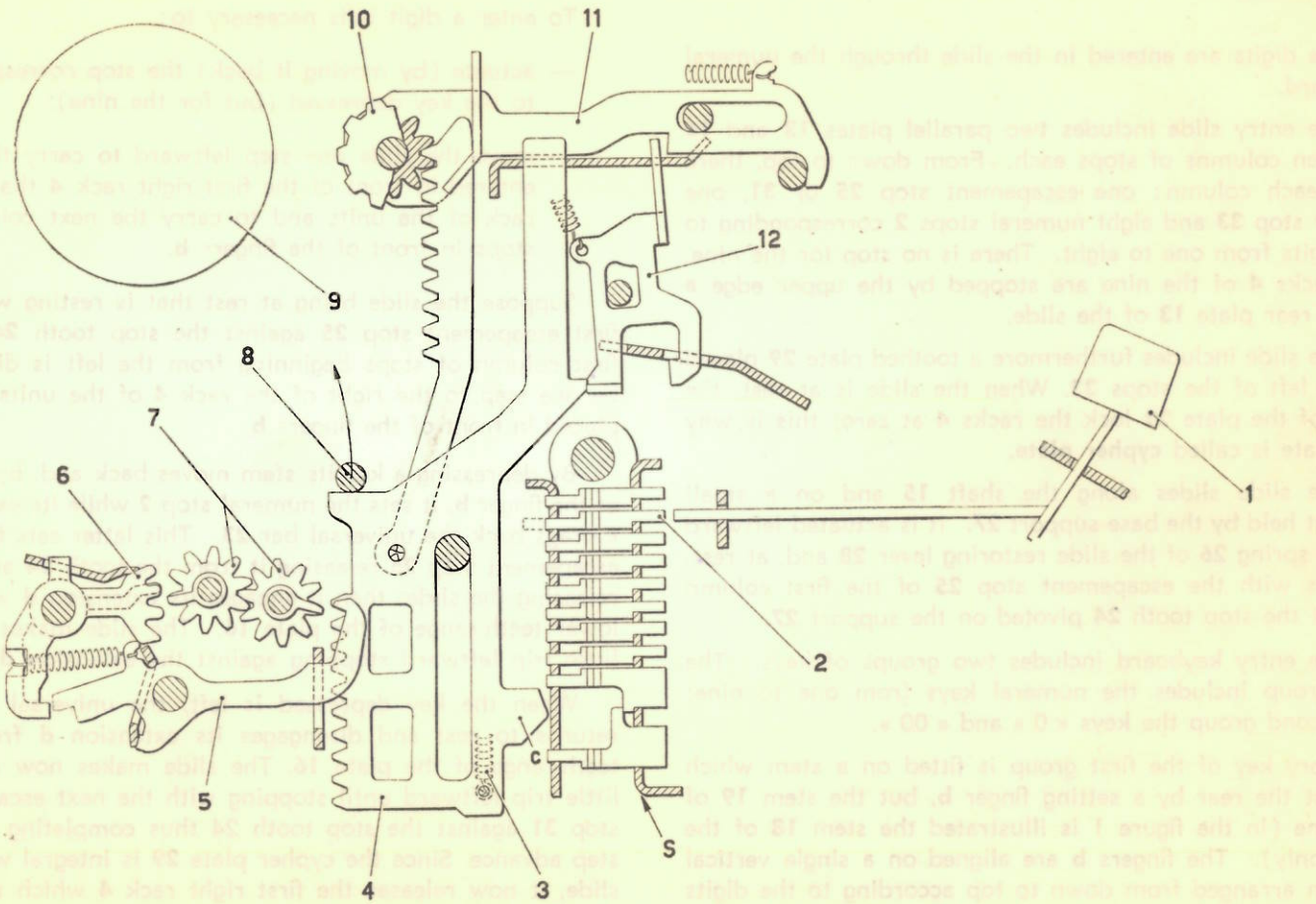
By depressing a numeral key **1,** a stop **2** of the entry slide **5** is pushed leftward. When the universal bar **8** releases the rack **4,** this latters is dragged upward by the spring **3** until it stops with the lug **c** against the stop **2** set. The rack makes therefore a number of steps equal to the value of the digit entered, rotating at the same time the corresponding type-wheel **10** by an equal number of steps.

The hook **12** then releases the slider **11** which compels the wheel **10** to print the figure entered on the platen **9.**

Then, by engaging the register **7** with the rack **4** and by moving this latter back to rest, the register wheels rotate by a number of steps equal to the digit entered.

Concluding, the figure entered has been printed on the tape and added into the register.

The levers **5** et the sectors **6** are used to perform the transfer of the tens.


10
11
12
9
8
7
6
1
2
5
4
3
C
S

II. Keyboard and entry slide.

a) Foreword.

The digits are entered in the slide through the numeral keyboard.

The entry slide includes two parallel plates **13** and **16** with ten columns of stops each. From down to top, there is in each column: one escapement stop **25** or **31**, one cypher stop **33** and eight numeral stops **2** corresponding to the digits from one to eight. There is no stop for the nine. The racks **4** of the nine are stopped by the upper edge **a** of the rear plate **13** of the slide.

The slide includes furthermore a toothed plate **29** placed at the left of the stops **33**. When the slide is at rest, the teeth of the plate **29** lock the racks **4** at zero; this is why this plate is called **cypher plate.**

The slide slides along the shaft **15** and on a small bracket held by the base support **27**. It is actuated leftward by the spring **26** of the slide restoring lever **28** and, at rest, it rests with the escapement stop **25** of the first column against the stop tooth **24** pivoted on the support **27**.

The entry keyboard includes two groups of keys. The first group includes the numeral keys from one to nine; the second group the keys « 0 » and « 00 ».

Every key of the first group is fitted on a stem which ends at the rear by a setting finger **b**, but the stem **19** of the nine (in the figure 1 is illustrated the stem **18** of the eight only). The fingers **b** are aligned on a single vertical column arranged from down to top according to the digits from one to eight and, when the slide is at rest, they are placed before the first left column of stops. The stem **19** of the key nine is fingerless since it doesn't enter numeral stop **2.**

To enter a digit it is necessary to:

— actuate (by moving it back) the stop corresponding to the key depressed (but for the nine);

— move the slide one step leftward to carry the stop entered in front of the first right rack **4** that is the rack of the units and to carry the next column of stops in front of the fingers **b.**

Suppose the slide being at rest that is resting with the first escapement stop **25** against the stop tooth **24**. The first column of stops beginning from the left is displaced by one step to the right of the rack **4** of the units and is placed in front of the fingers **b.**

By depressing a key its stem moves back and, by means of the finger **b**, it sets the numeral stop **2** while its extension **c** drags back the universal bar **23**. This latter sets first the escapement stop **25** releasing it from the tooth **24** and thus releasing the slide; then it engages its extension **d** with the lower teeth-range of the plate **16**. The slide makes now a little trip leftward stopping against the extension **d**.

When the key depressed is left, the universal bar **23** returns to rest and disengages its extension **d** from the teeth-range of the plate **16**. The slide makes now another little trip leftward until stopping with the next escapement stop **31** against the stop tooth 24 thus completing its one step advance. Since the cypher plate **29** is integral with the slide, it now releases the first right rack **4** which remains therefore controlled by the stop **2** set.

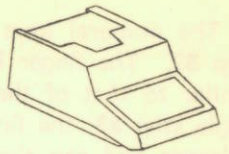


Fig. 2

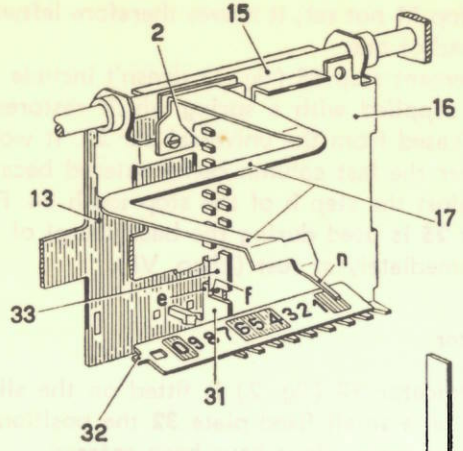
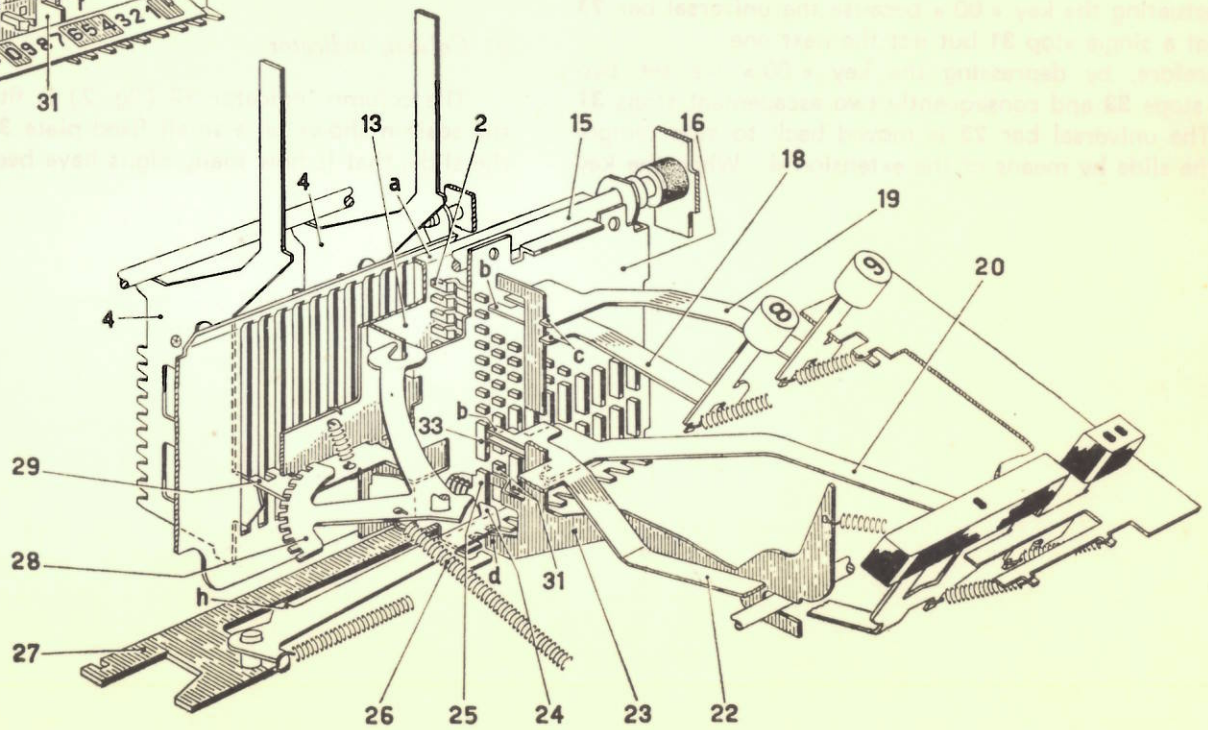

2
15
16
17
13
n
33
e
f
32
31

Fig. 1


13
2
15
16
18
19
20
4
a
b
c
4
b
33
29
28
h
d
31
27
26
25
24
23
22

The numeral keys of the second group set the cypher stop **33**. The finger **b** of the stem **22** of the key « 0 » is similar to that of the keys from one to eight and sets a single stop **33**; the finger of the stem **20** of the key « 00 » is larger and can therefore set two consecutive stops **33**.

All the escapement stops **31** immediately after the first left stop **25** are supplied with the extension **e** (fig. 2) placed behind the corresponding small tooth **f** of the cypher stop **33**. If a cypher stop **33** is set in the columns it drags directly the corresponding escapement stop **31**. This is necessary when actuating the key « 00 » because the universal bar **23** could set a single stop **31** but not the next one.

Therefore, by depressing the key « 00 » we set two cypher stops **33** and consequently two escapement stops **31** also. The universal bar **23** is moved back to stop temporarily the slide by means of the extension **d**. When the key moves back to rest, the slide goes stopping against the tooth **24** with the first stop **31** not set; it moves therefore leftward by two steps instead of one.

The first escapement stop **25** (fig. 1) doesn't include the extension **e**; it is supplied with a spring which restores it as soon as it is released from the universal bar **23**. It works as a slide stop after the last column being entered because it goes resting against the step **h** of the stop tooth **24**. Furthermore the stop **25** is used during the back travel of the slide to lock it immediately at rest (chap. VI).

b) Column indicator.

The column indicator **17** (fig. 2) is fitted on the slide; the scale **n** shows on a small fixed plate **32** the position of the slide, that is how many digits have been entered.

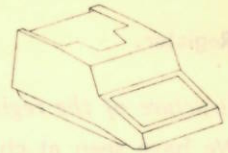


Fig. 2

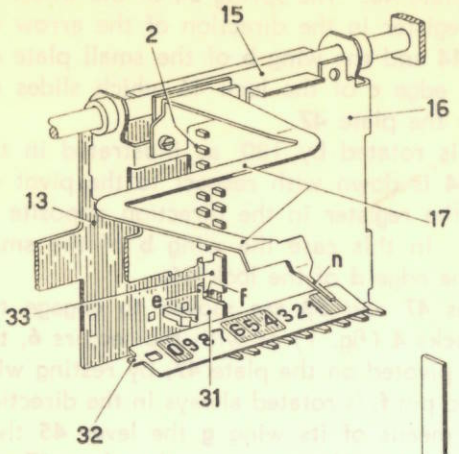
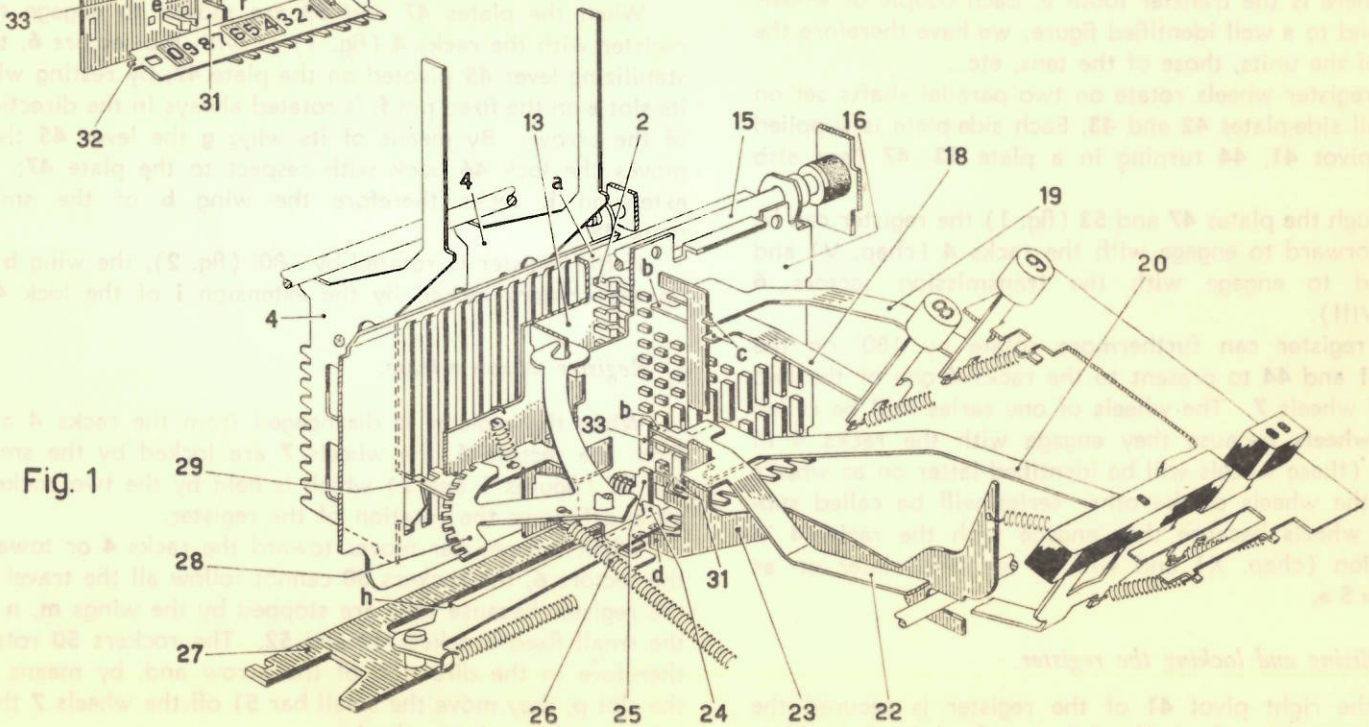

15
2
16
17
13
n
f
e
33
0 9 8 7 6 5 4 3 2 1
31
32

Fig. 1


13
2
15
16
18
19
20
4
a
b
c
4
33
b
29
28
h
d
31
27
26
25
24
23
22

III. Register.

a) Structure of the register.

We have seen at chap. I that the digits entered in the slide are accumulated into the wheels **7** of the register.

The register is supplied with a series of eleven couples of wheels **7**. The wheels of each couple are constantly engaged one another according to the complement to nine. Each wheel has ten teeth; on the axial prolongation of one thooth there is the transfer tooth **a**. Each couple of wheels correspond to a well identified figure; we have therefore the wheels of the units, those of the tens, etc...

The register wheels rotate on two parallel shafts set on two small side-plates **42** and **43**. Each side-plate is supplied with a pivot **41**, **44** turning in a plate **53**, **47** (see also fig. 2).

Through the plates **47** and **53** (fig. 1) the register can be moved forward to engage with the racks **4** (chap. V) and backward to engage with the transmission sectors **6** (chap. VIII).

The register can furthermore rotate by 180° on the pivots **41** and **44** to present to the racks **4** one of the two series of wheels **7**. The wheels of one series mill be called **adding wheels** because they engage with the racks **4** in addition (these wheels will be identified latter on as wheels **« A »**); the wheels of the other series will be called **subtracting wheels** because they engage with the racks **4** in subtraction (chap. X) and will be identified later on as wheels **« S »**.

b) Stabilizing and locking the register.

On the right pivot **41** of the register is secured the register inversion wheel **40** while on the left pivot **44** is secured the small plate **48**. The spring **54** of the wheel **40** tries rotating the register in the direction of the arrow on the pivots **41** and **44** and the wing **b** of the small plate **48** rests on the upper edge **c** of the lock **46** which slides on two pivots held by the plate **47**.

If the register is rotated by 180° as illustrated in the fig. 2, the spring **54** is down with respect to the pivot **41** and tries rotating the register in the direction opposite to that of the arrow. In this case the wing **b** of the small plate **48** rests on the edge **d** of the lock **46**.

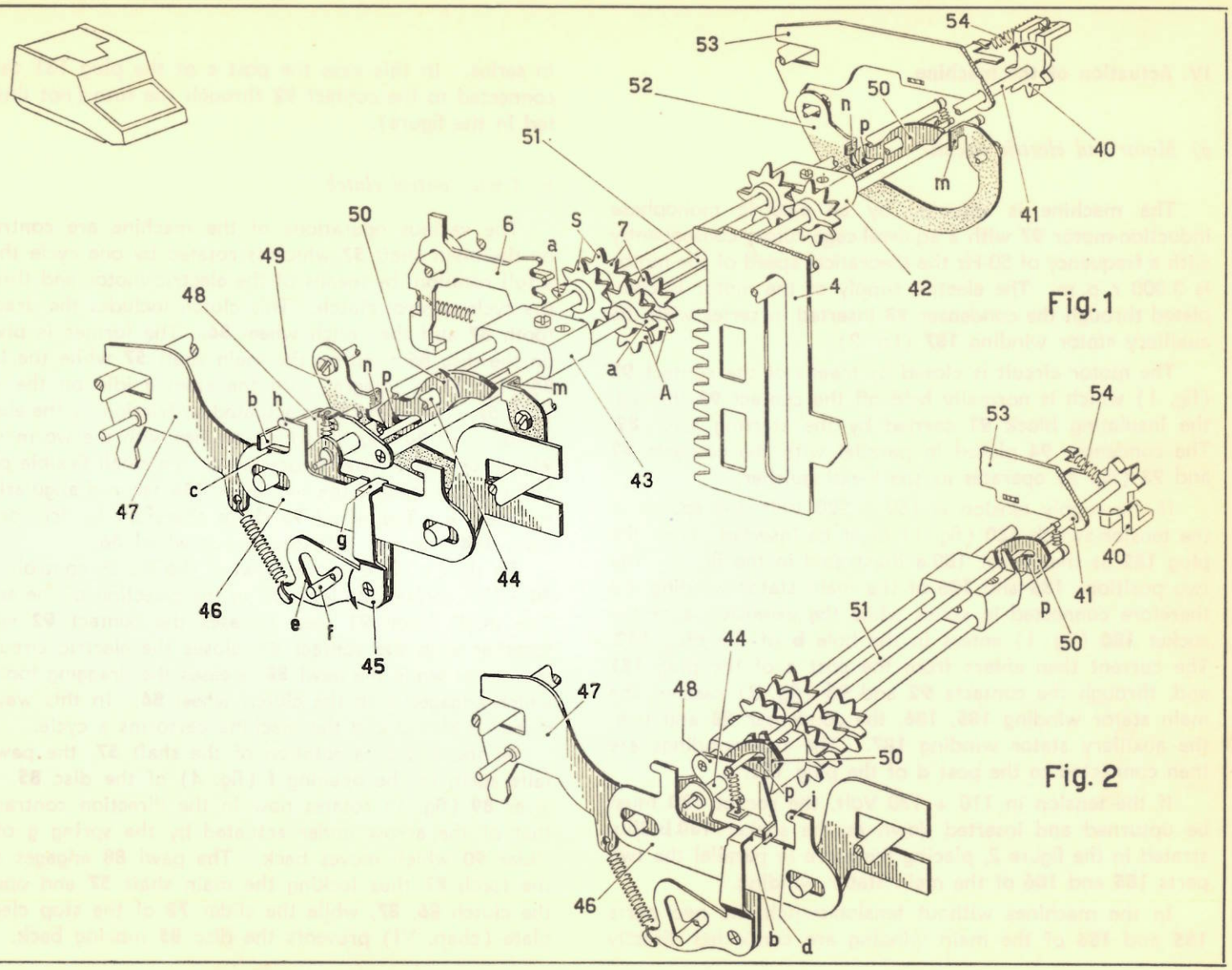
When the plates **47** and **53** are moved to engage the register with the racks **4** (fig. 1) or with the sectors **6**, the stabilizing lever **45** pivoted on the plate **47**, by resting with its slot **e** on the fixed pin **f**, is rotated always in the direction of the arrow. By means of its wing **g** the lever **45** then moves the lock **46** back with respect to the plate **47**; its extension **h** locks therefore the wing **b** of the small plate **48**.

If the register is rotated by 180° (fig. 2), the wing **b** is on the contary locked by the extension **i** of the lock **46**.

c) Register wheels release.

When the register is disengaged from the racks **4** and from the sectors **6**, the wheels **7** are locked by the small bar **51** (figures 1 and 2) which is held by the two rockers **50** and follows the rotation of the register.

When the register moves toward the racks **4** or toward the sectors **6**, the rockers **50** cannot follow all the travel of the register because they are stopped by the wings **m**, **n** of the small fixed brackets **49** and **52**. The rockers **50** rotate therefore in the direction of the arrow and, by means of the slot **p**, they move the small bar **51** off the wheels **7** thus releasing the register wheels.


53
54
52
50
n
p
51
40
m
41
50
6
S
7
a
49
48
42
4
Fig. 1
n
p
m
a
A
b
h
43
c
47
g
44
46
e
f
45
54
53
40
41
p
50
51
44
47
48
50
p
i
46
b
d
Fig. 2

IV. Actuation of the machine.

a) Motor and electric circuit.

The machine is actuated by an electric monophase induction-motor **97** with a squirrel-cage rotor; consequently with a frequency of 50 Hz the theoretical speed of the motor is 3.000 r. p. m. The electric supply of the motor is completed through the condenser **98** inserted in series with the auxiliary stator winding **187** (fig. 2).

The motor circuit is closed by means of the contact **92** (fig. 1) which is normally held off the contact **93** through the insulating block **91** carried by the starting lever **89**. The condenser **94** placed in parallel with the contacts **92** and **93** (fig. 2) operates as spark-extinguisher.

If the supply tension is 150 ÷ 220 Volt, the socket of the tension-switch **180** (fig. 1) must be inserted up on the plug **182** as the socket **180 a** illustrated in the fig. 2. The two positions **185** and **186** of the main stator winding are therefore connected in series while the extension **a** of the socket **180** (fig. 1) enters in the hole **b** of the plug **182**. The current then enters from the post **c** of the plug **181** and, through the contacts **92** and **93** (fig. 2) reaches the main stator winding **185**, **186**, the condenser **98** and then the auxiliary stator winding **187**. The two windings are then connected to the post **d** of the plug **181**.

If the tension in 110 ÷ 130 Volt, the socket **180** must be upturned and inserted down as the socket **180 b** illustrated in the figure 2, placing therefore in parallel the two parts **185** and **186** of the main stator winding.

In the machines without tension-switch the two parts **185** and **186** of the main winding are connected directly in series. In this case the post **c** of the plug **181** can be connected to the contact **93** through the fuse (not illustrated in the figure).

b) Cycle control clutch.

The various operations of the machine are controlled by the main shaft **57** which is rotated by one cycle that is a full rotation, by means of the electric motor and through the cycle control clutch. This clutch includes the dragging tooth **87** and the clutch wheel **86**. The former is pivoted on the disc **85** fixed on the main shaft **57** while the latter **86** (fig. 3) is integral with the stem **e** idle on the main shaft **57**. The wheel **86** is actuated by friction by the electric motor shaft **96** (fig. 1) which meshes with the worm-wheel **95**. In fact, this latter is pressed by the small flexible plates **183** (fig. 3) against the two discs **184** secured angularly on the stem **e**. The wheel **95** drags therefore by friction the discs **184** together with the clutch wheel **86**.

To start a cycle, move forward the clutch control slider **90** which rotates the lever **89** in the direction of the arrow. The small block **91** then releases the contact **92** which, together with the contact **93**, closes the electric circuit of the motor while the pawl **88** releases the dragging tooth **87** which engages with the clutch wheel **86**. In this way the clutch is closed and the machine performs a cycle.

At the end of a rotation of the shaft **57**, the pawl **88** falls again in the opening **f** (fig. 4) of the disc **85**. The lever **89** (fig. 1) rotates now in the direction contrary to that of the arrow under actuated by the spring **g** of the slider **90** which moves back. The pawl **88** engages again the tooth **87** thus locking the main shaft **57** and opening the clutch **86**, **87**, while the slider **72** of the stop clearing plate (chap. VI) prevents the disc **85** moving back. The

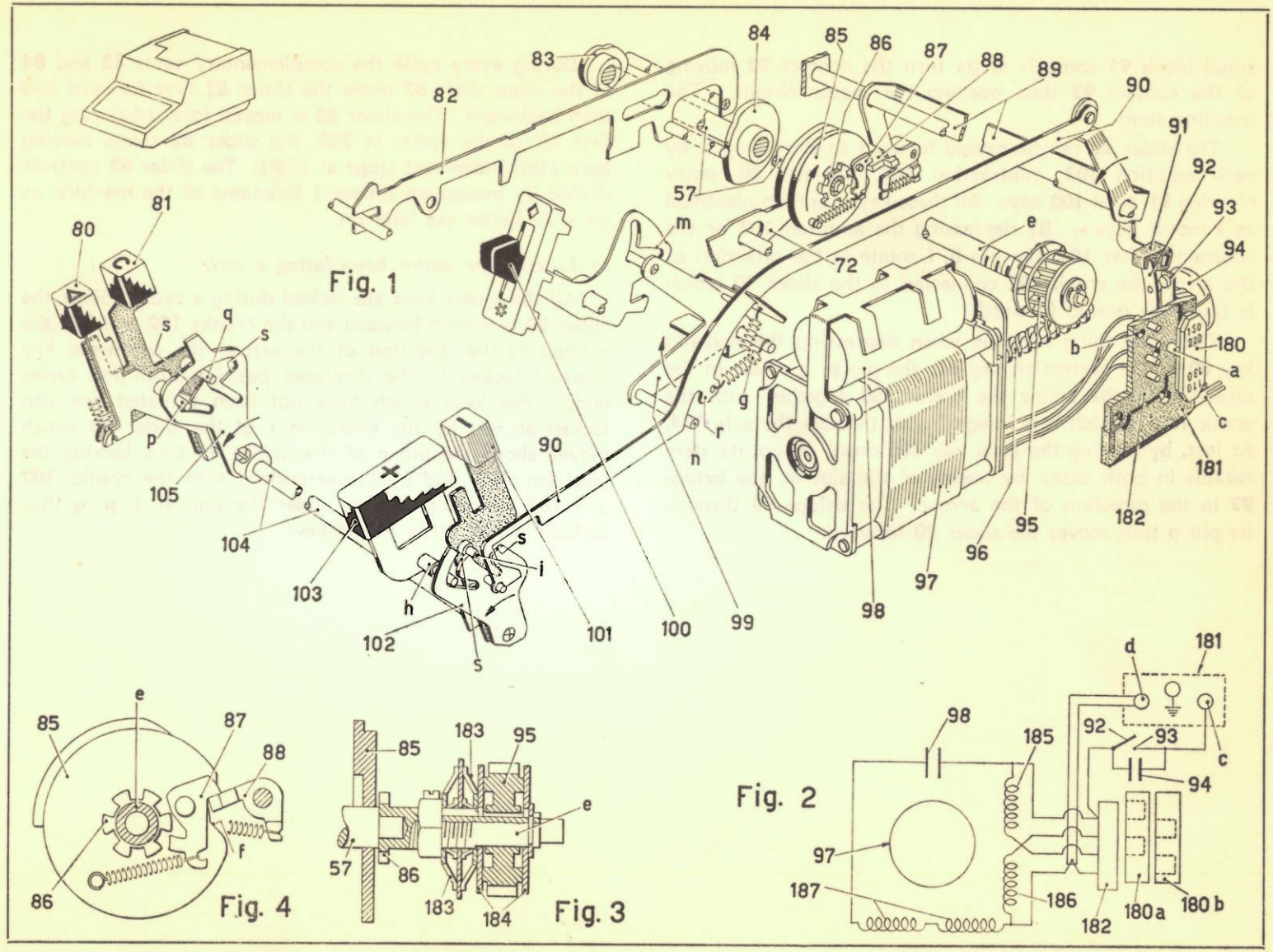


Fig. 1
Fig. 2
Fig. 3
Fig. 4

small block **91** compels at its turn the contact **92** moving of the contact **93** thus opening the motor circuit. The machine stops.

The slider **90** can be moved forward to start a cycle by each addition **103**, subtraction **101**, non-add **80**, entry clearing **81**, total **100** keys. All these keys are then identified as « motor keys ». By depressing the addition **103** or the subtraction key **101**, the pin **h**, **i** rotate in the direction of the arrow the crank **102** connected to the slider **90** which is therefore moved forward.

The same thing happens when depressing the non-add key **80** or the correction key **81**; the pin **p**, **q** rotate in the direction of the arrow the crank **105** together with the crank **102** towhich it is integral with through the axle **104**. At last, by moving the total key **100** down or up, its stem rotates in both cases, by means of the slot **m**, the bridge **99** in the direction of the arrow. The bridge **99** through its pin **n** thus moves the slider **90** forward.

During every cycle the complementary cams **83** and **84** of the main shaft **57** move the slider **82** first forward and than backward. The slider **82** is moved forward during the first 70° of the cycle; at 250° the slider **82** starts moving back (this movement stops at 335°). The slider **82** controls during its movement different functions of the machine as we shall better see later on.

c) Locking the motor keys during a cycle.

All the motor keys are locked during a cycle. Since the slider **90** is moved forward and the cranks **102** and **105** are rotated in the direction of the arrow, the depressed key remains locked in the displaced position until the cycles ends. The keys which have not been actuated are also locked at rest by the extension **r** of the slider **90** which moves above the pin **n** of the bridge **99** thus locking the total key **100**, and by the extensions **s** of the cranks **102** and **105** which are placed under the pins **h**, **i**, **p**, **q** thus locking all the other motor keys.

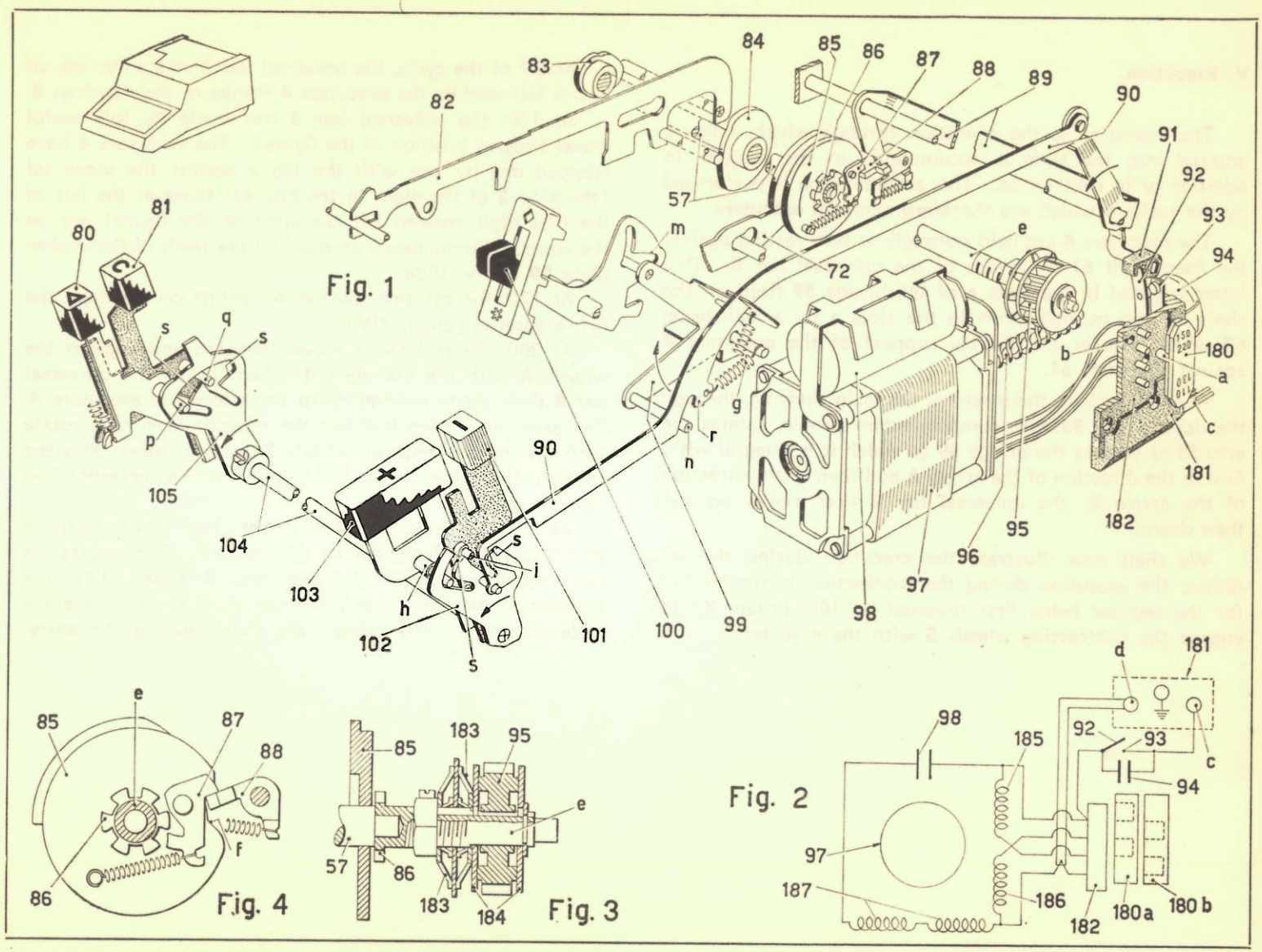


Fig. 1
Fig. 2
Fig. 3
Fig. 4

V. Execution.

The execution is the operation through which a figure entered into the slide is accumulated in the register in addition or in subtraction. This accumulation is performed by the racks **4** which are therefore nammed **executers.**

The executers **4** are held normally at zero resting against the fixed shaft **61** by means of the universal bar **8**. This latter is fitted in the slots **a** of the bridge **59** fixed on the shaft **58** and pushed down in the slots **a** by a leaf-spring **60** which assures the flexible support of the executers **4** against the shaft **61**.

At every cycle of the machine, the main shaft **57**, through the double cam **55** with complementary profile, rotates the arm **55** as well as the bridge **59** to which it is integral with, first in the direction of the arrow **A** and then in the direction of the arrow **R**; the universal bar **8** first moves up and then down.

We shall now illustrate the execution during the addition; the execution during the subtraction is similar but for the register being first reversed by 180° (chap. X) to engage the subtracting wheels **S** with the executers.

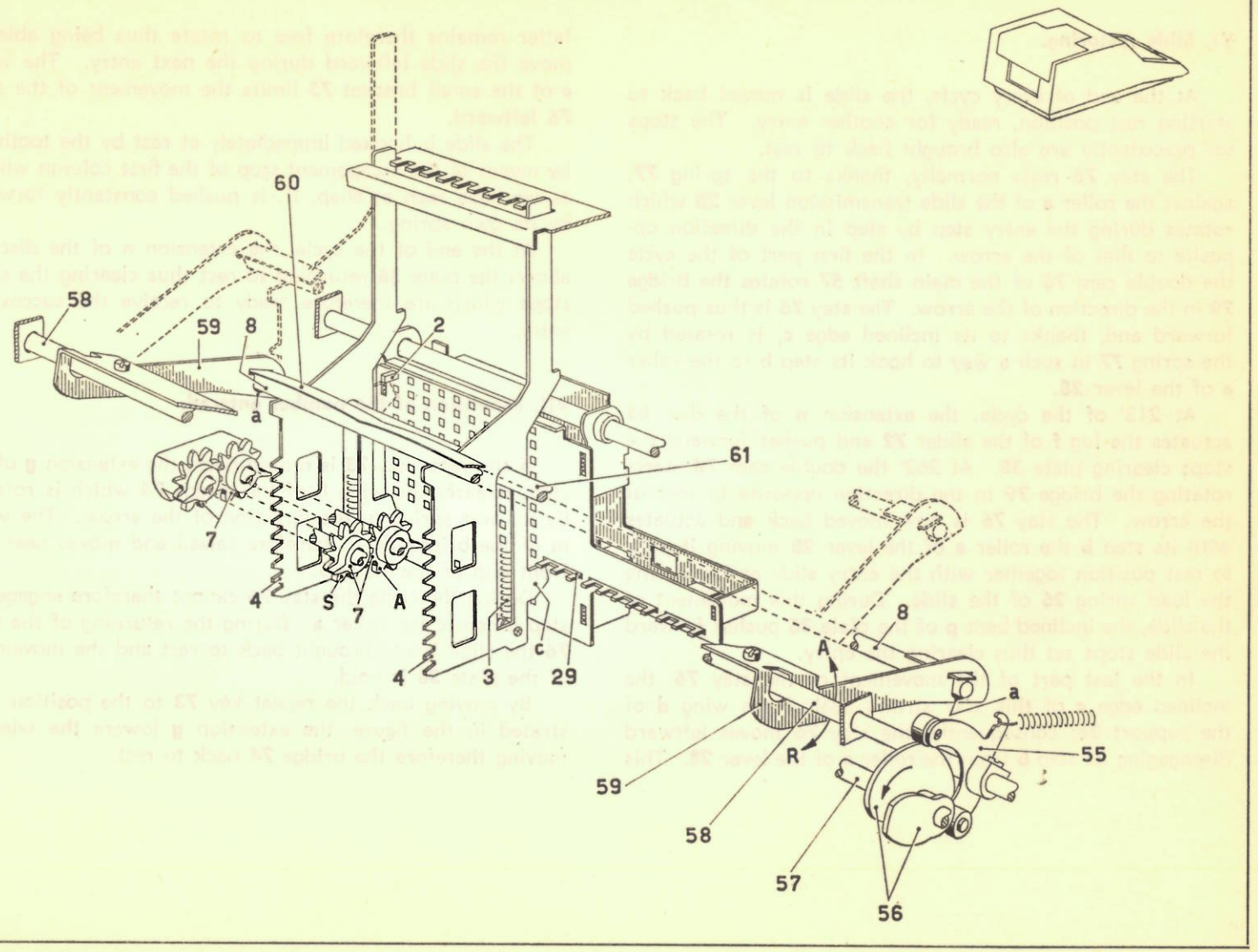
At 85° of the cycle, the universal bar **8** strats moving up and is followed by the executers **4** thanks to their springs **3**.

At 170° the universal bar **8** has made its full useful travel (dotted position in the figure). The executers **4** have stopped one by one with the lug **c** against the stops set (the stop **2** of the eight in the figure); those at the left of the first digit entered (at the right in the figure) are on the contrary immediately stopped by the teeth of the cypher plate **29** of the slide.

At 172° the printing mechanism prints on the tape the figure entered (chap. XIV).

At 200° the register is moved forward and engages the wheels **A** with the executers **4** (chap. IX). The universal bar **8** then starts moving down to restore the executers **4**. The executers which had left the position zero now rotate each the proper register wheels **7** by a number of steps equal to the value of the digit entered in the corresponding column of the slide.

At 270° the executers **4** have returned to the position zero (position illustrated in the figure). The register is now disengaged from the executers **4** (chap. IX), the transfer of the tens takes place (chap. VIII) and the entry slide returns to rest (chap. VI) thus clearing the entry.


60
58
59
8
2
a
61
7
4
S
7
A
4
3
c
29
8
A
a
55
R
59
58
57
56

VI. Slide restoring.

At the end of every cycle, the slide is moved back to starting rest position, ready for another entry. The stops set precedently are also brought back to rest.

The stay **76** rests normally, thanks to the spring **77**, against the roller **a** of the slide transmission lever **28** which rotates during the entry step by step in the direction opposite to that of the arrow. In the first part of the cycle the double cam **78** of the main shaft **57** rotates the bridge **79** in the direction of the arrow. The stay **76** is thus pushed forward and, thanks to its inclined edge **c**, is rotated by the spring **77** in such a way to hook its step **b** to the roller **a** of the lever **28**.

At 213° of the cycle, the extension **n** of the disc **85** actuates the lug **f** of the slider **72** and pushes forward the stops clearing plate **38**. At 262° the double cam **78** starts rotating the bridge **79** in the direction opposite to that of the arrow. The stay **76** is now moved back and actuates with its step **b** the roller **a** of the lever **28** moving it back to rest position together with the entry slide and restoring the load spring **26** of the slide. During this movement of the slide, the inclined bent **p** of the plate **38** pushes forward the slide stops set thus clearing the entry.

In the last part of the movement of the stay **76**, the inclined edge **c** of this stay strikes against the wing **d** of the support **36**; consequently, the stay **76** moves leftward disengaging its step **b** from the roller **a** of the lever **28**. This latter remains therefore free to rotate thus being able to move the slide leftward during the next entry. The wing **e** of the small bracket **75** limits the movement of the stay **76** leftward.

The slide is hooked immediately at rest by the tooth **24** by means of the escapement stop of the first column which, as we have seen at chap. II, is pushed constantly forward by its own spring.

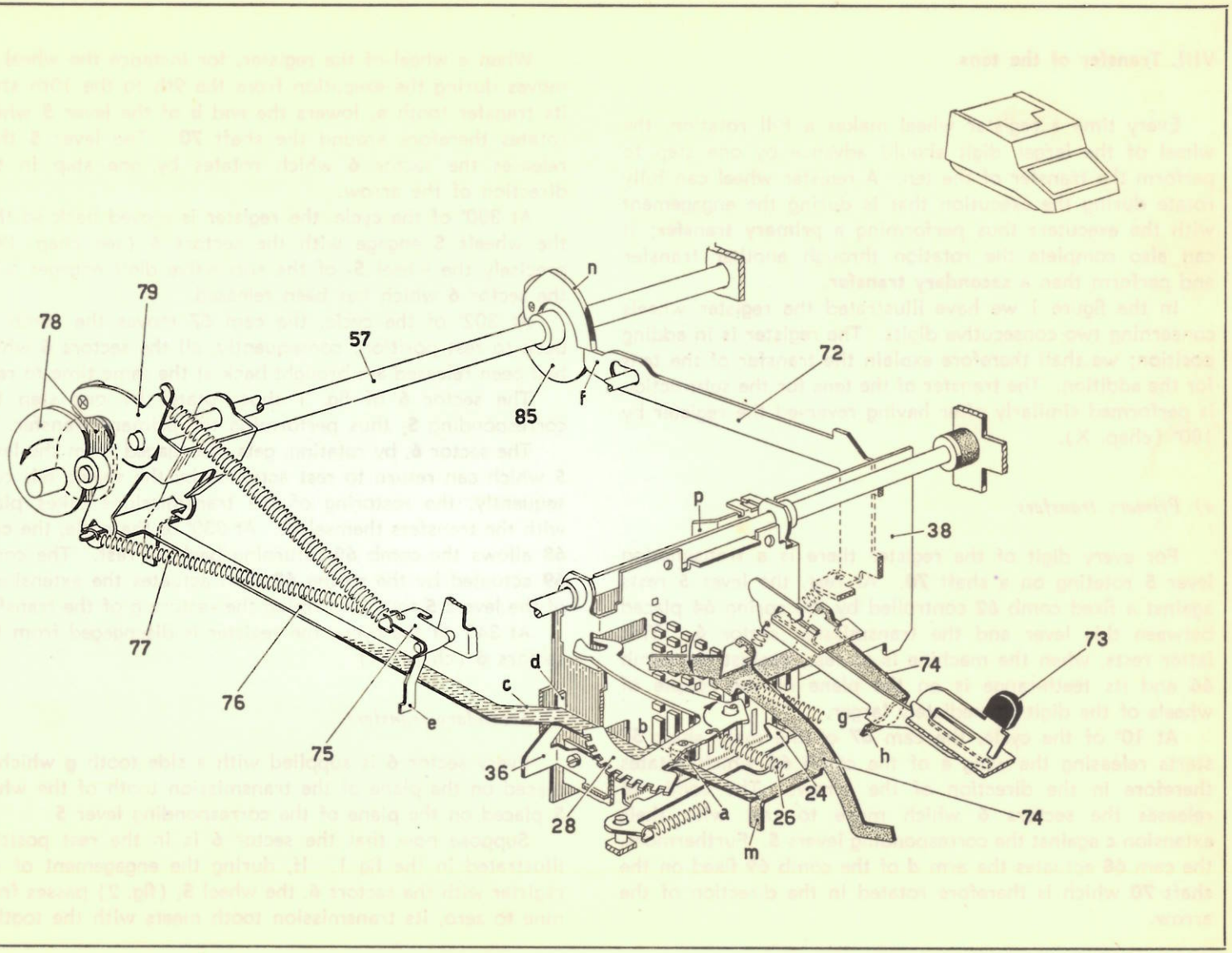
At the end of the cycle, the extension **n** of the disc **85** allows the plate **38** returning to rest thus clearing the slide stops which are therefore ready to receive the successive entry.

VII. Repetition of the number entered.

If the repet key **73** is moved back, the extension **g** of its stem releases the wing **h** of the bridge **74** which is rotated by its own spring in the direction of the arrow. The wing **m** of the bridge **74** is therefore raised and moves near the front end of the stay **76**.

During the cycle the stay **76** cannot therefore engage its step **b** before the roller **a**. During the returning of the stay **76** the slide is not brought back to rest and the movement of the plate **38** is void.

By moving back the repeat key **73** to the position illustrated in the figure, the extension **g** lowers the wing **h** moving therefore the bridge **74** back to rest.


n
79
78
57
72
85
f
p
38
77
76
75
d
c
e
b
36
28
a
26
24
m
74
g
h
74
73

VIII. Transfer of the tens.

Every time a register wheel makes a full rotation, the wheel of the larger digit should advance by one step to perform the transfer of the ten. A register wheel can fully rotate during the execution that is during the engagement with the executers thus performing a **primary transfer**; it can also complete the rotation through another transfer and perform then a **secondary transfer.**

In the figure 1 we have illustrated the register wheels concerning two consecutive digits. The register is in adding position; we shall therefore explain the transfer of the tens for the addition. The transfer of the tens for the subtraction is performed similarly after having reversed the register by 180° (chap. X).

a) Primary transfers.

For every digit of the register there is a transmission lever **5** rotating on a shaft **70**. At rest, the lever **5** rests against a fixed comb **62** controlled by the spring **64** placed between this lever and the transmission sector **6**. This latter rests, when the machine is at rest, against the comb **66** and its teeth-range is on the plane of the couple of wheels of the digit immediately larger.

At 10° of the cycle, the cam **67** of the main shaft **57** starts releasing the wing **e** of the comb **66** which rotates therefore in the direction of the arrow. The comb **66** releases the sectors **6** which move to rest with their extension **c** against the corresponding levers **5**. Furthermore, the cam **68** actuates the arm **d** of the comb **69** fixed on the shaft **70** which is therefore rotated in the direction of the arrow.

When a wheel of the register, for instance the wheel $\mathbf{A_1}$ moves during the execution from the 9th to the 10th step, its transfer tooth $\mathbf{a_1}$ lowers the end **b** of the lever **5** which rotates therefore around the shaft **70**. The lever **5** then releases the sector **6** which rotates by one step in the direction of the arrow.

At 300° of the cycle, the register is moved back so that the wheels **S** engage with the sectors **6** (see chap. IX); precisely the wheel $\mathbf{S_2}$ of the successive digit engages with the sector **6** which has been released.

At 302° of the cycle, the cam **67** moves the comb **66** back to rest position; consequently, all the sectors **6** which had been released are brought back at the same time to rest.

The sector **6** of fig. 1 thus rotates by one step the corresponding $\mathbf{S_2}$ thus performing the primary transfer.

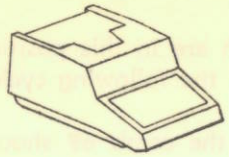
The sector **6**, by rotating, gets disengaged from the lever **5** which can return to rest actuated by the spring **64**; consequently, the restoring of the transmissions takes place with the transfers themselves. At 330° of the cycle, the cam **68** allows the comb **69** returning back to rest. The comb **69** actuated by the spring **63** then actuates the extension **f** of the levers **5** thus confirming the restoring of the transfer.

At 345° of the cycle, the register is disengaged from the sectors **6** (chap. IX).

b) Secondary transfers.

Every sector **6** is supplied with a side tooth **g** which is placed on the plane of the transmission tooth of the wheel **S** placed on the plane of the corresponding lever **5**.

Suppose now that the sector **6** is in the rest position illustrated in the fig 1. If, during the engagement of the register with the sectors **6**, the wheel $\mathbf{S_1}$ (fig. 2) passes from nine to zero, its transmission tooth meets with the tooth **g**



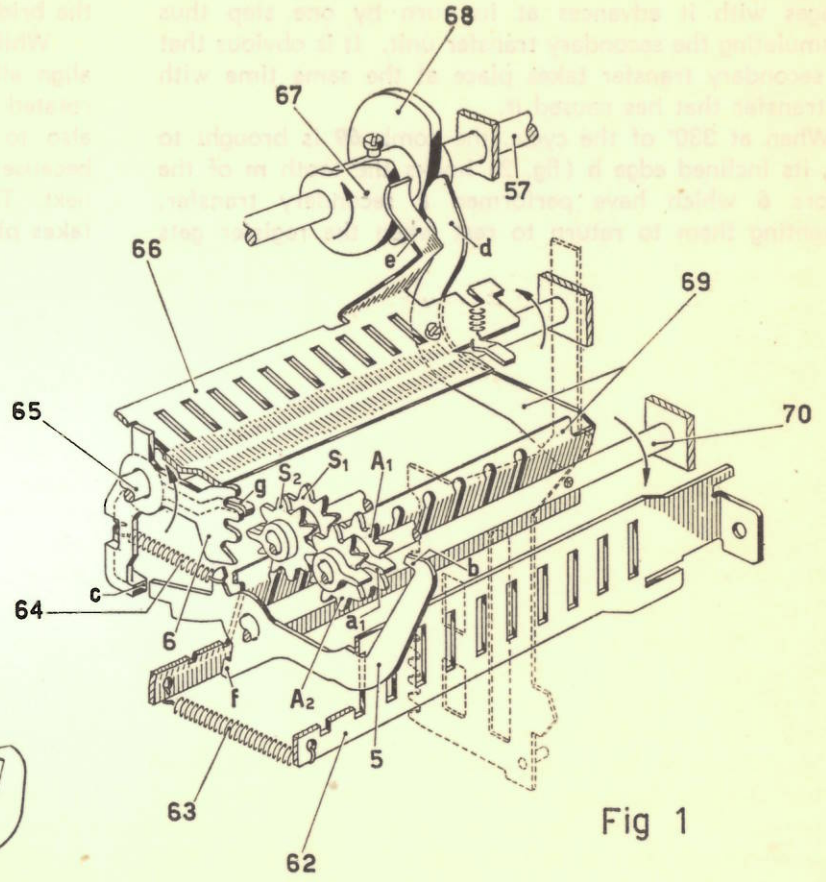

68
67
57
66
d
e
69
65
70
S1
A1
S2
g
b
c
64
a1
6
f
A2
5
63
62

Fig 1

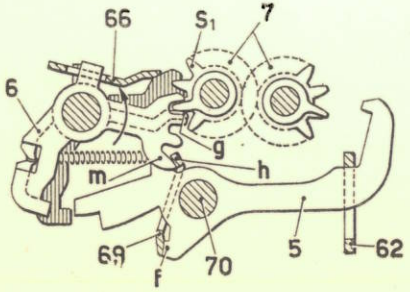
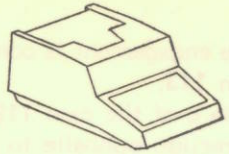

66
S1
7
6
g
m
h
69
f
70
5
62

Fig. 2

of the sector **6** and rotates it by one step in the direction opposite to that of the arrow. The wheel S_2 (fig. 1) which engages with it advances at its turn by one step thus accumulating the secondary transfer unit. It is obvious that the secondary transfer takes place at the same time with the transfer that has caused it.

When at 330° of the cycle, the comb **69** is brought to rest, its inclined edge **h** (fig. 2) hooks the tooth **m** of the sectors **6** which have performed a secondary transfer, preventing them to return to rest when the register gets disengaged. The sectors **6** which are in this position will be able to return to rest only in the following cycle when the bridge **69** is rotated again.

While hooking the tooth **m**, the comb **69** should also align all the sectors **6** which have moved to the position rotated in the direction opposite to that of the arrow and also to correct the little misadjustment which happens, because of the plays, between one register wheel and the next. This is very important in case the secondary transfer takes place in a series of successive digits.



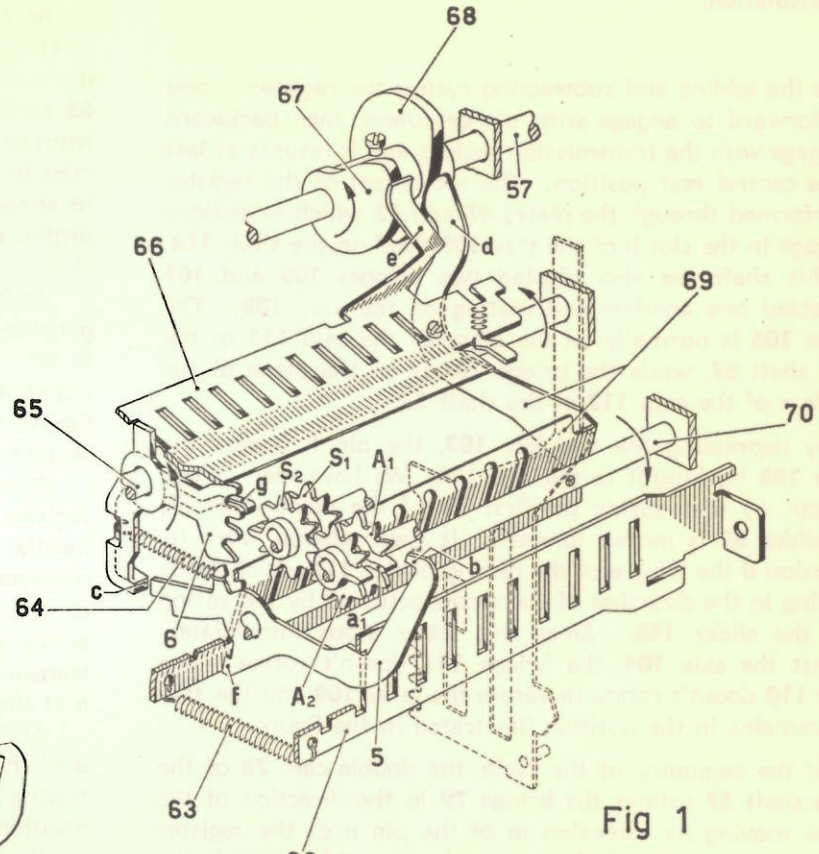

68
67
57
66
e
d
69
65
70
S_2
S_1
A_1
g
c
64
6
a_1
b
f
A_2
5
63
62

Fig 1

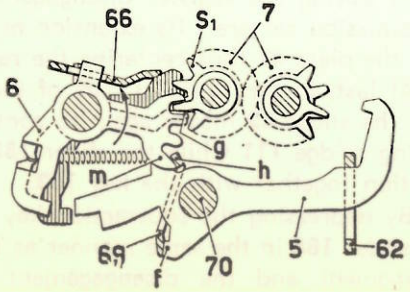

66
S_1
7
6
g
m
h
69
f
70
5
62

Fig. 2

IX. Engagement and disengagement of the register during calculation.

In the adding and subtracting cycles, the register moves first forward to engage with the executers, then backward to engage with the transmission sectors and it returns at last to the central rest position. The movement of the register is performed through the plates **47** and **53** which extensions **a** engage in the slot **b** of the stay **108** fixed on the shaft **114**. On this shaft are also pivoted two bridges **106** and **107** connected one another and resting on the stay **108**. The bridge **106** is normally on the plane of the cam **113** of the main shaft **57**, while the bridge **107** is on the plane of the profile **c** of the cam **112** of the shaft **57**.

By depressing the add key **103**, the pin **h** lowers the slider **188** hooking it to the axle **104**. We have seen (chap. IV, par. *b*) that during the first 70° of the main shaft **57**, the slider **82** is moved forward. It then releases from its extension **d** the wing **e** of the testing bridge **111** which tends rotating in the direction of the arrow actuated by the spring **f** of the slider **188**. Since this latter stops immediately against the axle **104**, the bridge **111** doesn't rotate. The plate **110** doesn't rotate therefore the lever **109** and the stay **108** remains in the position illustrated in the figure.

At the beginning of the cycle, the double cam **78** of the main shaft **57** rotates the bridge **79** in the direction of the arrow moving its extension **m** of the pin **n** of the register plate **47**. At 185° of the cycle, the cam **113** rotates the bridge **106** as weel as the stay **108** in the direction of the arrow. The two plates **47** and **53** are therefore moved forward and they carry the register to engage with the executers. At 200° of the cycle, the engagement is completed and held by the profile of the cam **113**.

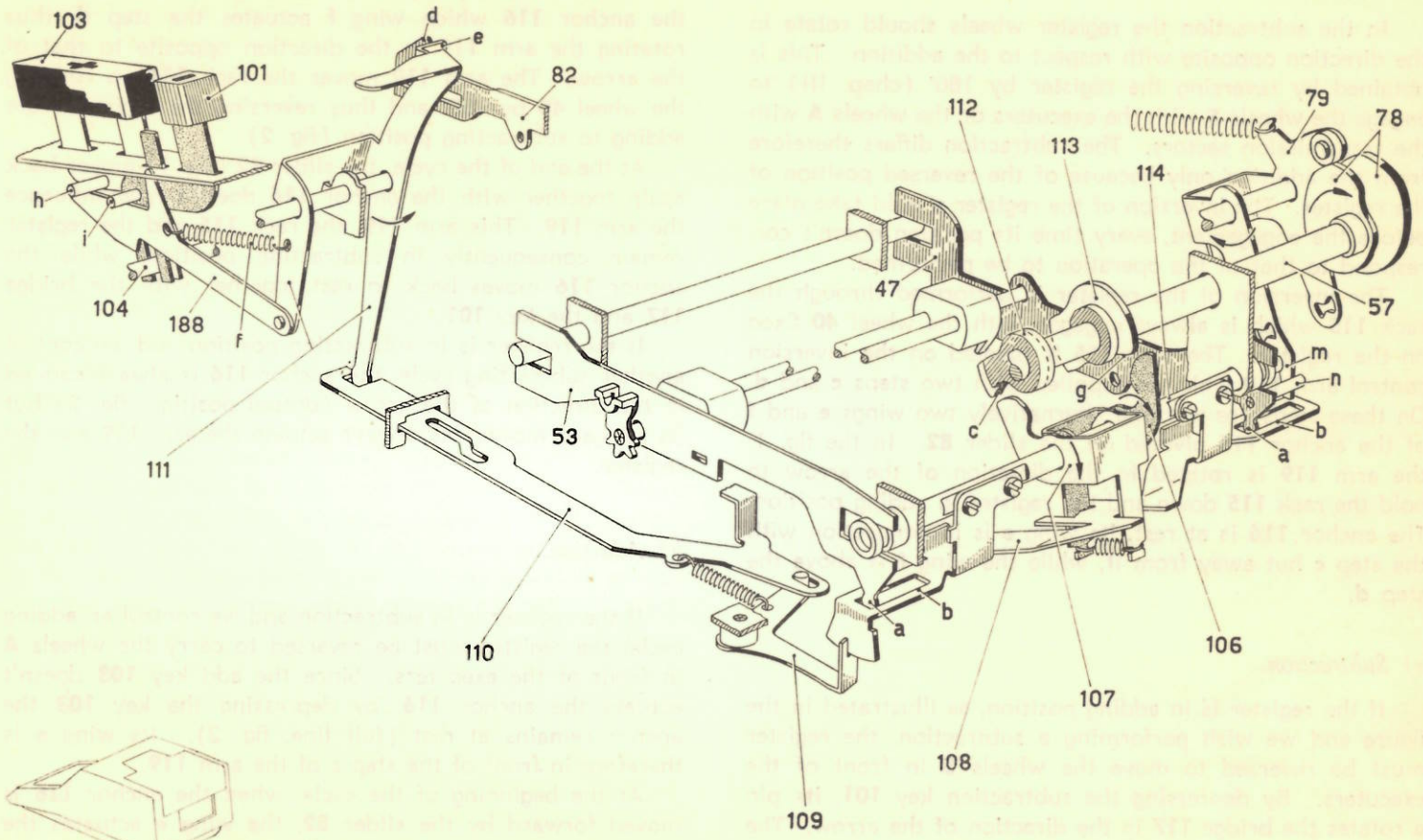
At 270° of the cycle, the profile **c** of the cam **112** starts rotating the bridge **107** in the direction opposite to that of the arrow. The stay **108** then moves the two plates **47** and **53** back. At 285° of the cycle, the register is disengaged from the executers. The rotation of the bridge **107** continues to 300° of the cycle and the stay **108** carries the register to engage with the transmission sectors (chap. VIII). The profile **c** of the cam **112** holds as before this engagement also.

At 345° of the cycle, the cam **113**, by means of its lobe **g** rotates again the bridge **106** together with the stay **108** in the direction of the arrow. The stay **108** brings now the plates **47** and **53** to the central position illustrated in the figure, thus disengaging the register from the transmission sectors. This movement stops at 357° of the cycle.

After the transmission sectors have been disengaged, the register should tend to move beyond the rest position by inertia thus coming nearer to the executers. This is preventend by the bridge **79** which performs its last part of the rotation in the direction opposite to that of the arrow during the register disengagement control from the transmission sectors. Its extension **m** engages then the pin **n** of the plate **47** thus centering the register at rest.

At last, in the terminal part of the cycle, the extension **d** of the slider **82** moves again to contact the wing **e** of the testing bridge **111** while the slider **188** moves back to high position together with the key **103**.

By depressing the subtraction key **101**, its pin **i** lowers the slider **188** in the same manner as the add key **103**. The engagement and the disengagement of the register are performed therefore as said above concerning the addition.


103
101
d
e
82
h
i
104
188
f
111
53
110
109
112
113
114
79
78
47
57
m
n
g
c
b
a
b
a
106
107
108

X. Inversion of the register during calculation.

In the subtraction the register wheels should rotate in the direction opposite with respect to the addition. This is obtained by reversing the register by 180° (chap. III) to engage the wheels **S** with the executers or the wheels **A** with the transmission sectors. The subtraction differs therefore from the addition only because of the reversed position of the register. The inversion of the register should take place before the engagement, every time its position doesn't correspond to that of the operation to be performed.

The inversion of the register is performed through the rack **115** which is always engaged with the wheel **40** fixed on the register. The rack **115** is pivoted on the inversion control arm **119** which is supplied with two steps **c** and **d**. On these steps are working alternatively two wings **e** and **f** of the anchor **116** pivoted on the slider **82**. In the fig. 1, the arm **119** is rotated in the direction of the arrow to hold the rack **115** down and the register in adding position. The anchor **116** is at rest, its wing **e** is in connection with the step **c** but away from it, while the wing **f** is above the step **d**.

a) Subtraction.

If the register is in adding position, as illustrated in the figure and we wish performing a subtraction, the register must be reversed to move the wheels **S** in front of the executers. By depressing the subtraction key **101**, its pin **a** rotates the bridge **117** in the direction of the arrow. The arm **g** of the brigde **117**, through the wing **h** of the anchor **116**, rotates this latter in the direction of the arrow to carry the wing **f** behind the step **d** of the arm **119** and the wing **e** under the step **c**, as dotted in the fig. 1.

At the beginning of the main shaft cycle, the slider **82** is moved forward (chap. IV). It drags therefore forward the anchor **116** which wing **f** actuates the step **d**, thus rotating the arm **119** in the direction opposite to that of the arrow. The arm **119** moves the rack **115** up rotating the wheel **40** by 180° and thus reversing the register from adding to subtracting position (fig. 2).

At the end of the cycle, the slider **82** (fig. 1) moves back again together with the anchor **116** doesn't now influence the arm **119**. This arm **119**, the rack **115** and the register remain consequently in subtracting position, while the anchor **116** moves back to rest together with the bridge **117** and the key **101**.

If the register is in subtracting position and we control another subtracting cycle, the anchor **116** is always rotated in the direction of the arrow (dotted position, fig. 2) but its forward movement doesn't actuate the arm **119** and the register.

b) Addition.

If the register is in subtraction and we control an adding cycle, the register must be reversed to carry the wheels **A** in front of the executers. Since the add key **103** doesn't actuate the anchor **116**, by depressing the key **103** the anchor remains at rest (full line, fig. 2). Its wing **e** is therefore in front of the step **c** of the arm **119**.

At the beginning of the cycle, when the anchor **116** is moved forward by the slider **82**, the wing **e** actuates the step **c** thus rotating the arm **119** in the direction of the arrow and carrying it to the position illustrated in the fig. 1. Consequently, the rack **115** is moved down thus reversing the register from subtracting to adding position.

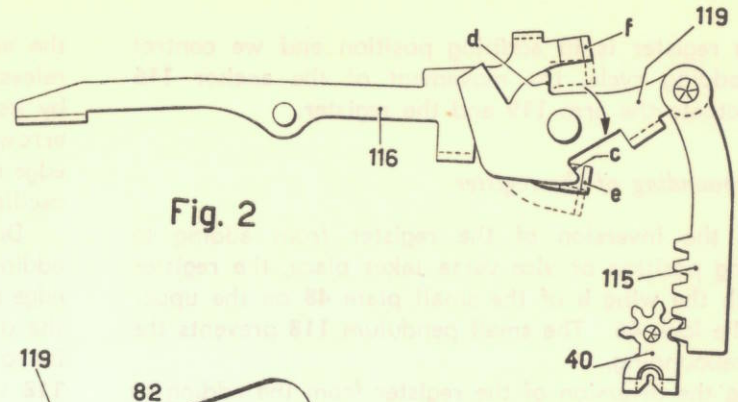

d
f
119
116
c
e
115
40

Fig. 2

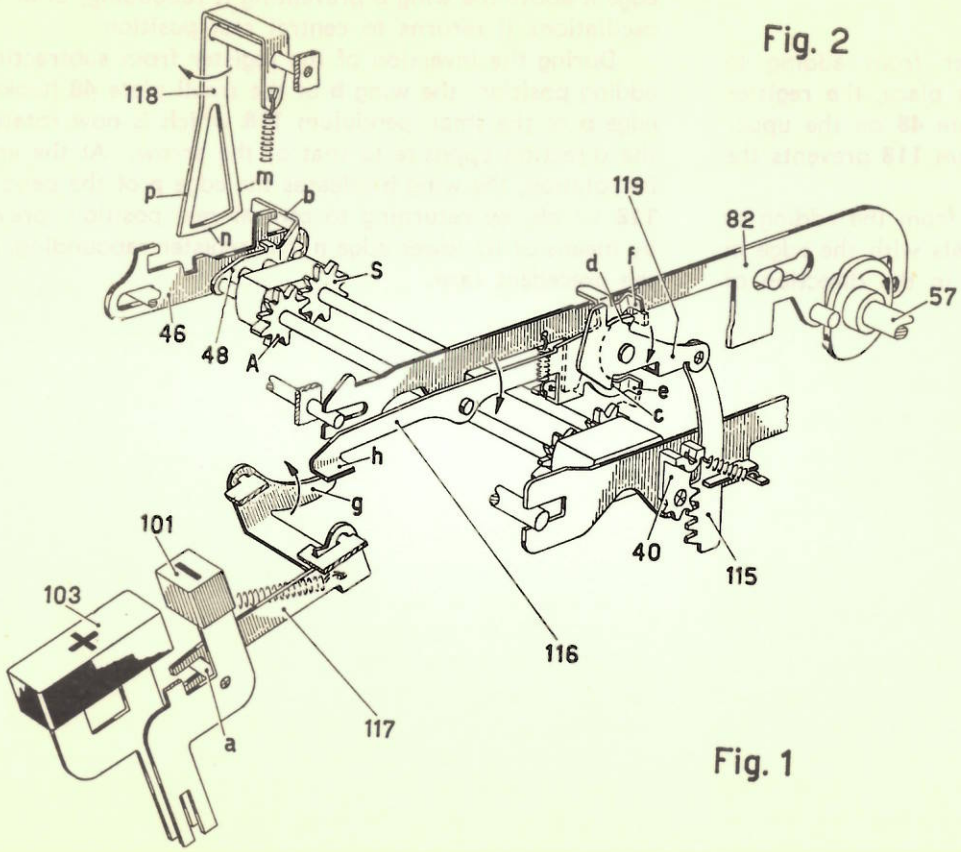
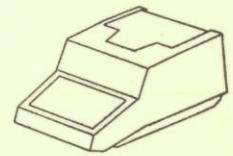

118
p
m
b
n
S
46
48
A
119
82
d
f
57
e
c
h
g
101
103
40
115
116
117
a

Fig. 1



If the register is in additing position and we control another adding cycle, the movement of the anchor **116** doesn't actuate the arm **119** and the register.

c) Antirebounding of the register.

When the inversion of the register from adding to subtracting position or vice versa takes place, the register stops with the wing **b** of the small plate **48** on the upper edge of the lock **46**. The small pendulum **118** prevents the register rebounding.

During the inversion of the register from the adding to the subtracting position, the wing **b** meets with the edge **m** of the small pendulum **118** rotating it in the direction of the arrow. In the last part of its rotation, the wing **b** releases the edge **m** and the small pendulum **118** actuated by its spring trips in the direction opposite to that of the arrow. When rotating the pendulum moves first its lower edge **n** above the wing **b** preventing it rebouding; after some oscillations it returns to central rest position.

During the inversion of the register from subtracting to adding position, the wing **b** of the small plate **48** hooks the edge **p** of the small pendulum **118** which is now rotated in the direction opposite to that of the arrow. At the end of its rotation, the wing **b** releases the edge **p** of the pendulum **118** which, by returning to central rest position, prevents, by means of its lower edge **n**, the register rabounding, as in the precedent case.

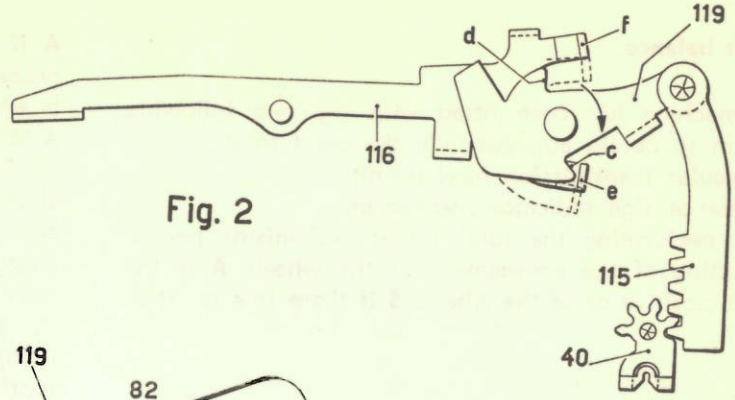

d
f
119
116
c
e
115
40

Fig. 2

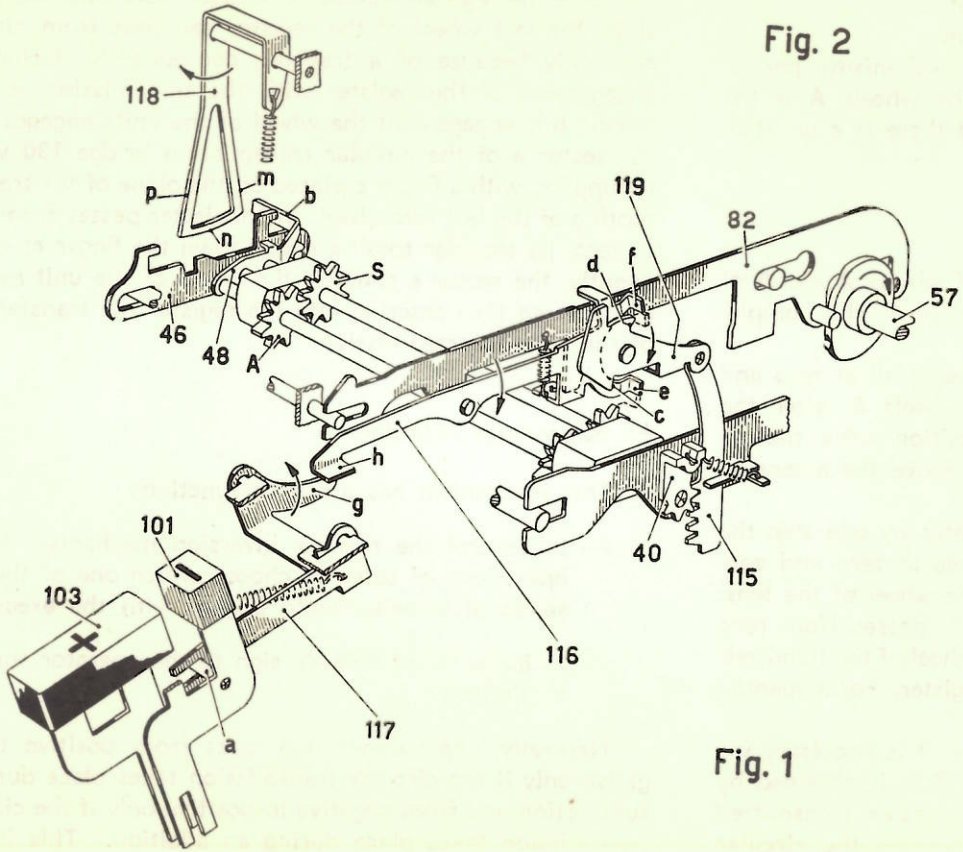
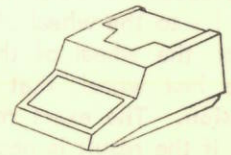

118
p
m
b
n
S
46
48
A
119
82
d
f
57
e
c
h
g
101
103
40
115
116
117
a

Fig. 1



XI. Credit balance.

The machine has been fitted with the two following mechanism to obtain automatically the exact total :

— circular transmission mechanism;

— balance sign indicator mechanism.

When performing the total these mechanisms permit the presetting of the engagement of the wheels **A** if the balance is positive or of the wheels **S** if there is a negative balance.

a) Circular transmission.

We have seen that the two series of wheels **A** and **S** of the register engage one another according to the complement to nine.

Suppose now the adding wheels **A** being all at zero and we wish to subtract one unit. The wheels **S**, after the register has been reversed, are in position « 9 » that is whit the transfer tooth **a** immediately above the extension **b** of the corresponding lever **5**.

When the executer of the units rotates by one step the corresponding wheel **S**, this latter passes to zero and controls the transmission of one unit to the wheel of the tens. When this wheel receives the transfer it passes from nine to zero and performs a transfer on the wheel of the hundreds and so on to the last wheel of the register; consequently, all the wheels **S** move to zero.

But because the exact result is « 1 », it is necessary yet to add « 1 » to the wheel of the units. This is obtained by passing to the wheel of the units a transfer transmitted from the last wheel, that is by performing the **circular transmission.** The exact result is therefore stored in the wheels **S** if the result is negative; it is stored in the wheels **A** if the total is positive. The circular transmission is necessary every time the sign of the balance changes, that is when the result of the operation passes fram the wheels **A** to the wheels **S** and vice versa.

Since the register includes one digit more than the entry slide, the last wheel of the register can pass from nine to zero only because of a transfer, consequently during the engagement of the register with the transmission sectors. During this engagement the wheel of the units engages with the sector **e** of the circular transmission bridge **130** which is supplied with a finger **c** placed on the plane of the transfer tooth **a** of the last left wheel. If this latter passes from nine to zero, its transfer tooth **a** drags down the finger **c**; consequently, the sector **e** compels the wheel of the unit moving by one step thus entering into the register the transfer unit of the circular transmission.

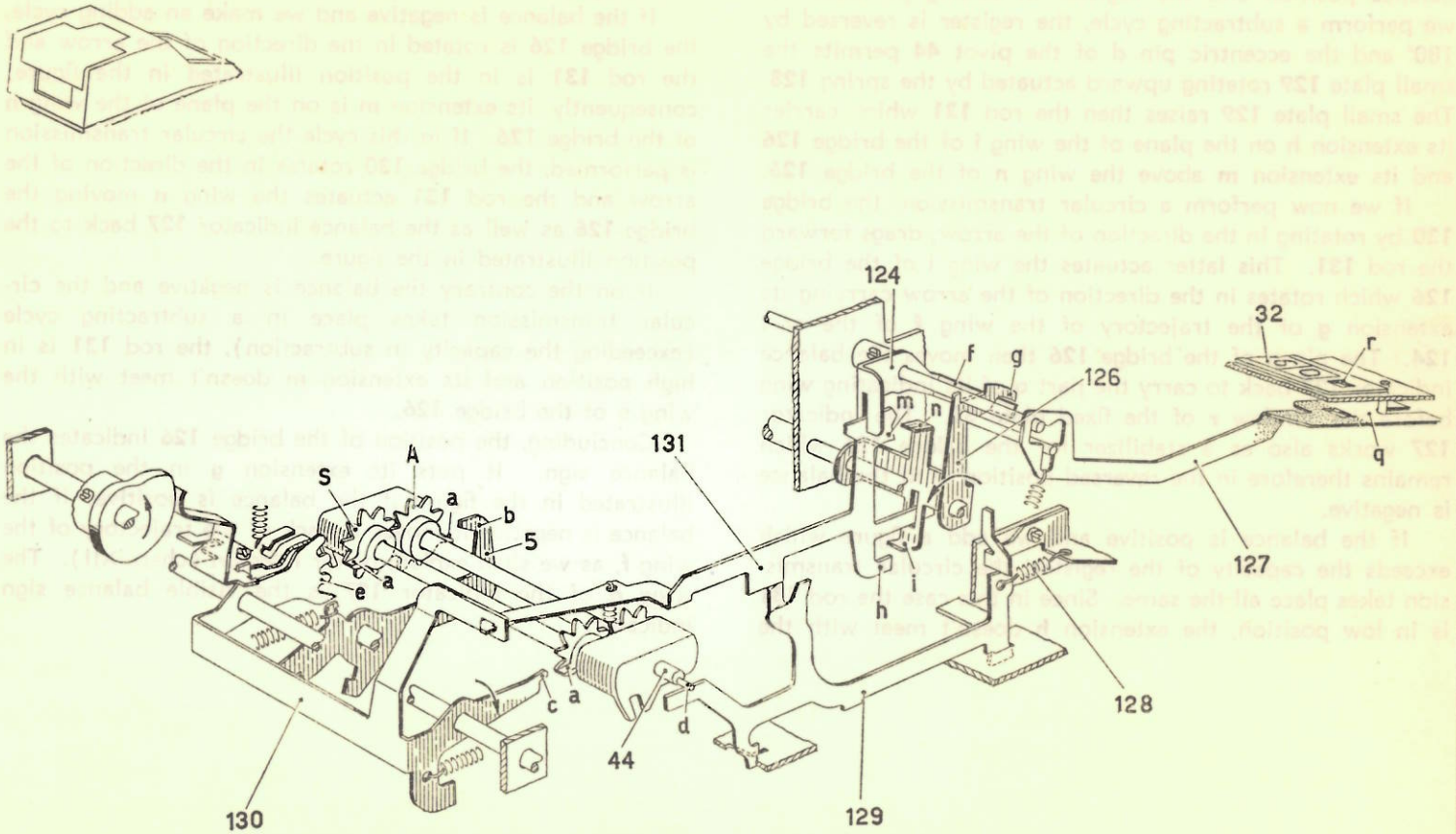
b) Balance sign indicator.

This mechanism has a double function :

— to control the register inversion mechanism in the operations of total, to choose which one of the two series of wheels should engage with the executers;

— to indicate the balance sign to the operator through a window.

Naturally, the balance may pass from positive to negative only if the circular transmission takes place during a subtraction and from negative to positive only if the circular transmission takes place during an addition. This is why the balance sign indicator is controlled by the circular transmission mechanism and the register position.


124
32
r
f
g
126
m
n
q
131
A
S
a
b
5
a
e
i
h
127
c
a
d
44
128
130
129

In the figure the mechanism is illustrated in positive balance position and the register in adding position. If we perform a subtracting cycle, the register is reversed by 180° and the eccentric pin **d** of the pivot **44** permits the small plate **129** rotating upward actuated by the spring **128**. The small plate **129** raises then the rod **131** which carries its extension **h** on the plane of the wing **i** of the bridge **126** and its extension **m** above the wing **n** of the bridge **126**.

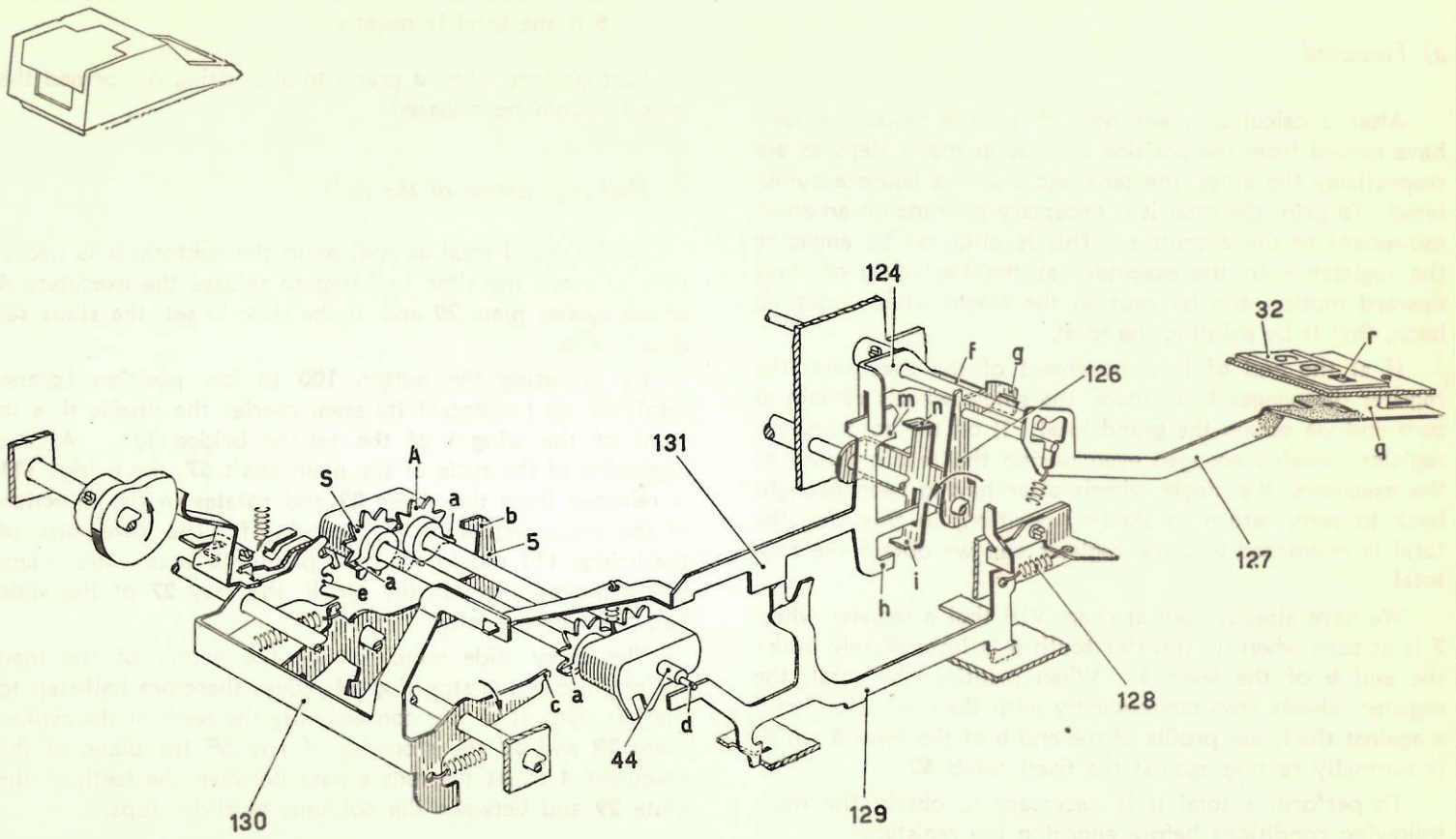
If we now perform a circular transmission, the bridge **130** by rotating in the direction of the arrow, drags forward the rod **131**. This latter actuates the wing **i** of the bridge **126** which rotates in the direction of the arrow carrying its extension **g** of the trajectory of the wing **f** of the arm **124**. The pin **p** of the bridge **126** then moves the balance indicator **127** back to carry the part **q** of its indicating wing before the window **r** of the fixed plate **32**. The indicator **127** works also as a stabilizer for the bridge **126** which remains therefore in the reversed position until the balance is negative.

If the balance is positive and we add a figure which exceeds the capacity of the register, the circular transmission takes place all the same. Since in this case the rod **131** is in low position, the extension **h** doesn't meet with the wing **i** and leaves the bridge **126** in the position illustrated in the figure.

If the balance is negative and we make an adding cycle, the bridge **126** is rotated in the direction of the arrow and the rod **131** is in the position illustrated in the figure; consequently, its extension **m** is on the plane of the wing **n** of the bridge **126**. If in this cycle the circular transmission is performed, the bridge **130** rotates in the direction of the arrow and the rod **131** actuates the wing **n** moving the bridge **126** as well as the balance indicator **127** back to the position illustrated in the figure.

If on the contrary the balance is negative and the circular transmission takes place in a subtracting cycle (exceeding the capacity in subtraction), the rod **131** is in high position and its extension **m** doesn't meet with the wing **n** of the bridge **126**.

Concluding, the position of the bridge **126** indicates the balance sign. It puts its extension **g** in the position illustrated in the figure if the balance is positive; if the balance is negative it moves it back of the trajectory of the wing **f**, as we shall explain better later on (chap. XII). The wing **q** of the indicator **127** is the visible balance sign indicator.


124
32
r
f
g
126
m
n
131
A
S
a
b
5
e
a
q
127
i
h
c
a
d
44
128
130
129

XII. Total.

a) Foreword.

After a calculation has been done, the register wheels have moved from the position zero by as many steps as are respectively the units, the tens, etc... of the figure accumulated. To print the total it is necessary to transmit an equal movement to the executers. This is obtained by engaging the register with the executers at the beginning of their upward motion and by causing the single wheels rotating back, that is by printing the total.

If at the end of this movement of the executers, the register disengages from them, the single wheels remain at zero and we obtain the **grand total.** If on the contrary the register remains engaged even during the return travel of the executers, the single wheels after having been brought back to zero, return to starting position; in this way the total is re-entered into the register and we obtain the **subtotal.**

We have already seen at chap. VIII that a register wheel **7** is at zero when its transfer tooth **a** is immediately under the end **b** of the lever **5**. When printing the total, the register wheels stop consequently with their transfer tooth **a** against the lower profile of the end **b** of the lever **5** which is normally resting against the fixed comb **62**.

To perform a total it is necessary to obtain the main following conditions before engaging the register:

— the executers **4** must be free from the slide control and can therefore move by all the steps necessary to bring the register wheels back to zero;

— the register must be preset to present the wheels **A** to the executers if the total is positive or the wheels **S** if the total is negative.

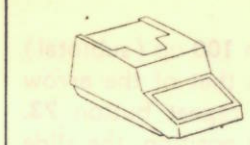
Furthermore when a grand total is being performed the repeat should be released.

b) Half-step motion of the slide.

In the grand total as well as in the subtotal it is necessary to move the slide half-step to release the executers **4** of the cypher plate **29** and, if the slide in set, the stops set also if any.

By actuating the button **100** to low position (grand total) or up (subtotal) its stem carries the profile **d**, **e** in front of the wing **i** of the testing bridge **111**. At the beginning of the cycle of the main shaft **57**, the bridge **111** is released from the slider **82** and rotates in the direction of the arrow actuated by the spring **f**. The lower arm of the bridge **111** moves then the plate **110** back which cam-slot **g** moves, through the pin **h**, the stay **27** of the slide half- step to the left.

The entry slide which under the action of the load spring follows the stop dog **24** moves therefore half-step to the left also. It carries consequently the teeth of the cypher plate **29** and all the stops set if any off the plane of the executers **4** to let the lugs **c** pass between the teeth of the plate **29** and between the columns of slide stops.



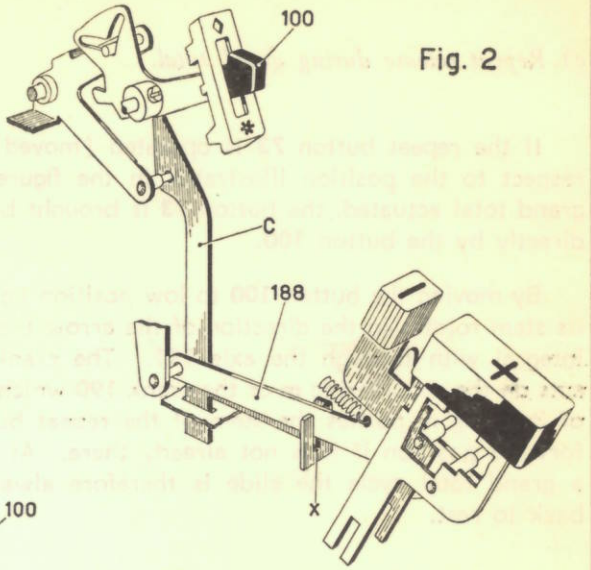

100
C
188
X

Fig. 2

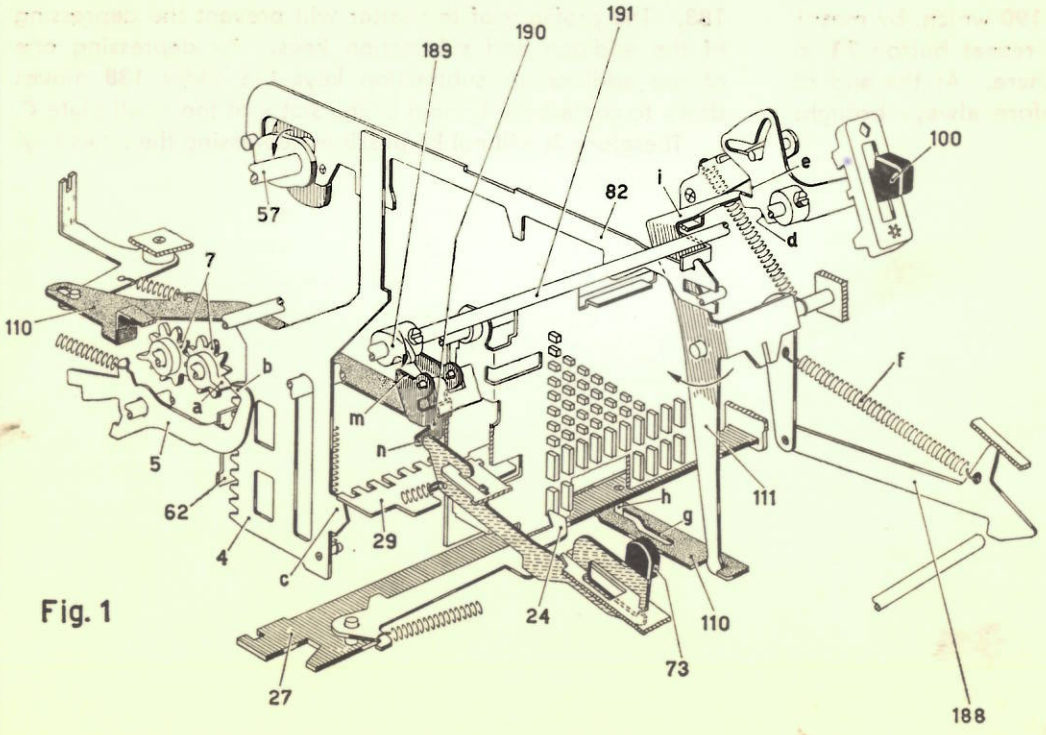

189
190
191
57
82
i
e
d
100
7
110
b
a
5
62
4
c
m
n
29
h
g
111
f
24
110
73
27
188

Fig. 1

c) Repeat release during grand total.

If the repeat button **73** is operated (moved back with respect to the position illustrated in the figure) and the grand total actuated, the button **73** is brought back to rest directly by the button **100**.

By moving the button **100** to low position (grand total) its stem rotates in the direction of the arrow the crank **189** integral with through the axle **191**. The crank **189** then acts on the shouldering **m** of the crank **190** which, by means of its wing **n**, pushes the stem of the repeat button **73** to forward position if it is not already there. At the end of a grand total cycle the slide is therefore always brought back to rest.

On the contrary, by moving the button **100** up (subtotal) the rotation in the direction opposite to that of the arrow of the crank **189** doesn't influence the repeat button **73**. Consequently, if this latter is in working position, the slide will not be brought back to rest at the end of the subtotal cycle.

c') Reciprocal locking between totals key and addition and subtraction keys (figure 2).

When the totals key **100** is actuated the small plate **C** rises and moves the bottom of its slot **x** to contact the slider **188.** The profile **y** of this latter will prevent the depressing of the addition and subtraction keys. By depressing one of the addition or subtraction keys the slider **188** moves down to contact the bottom of the slot **x** of the small plate **C.**

Therefore, it will not be possible depressing the totals key.

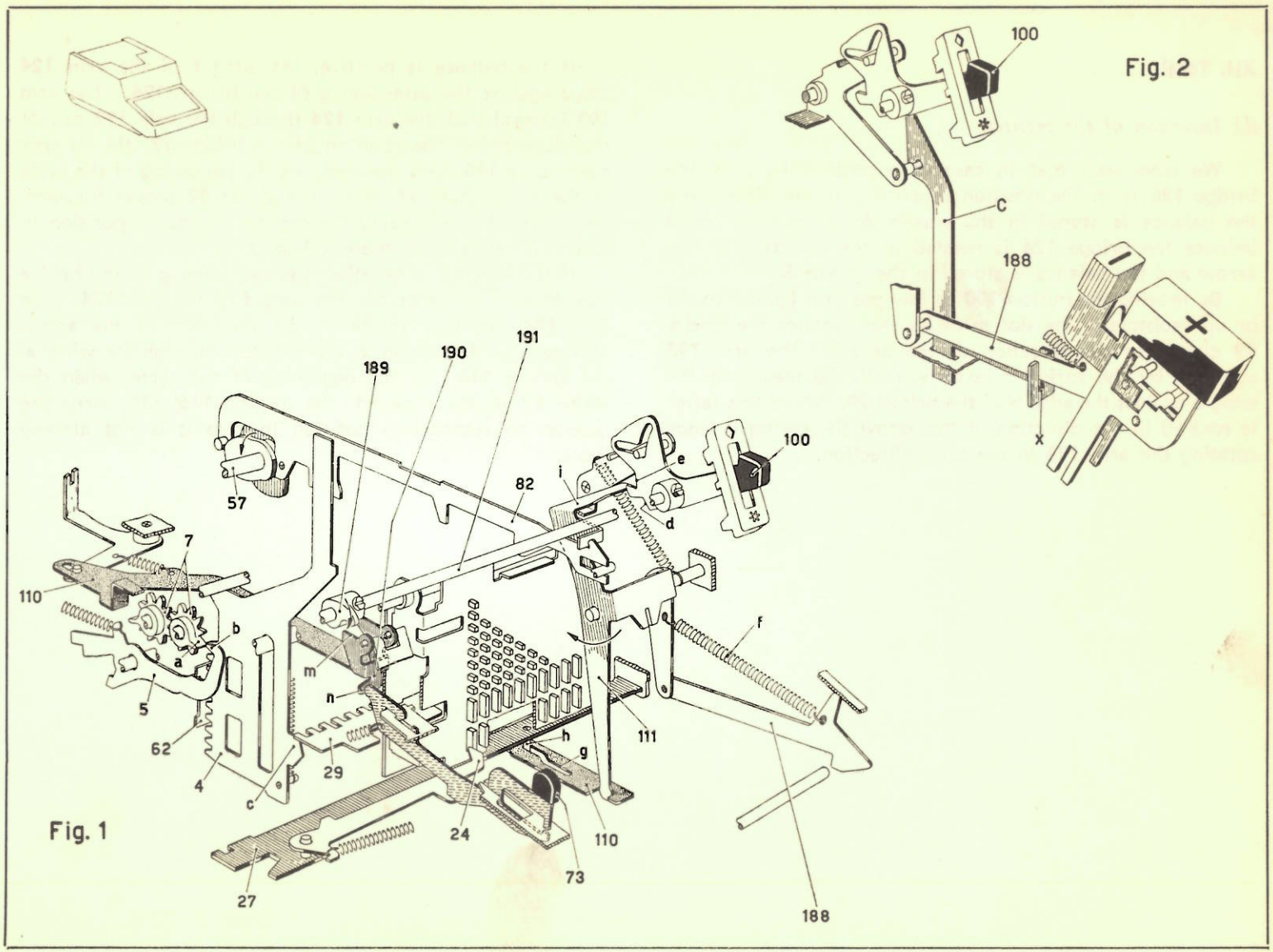

100
C
188
x
+
191
190
189
100
e
i
82
57
d
7
110
b
a
f
m
n
5
62
4
c
29
h
g
111
24
110
73
27
188

Fig. 2

Fig. 1

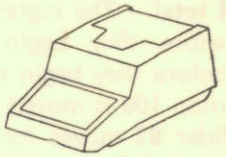
d) Inversion of the register.

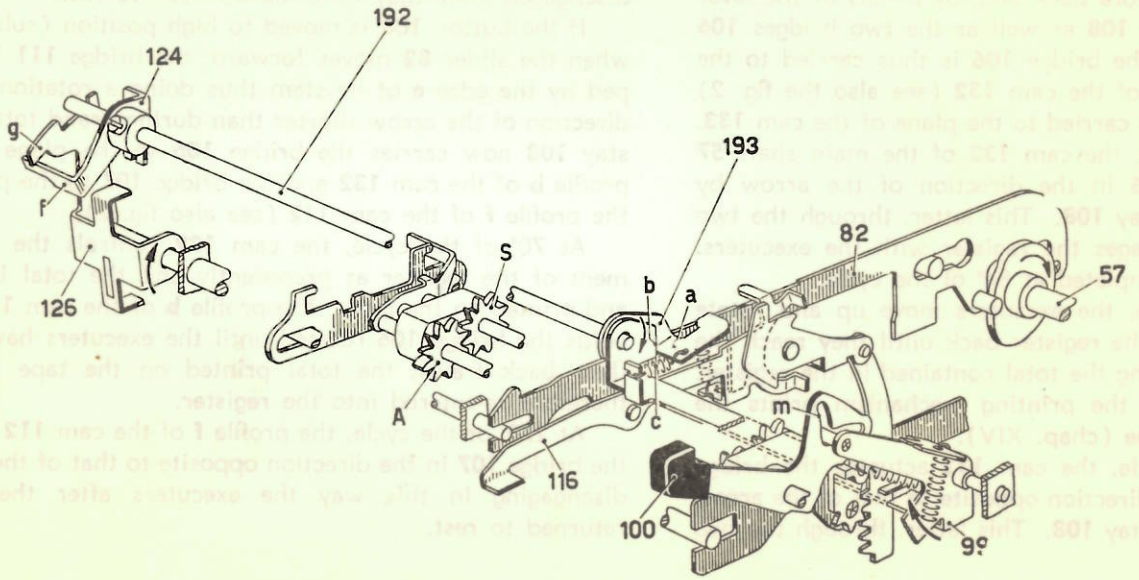
We have seen that in case of a positive balance, the bridge **126** is in the position illustrated in the figure and the balance is stored in the wheels **A**; in case of credit balance the bridge **126** is rotated in the direction of the arrow and the balance is stored in the wheels **S**.

By moving the button **100** to low position (grand total) or up (subtotal), the slot **m** of its stem rotates the bridge **99** always in the direction of the arrow. The arm **193** actuated by the spring **c** rests normally by means of the wing **a** against the edge **b** of the bridge **99**. When this latter is rotated in the direction of the arrow the spring **c** tends rotating the arm **193** in the same direction.

If the balance is positive, the wing **f** of the arm **124** stops against the extension **g** of the bridge **126**. The arm **193** integral with the arm **124** through the axle **192** cannot therefore follow the rotation of the bridge **99**; this is why the anchor **116** is not rotated. At the beginning of the cycle of the main shaft **57**, when the slider **82** moves forward, the anchor **116** will carry the register to adding position in case it is not already there (chap. X).

If the balance is negative, the extension **g** of the bridge **126** doesn't lock anymore the wing **f** of the arm **124**. The arm **193** can now rotate in the direction of the arrow actuated by the spring **c** and rotates, through its wing **a**, the anchor **116**. At the beginning of the cycle, when the slider **82** moves forward, the anchor **116** will carry the register to subtracting position in case it is not already there.




192
124
g
F
126
193
S
82
57
b
a
A
c
m
116
100
9º

XII. Total.

e) Engagement and disengagement of the register.

1. Grand total. - The register must be engaged with the executers before they begin moving up and must be disengaged before they begin moving back.

If the button **100** is moved to low position (grand total), when the slider **82** moves forward, the bridge **111** rotates in the direction of the arrow until stopping with its wing **i** against the edge **d** of its stem thus doing its full travel. The plate **110** moves therefore back and, by means of the lever **109**, it moves the stay **108** as well as the two bridges **106** and **107** rightward. The bridge **106** is thus carried to the plane of the profile **a** of the cam **132** (see also the fig. 2) while the bridge **107** is carried to the plane of the cam **133**.

At 70° of the cycle, the cam **132** of the main shaft **57** rotates the bridge **106** in the direction of the arrow by moving forward the stay **108**. This latter, through the two plates **47** and **53**, engages the register with the executers. The engagement is completed at 84° of the cycle.

At 85° of the cycle, the executers move up and rotate the proper wheels of the register back until they reach the position zero thus giving the total contained in the register. At 172° of the cycle, the printing mechanism prints the grand total on the tape (chap. XIV).

At 194° of the cycle, the cam **133** actuates the bridge **107** rotating it in the direction opposite to that of the arrow and moving back the stay **108**. This latter, through the two plates **47** and **53** disengages the register from the executers completing it at 204° of the cycle. At the same time the executers start moving back (chap. V).

The rotation of the bridge **107** by the cam **133** is shorter than that done in the calculation cycles by means of the profile **c** of the cam **112**. Consequently, after the executers have been disengaged, the register doesn't engage with the transmission sectors but remains in central position.

2. Subtotal. - The register must be engaged with the executers before they begin moving forward and must be disengaged after they have moved back to rest.

If the button **100** is moved to high position (sub-total), when the slider **82** moves forward, the bridge **111** is stopped by the edge **e** of its stem thus doing a rotation in the direction of the arrow shorter than during grand total. The stay **108** now carries the bridge **106** to the plane of the profile **b** of the cam **132** and the bridge **107** to the plane of the profile **f** of the cam **112** (see also fig. 2).

At 70° of the cycle, the cam **132** controls the engagement of the register as precedently and the total is given and printed on the tape. The profile **b** of the cam **132** now holds the bridge **106** rotated until the executers have done their back travel, the total printed on the tape will be therefore re-entered into the register.

At 270° of the cycle, the profile **f** of the cam **112** rotates the bridge **107** in the direction opposite to that of the arrow disengaging in this way the executers after they have returned to rest.

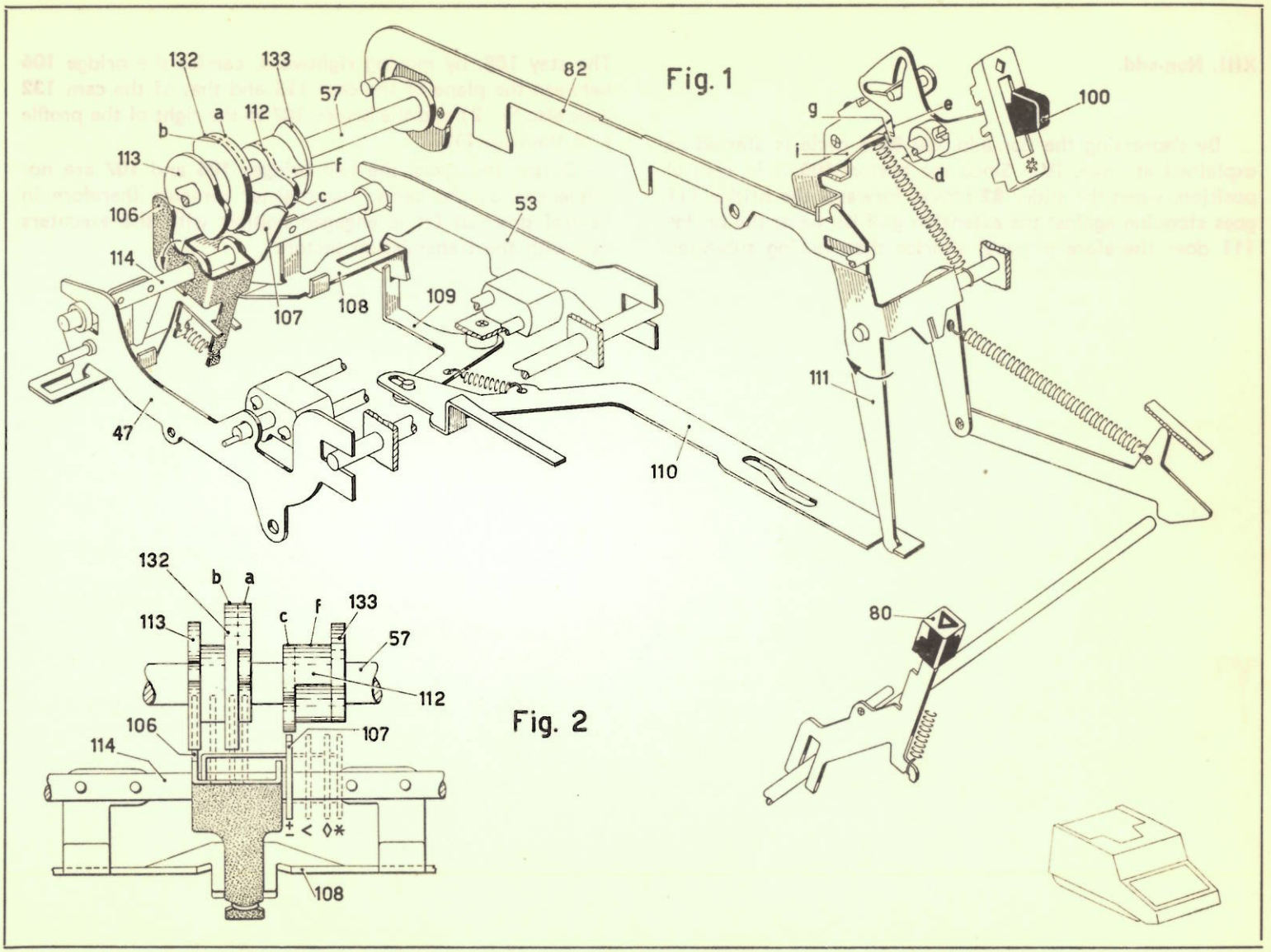


Fig. 1
132
133
57
82
a
b
112
113
f
c
106
53
114
107
108
109
47
110
111
g
e
100
i
d
Fig. 2
132
b
a
133
f
c
113
57
112
106
107
114
108
80

XIII. Non-add.

By depressing the non-add key **80** a cycle is started as explained at chap. IV. Since the button **100** is in central position, when the slider **82** moves forward, the bridge **111** goes stopping against the extension **g** of its stem; the bridge **111** does therefore a travel shorter than during sub-total.

The stay **108**, by moving rightward, carries the bridge **106** between the plane of the cam **113** and that of the cam **132** (see also fig. 2) and the bridge **107** to the right of the profile **c** of the cam **112.**

During the cycle, the two bridges **106** and **107** are not influenced by the cams; the register remains therefore in central position (it is engaged neither with the executers nor with the transmission sectors).

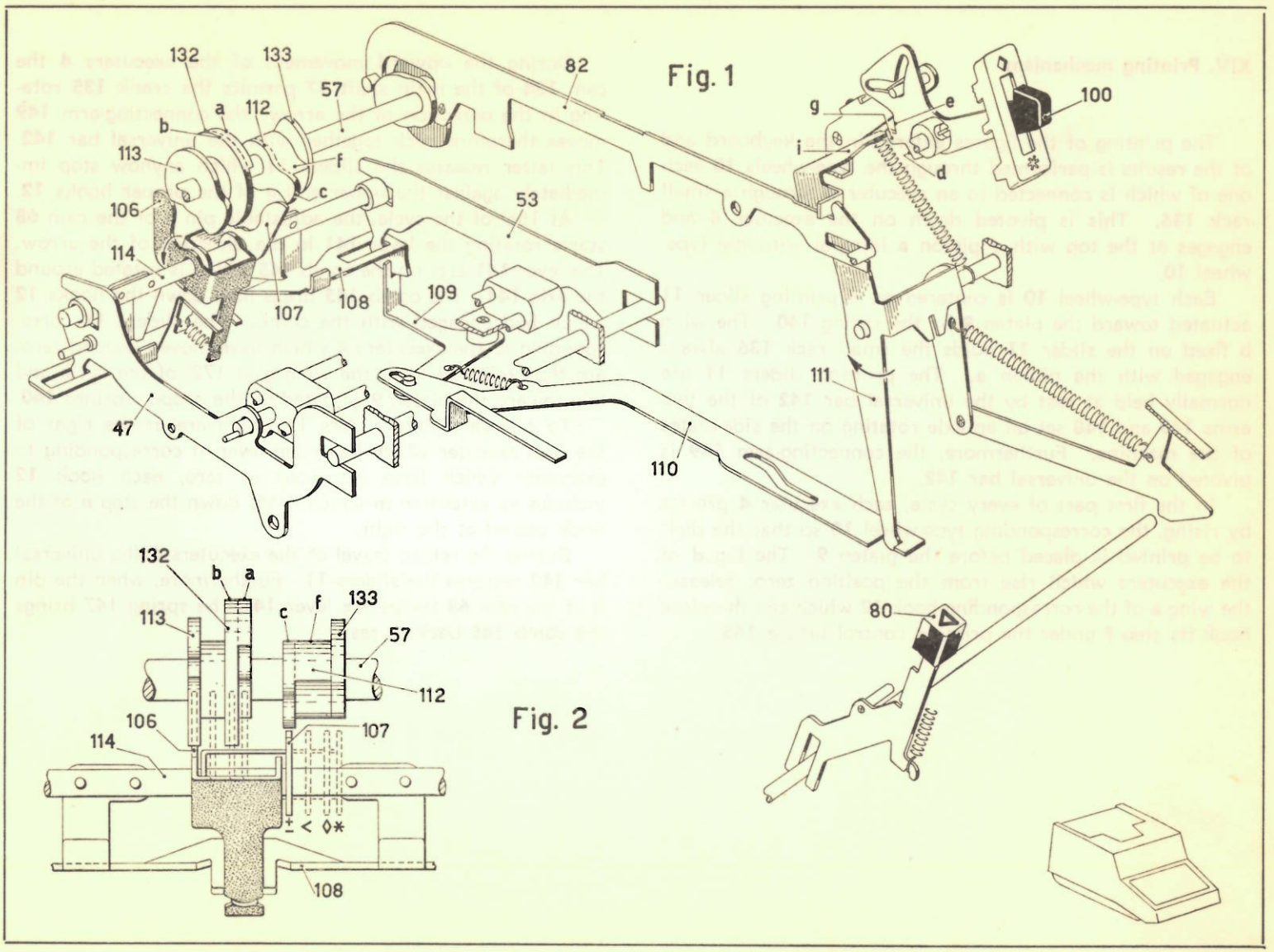


Fig. 1
132
133
57
82
a
112
b
113
f
c
106
53
114
107
108
109
47
110
111
g
e
100
i
d
80
Fig. 2
132
b
a
113
c
f
133
57
112
106
107
114
108

XIV. Printing mechanism.

The printing of the figures entered in the keyboard and of the results is performed through the type-wheels **10** each one of which is connected to an executer **4** through a small rack **136**. This is pivoted down on the executer **4** and engages at the top with a pinion **a** integral with the type-wheel **10**.

Each type-wheel **10** is centered on a printing slider **11** actuated toward the platen **9** by the spring **140**. The wing **b** fixed on the slider **11** holds the small rack **136** always engaged with the pinion **a**. The printing sliders **11** are normally held at rest by the universal bar **142** of the two arms **143** and **148** set on an axle rotating on the side-plates of the machine. Furthermore, the connecting-arm **149** is pivoted on the universal bar **142**.

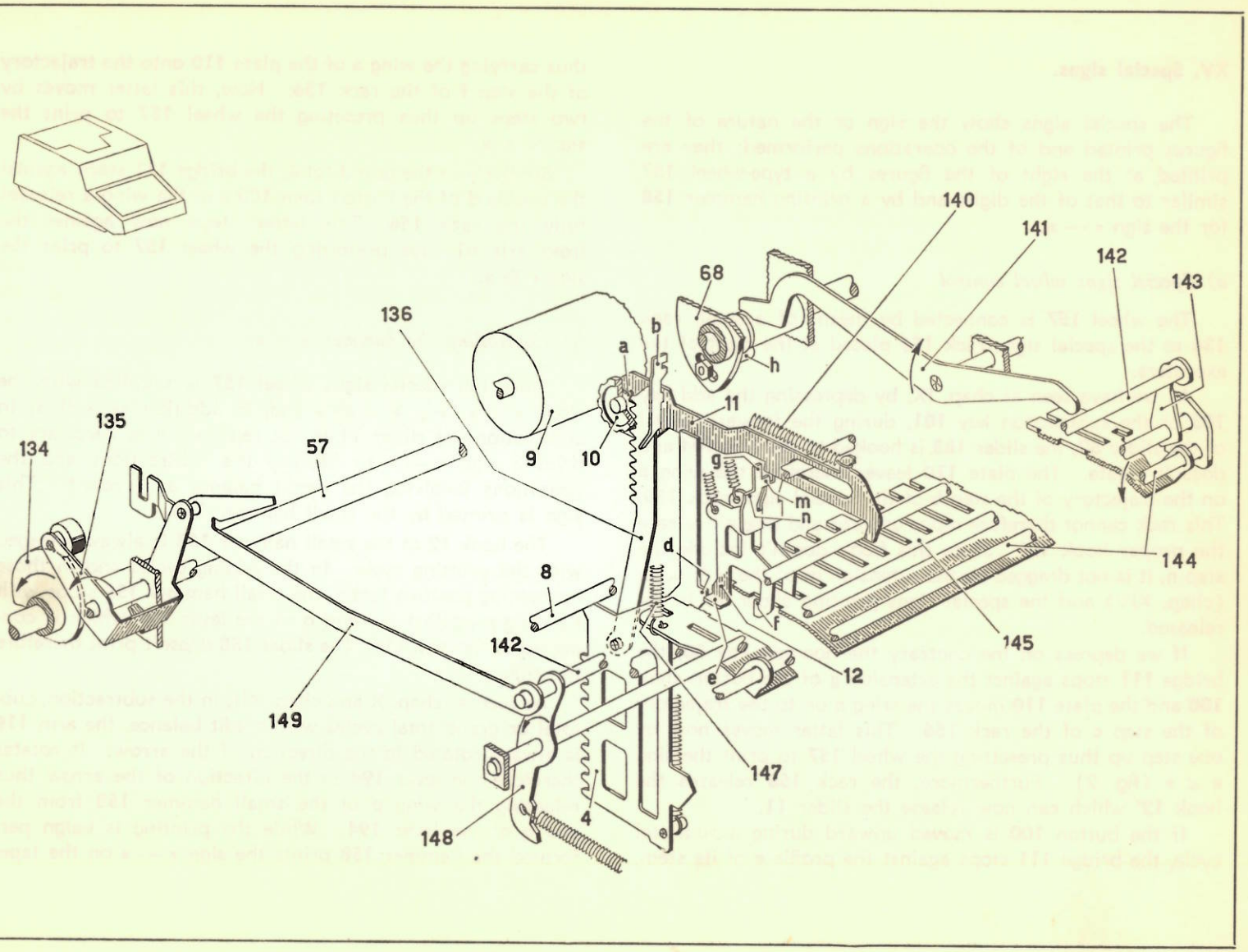
In the first part of every cycle, each executer **4** presets by rising, the corresponding type-wheel **10** so that the digit to be printed is placed before the platen **9**. The lug **d** of the executers which rise from the position zero, releases the wing **a** of the corresponding hook **12** which can therefore hook its step **f** under the printing control bridge **145**.

During the upward movement of the executers **4** the cam **134** of the main shaft **57** permits the crank **135** rotating in the derection of the arrow; the connecting-arm **149** moves therefore back together with the universal bar **142**. This latter releases the sliders **11** which anyhow stop immediately against the upper end **g** of the proper hooks **12**.

At 156° of the cycle, the adjustable pin **h** of the cam **68** starts rotating the lever **141** in the direction of the arrow. The lever **141** acts on the comb **145** which is rotated around the axle **144**. The comb **145** drags now down the hooks **12** which had engaged with the comb. The sliders **11** corresponding to the executers **4** which have moved beyond zero, are thus released from the wing **g** at 172° of the cycle and trip toward the platen **9** actuated by the proper springs **140**.

To release all the sliders **11** which are at the right of the first executer which has risen, even if corresponding to executers which have remained at zero, each hook **12** includes an extension **m** which drags down the step **n** of the hook placed at the right.

During the return travel of the executers **4** the universal bar **142** restores the sliders **11**. Furthermore, when the pin **h** of the cam **68** leaves the lever **141**, the spring **147** brings the comb **145** back to rest.


140
141
142
143
68
h
136
b
a
11
135
134
57
9
10
g
m
n
d
144
8
f
145
142
e
12
149
147
4
148

XV. Special signs.

The special signs show the sign or the nature of the figures printed and of the operations performed; they are printed at the right of the figures by a type-wheel **157** similar to that of the digits and by a printing hammer **158** for the sign « — ».

a) Special signs wheel control.

The wheel **157** is connected by means of a small rack **136** to the special signs rack **156** placed at the right of the executers.

As we have seen at chap. IX, by depressing the add key **103** or the subtraction key **101**, during the forward travel of the slider **82**, the slider **188** is hooked to the axle **104** and doesn't rotate. The plate **110** leaves therefore the wing **a** on the trajectory of the step **b** of the special signs rack **156**. This rack cannot therefore move upward and doesn't release the proper hook **12'**. Since this hook doesn't include the step **n**, it is not dragged by the extension **m** of the unit hook (chap. XIV) and the special signs printing slider **11** is not released.

If we depress on the contrary the non-add key **80**, the bridge **111** stops against the extension **g** of the button stem **100** and the plate **110** moves the wing **a** on to the trajectory of the step **c** of the rack **156**. This latter moves now by one step up thus presetting the wheel **157** to print the sign « < » (fig. 2). Furthermore, the rack **156** releases the hook **12'** which can now release the slider **11**.

If the button **100** is moved upward during a sub-total cycle, the bridge **111** stops against the profile **e** of its stem, thus carrying the wing **a** of the plate **110** onto the trajectory of the step **f** of the rack **156**. Now, this latter moves by two steps up thus preseting the wheel **157** to print the sign « ◊ ».

Similarly in the grand total, the bridge **111** stops against the profile **d** of the button-stem **100** and the wing **a** releases fully the rack **156**. This latter stops now against the fixed axle **61** thus presetting the wheel **157** to print the sign « ❋ ».

b) Controlling the hammer « — ».

Since the special signs wheel **157** is supplied with the signs « < », « ◊ », « ❋ » and, in addition as well as in subtraction the slider **11** is not released, it is necessary to print a sign « — » to identify the subtractions and the operations involving the credit balance as a result. This sign is printed by the small hammer **158**.

The hook **12** of the small hammer **158** is always engaged with the printing cycle. In the adding cycles and in those concerning positive totals, the small hammer **158** stops with its wing **p** against the end **q** of the lever **194** which is connected to the arm **119**. The slider **158** doesn't print therefore the sign « — ».

As seen at chap. X and chap. XII, in the subtraction, sub-total or grand total cycles with credit balance, the arm **119** is always rotated in the direction of the arrow. It rotates therefore the lever **194** in the direction of the arrow thus releasing the wing **p** of the small hammer **158** from the end **q** of the lever **194**. While the printing is beign performed the hammer **158** prints the sign « — » on the tape.

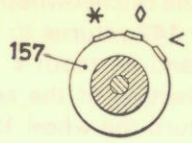
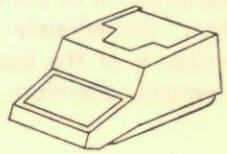

157

Fig.2

157
158
11
m
158
194
119
q
p
h
12'
12
136
100
e
145
d
g
61
80
82
111
a
101
c
f
b
103
110
156
188
104

Fig.1



XVI. Line-spacing of the platen.

When the machine performs addition, subtraction or non-add, the platen **9** must rotated by a single line-space; hen it performs grand total and sub-total it should make a double line-spacing.

a) Single line-spacing.

We have seen (chap. IX) that in the adding and subtracting cycles, the bridge **111** is locked by the slider **188** and doesn't rotate during the forward travel of the slider **82**. In the non-add cycles (chap. XIII) the bridge **111** stops against the wing **g** of the button-stem **100** after a short rotation. In all these cases the plate **110** is not able to move the base stay **27** of the slide to the left (chap. XII, par. *b*).

In the first part of the cycle of the main shaft **57**, the cam **134** permits the connecting-arm **149** moving back together with the universal bar **142** (chap. XIV). The line-space stay **152**, actuated by the spring, starts following the movement of the universal bar **142**. The inclined wing **a** of the fixed comb **153** against which rests the extension **b** of the stay **152** permits this latter to engage its tooth **c** with the ratchet-wheel **151** integral with the platen **9**.

At the same time, the connecting-arm **149** releases from its slot **d** the wing **e** of the plate **150** which, actuated by the spring **i** of the control connecting-arm **154** tries rotating in the direction of the arrow. The connecting-arm **154** stops anyhow immediately with its extension **f** against the extension **k** of the base stay **27**. The wing **h** of the plate **150** remains therefore on the trajectory of the lug **m** of the stay **152** which is immediately stopped after a back movement of about one step of the ratchet-wheel **151**.

When the universal bar **142** returns to rest, the stay **152** is brought forward again and its tooth **c** rotates the wheel **151** by one step in the direction of the arrow. The spring stabilizer **155** holds at its turn the wheel **151** in the position reached.

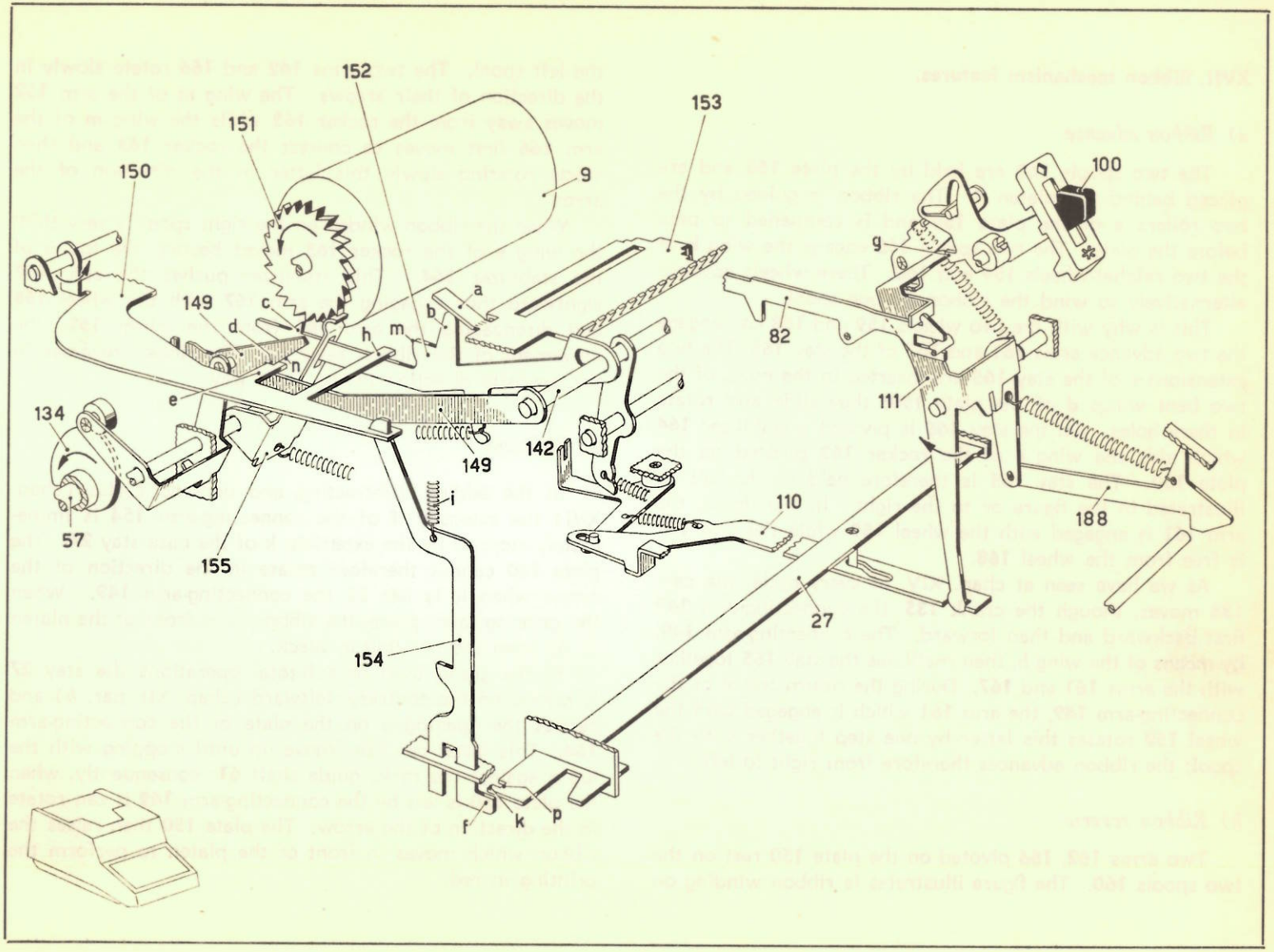
In the last part of the movement of the stay **152** the inclined wing **a** of the comb **153** disengages, by actuating on the extension **b** of the stay **152**, the tooth **c** of the wheel **151**. Furthermore, the inclined edge **n** of the connecting-arm **149** brings down again the wing **e** of the plate **150** thus moving the extension **f** of the connecting-arm **154** of the extension **k** of the stay **27**.

b) Double line-spacing.

As we have seen at chap. XII, par. *b*, in the grand total and sub-total cycles, the bridge **111** makes a rotation in the direction of the arrow greater than in case of non-add; consequently, the plate **110** moves the base stay **27** by half-step leftward. The stay **27** carries therefore the slot **p** onto the trajectory of the extension **f** of the connecting-arm **154**.

In the first part of the cycle when the connecting-arm **149** moves back, the plate **150** is free to rotate in the direction of the arrow. It moves now the wing **h** above the lug **m** of the stay **152**. The movement of the universal bar **142** can be consequently followed completely by the stay **152** which moves back by two steps of the ratchet-wheel **151**.

When the universal bar **142** returns to rest, the stay **152** now rotates the wheel **151** by two steps in the direction of the arrow thus performing the double line-spacing.


152
151
153
150
9
100
149
c
a
b
d
h
m
g
82
n
e
111
134
149
142
i
110
188
57
155
27
154
f
k
p

XVII. Ribbon mechanism features.

a) Ribbon advance.

The two spools **160** are held by the plate **150** and are placed behind the platen **9**. The ribbon is guided by the two rollers **a** of the plate **150** and is compelled to pass before the plate. The two spools **160** engage the wing **b** of the two ratchet-wheels **159** and **168**. These wheels advance alternatively to wind the ribbon on one spool.

This is why with the two wheels **159** and **168** can engage the two advance arms **161** and **167** of the stay **165**. The two extensions **c** of the stay **165** are inserted in the holes of the two bent wings **d** of the plate **150**; they slide and rotate in these holes. On the stay **165** is pivoted a stabilizer **164** which aids the wing **e** of the rocker **163** pivoted on the plate **150**. The stay **165** is therefore held to the left as illustrated in the figure or to the right. In the figure, the arm **161** is engaged with the wheel **159** while the arm **167** is free from the wheel **168**.

As we have seen at chap. XIV, at every cycle, the cam **134** moves, though the crank **135**, the connecting-arm **149** first backward and then forward. The connecting-arm **149**, by means of the wing **h**, then oscillates the stay **165** together with the arms **161** and **167**. During the return travel of the connecting-arm **149**, the arm **161** which is engaged with the wheel **159** rotates this latter by one step together with the spool; the ribbon advances therefore from right to left.

b) Ribbon reverse.

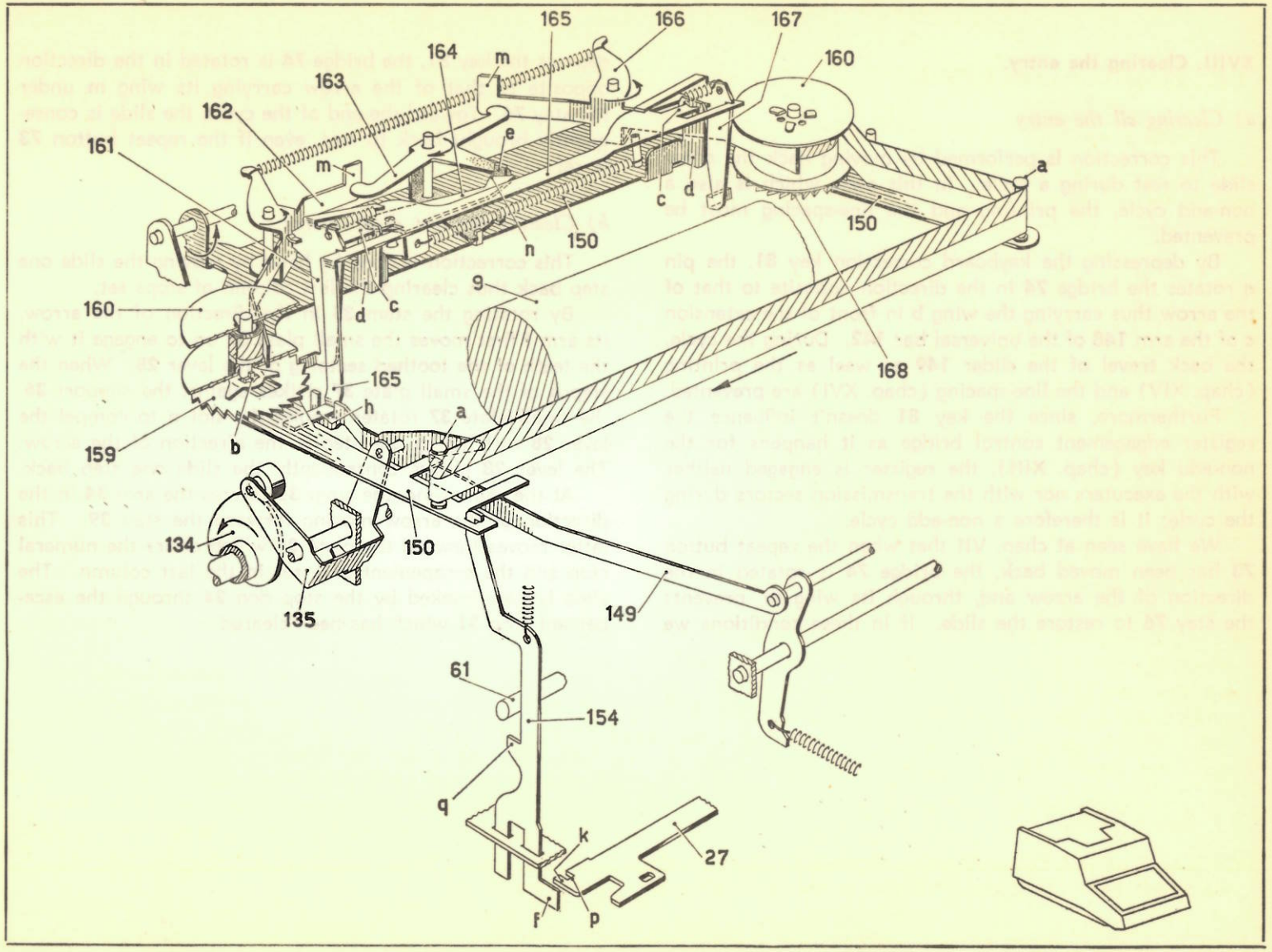
Two arms **162, 166** pivoted on the plate **150** rest on the two spools **160**. The figure illustrates le ribbon winding on the left spool. The two arms **162** and **166** rotate slowly in the direction of their arrows. The wing **m** of the arm **162** moves away from the rocker **163** while the wing **m** of the arm **166** first moves to contact the rocker **163** and then starts rotating slowly this latter in the direction of the arrow.

When the ribbon winded on the right spool is very thin, the wing **e** of the rocker **163** moves beyond the top **n** of the stabilizer **164**. This stabilizer pushes the stay **165** rightward thus engaging the arm **167** with the wheel **168** and disengaging the arm **161** from the wheel **159**; the movement of the ribbon reverses. The ribbon reverses in the opposite direction in the same way.

c) Bichrome.

In the adding, subtracting and non-add cycles (chap. XVI) the extension **f** of the connecting-arm **154** is immediately stopped by the extension **k** of the base stay **27**. The plate **150** cannot therefore rotate in the direction of the arrow when it is left by the connecting-arm **149**. When the printing takes place, the ribbon is in front of the platen to perform the printing in black.

In the grand total or sub-total operations the stay **27** is moved on the contrary, leftward (chap. XII, par. *b*) and carries the opening **p** on the plate of the connecting-arm **154**. This latter can now move up until stopping with the lug **q** against the racks guide shaft **61**; consequently, when the plate **150** is left by the connecting-arm **149** it can rotate in the direction of the arrow. The plate **150** then raises the ribbon which moves in front of the platen to perform the printing in red.


165
166
167
164
m
160
163
162
161
m
e
a
c
d
150
n
150
9
160
d
c
168
165
h
a
159
b
134
150
135
149
61
154
q
k
27
F
p

XVIII. Clearing the entry.

a) Clearing all the entry.

This correction is performed by moving back the entry slide to rest during a cycle. In this cycle which is also a non-add cycle, the printing and the line-spacing must be prevented.

By depressing the keyboard correction key **81**, the pin **q** rotates the bridge **74** in the direction opposite to that of the arrow thus carrying the wing **b** in front of the extension **c** of the arm **148** of the universal bar **142**. During the cycle, the back travel of the slider **149** as weel as the printing (chap. XIV) and the line-spacing (chap. XVI) are prevented.

Furthermore, since the key **81** doesn't influence the register engagement control bridge as it happens for the non-add key (chap. XIII), the register is engaged neither with the executers nor with the transmission sectors during the cycle; it is therefore a non-add cycle.

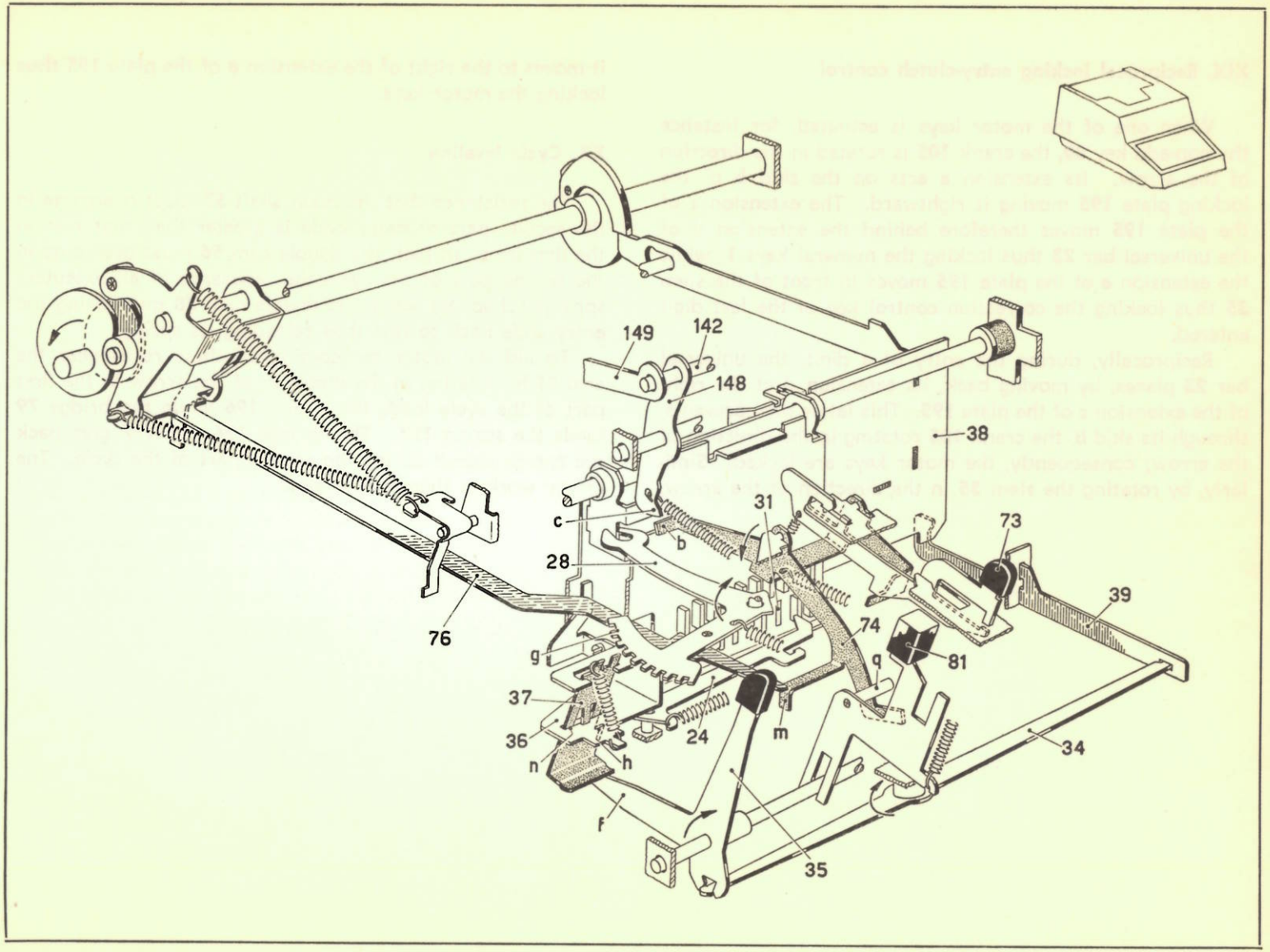
We have seen at chap. VII that when the repeat button **73** has been moved back, the bridge **74** is rotated in the direction of the arrow and, through its wing **m**, prevents the stay **76** to restore the slide. If in these conditions we depress the key **81**, the bridge **74** is rotated in the direction opposite to that of the arrow carrying its wing **m** under the stay **76**. Toward the end of the cycle, the slide is consequently brought back to rest, even if the repeat button **73** is set.

b) Clearing the last digit entered.

This correction is done by hand by moving the slide one step back thus clearing the last column of stops set.

By rotating the stem **35** in the direction of the arrow, its arm **f** first moves the small plate **37** up to engage it with the teeth of the toothed sector **g** of the lever **28**. When the step **h** of the small plate **37** strikes against the support **36**, the small plate **37** rotates around the slot **n** to compel the lever **28** rotating by one step in the direction of the arrow. The lever **28** moves consequently the slide one step back.

At the same time, the stem **35** rotates the arm **34** in the direction of the arrow moving forward the stay **39**. This latter moves forward the plate **38** which clears the numeral stop and the escapement stop set in the last column. The slide is now hooked by the stop dog **24** through the escapement stop **31** which has been cleared.


149
142
148
38
31
c
b
28
73
39
76
74
g
q
81
37
24
m
36
34
n
h
F
35

XIX. Reciprocal locking entry-clutch control.

When one of the motor keys is actuated, for instance the non-add key **80**, the crank **105** is rotated in the direction of the arrow. Its extension **a** acts on the skid **b** of the locking plate **195** moving it rightward. The extension **c** of the plate **195** moves therefore behind the extension **d** of the universal bar **23** thus locking the numeral keys **1**, while the extension **e** of the plate **195** moves in front of the stem **35** thus locking the correction control key of the last digit entered.

Reciprocally, during the entry of a digit, the universal bar **23** places, by moving back, its extension **d** at the right of the extension **c** of the plate **195**. This latter then prevents, through its skid **b**, the crank **105** rotating in the direction of the arrow; consequently, the motor keys are locked. Similarly, by rotating the stem **35** in the direction of the arrow, it moves to the right of the extension **e** of the plate **195** thus locking the motor keys.

XX. Cycle leveling.

The resistance that the main shaft **57** must overcome in the second part of every cycle is greater than that met in the first part. In fact, the double cam **56** must overcome in the second part of the cycle the resistance of all executers springs (chap. V) while the double cam **78** must bring the entry slide back to rest thus reloading its spring.

To aid the motor overcoming all these resistances the arm **55** by rotating in the direction of the arrow in the first part of the cycle loads the spring **196** while the bridge **79** loads the spring **197**. The springs **196** and **197** give back the energy stored during the second part of the cycle. The motor work is therefore leveled.

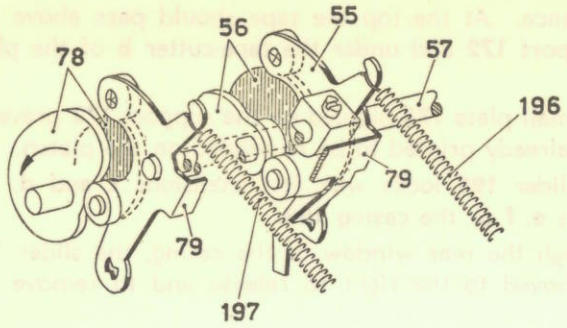
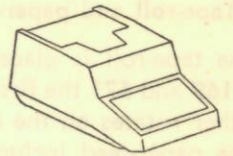


Fig.2



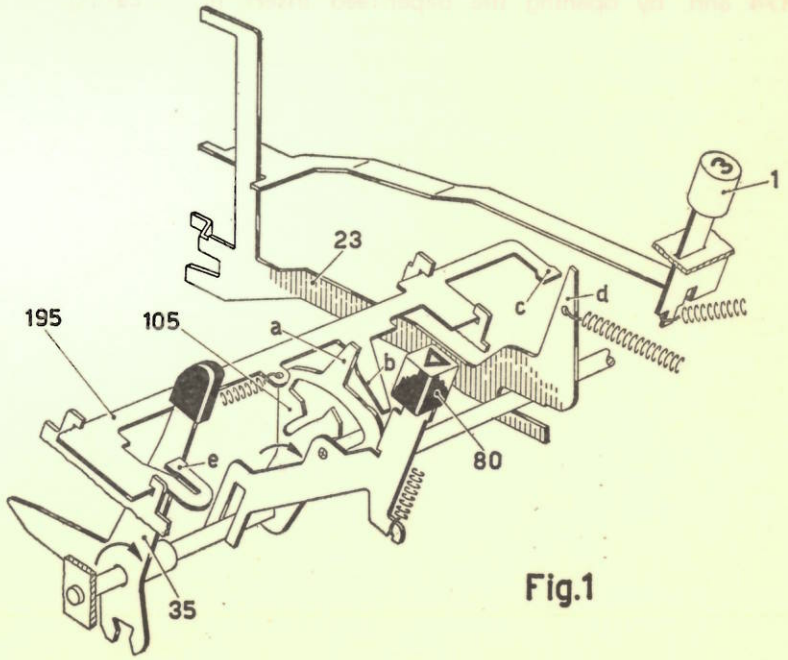


Fig.1

XXI. Tape-roll and paper-feed.

The tape-roll is placed between the pins **a** of the two arms **169** and **171** the first of which slides horizontally while the other rotates on the axle **170.**

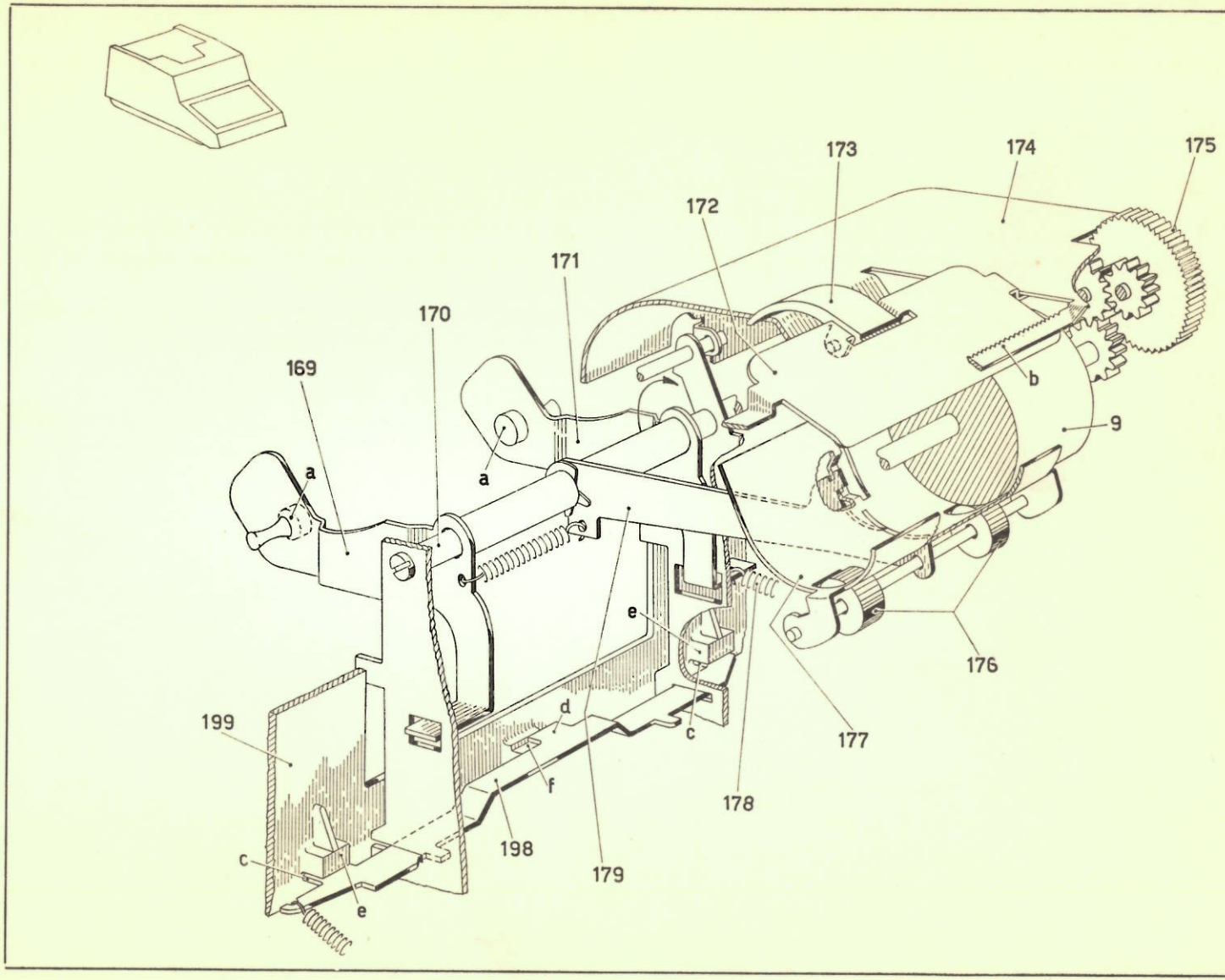
The paper-feed includes the paper-guide-plate **177** held by the arm **179** and the paper-feed-rollers **176** fitted in the plate **177.** The paper-feed is pushed against the platen by the spring **178** through the arms **171** and **179** integral one another. By rotating the arm **171** in the direction of the arrow the paper-feed can be opened and the tape released.

To place the tape on the platen **9,** insert the tape above the plate **174** and, by opening the paper-feed insert it between the platen and the paper-feed. By rotating now the platen by means of the knob **175,** the rollers **176** make the tape advance. At the top the tape should pass above the fixed support **172** and under the tape-cutter **b** of the plate **174.**

The small plate **173** pivoted on the support **172** prevents the tape already printed to be re-winded on the platen.

The slider **198** locks with its extensions **c** and **d,** the extensions **e, f** or the casing **199.**

Through the rear window of the casing, the slider **198** can be moved to the right to release and to remove the casing.


173
174
175
172
171
170
169
b
9
a
a
e
176
177
199
d
c
f
178
198
179
c
e

ADJUSTMENT STANDARDS

1 - FIGURES 1 - 2 and 3.

Centering the register with respect to the racks.

The register unit is held by two plates 46 8 065 B and 46 8 131 S which rest on the pivots 925 3 39 U and are guided at the rear by appropriate bushes.

The axial play of the register should be minimum; its rotation freedom perfect. The register wheels should be centered with respect to the proper racks while the transfer teeth of these wheels can control surely the transmission levers **L**.

All these conditions are obtained by adjusting suitably the position of the two pivots 46 3 052 Z and 46 8 064 A.

With the register in adding position (that is with the small locking bar down) the angular position of the above pivots is illustrated in the figures 2 and 3.

The angular positions are temporary since they will be adjusted later on.

2 - FIGURE 1 and 4.

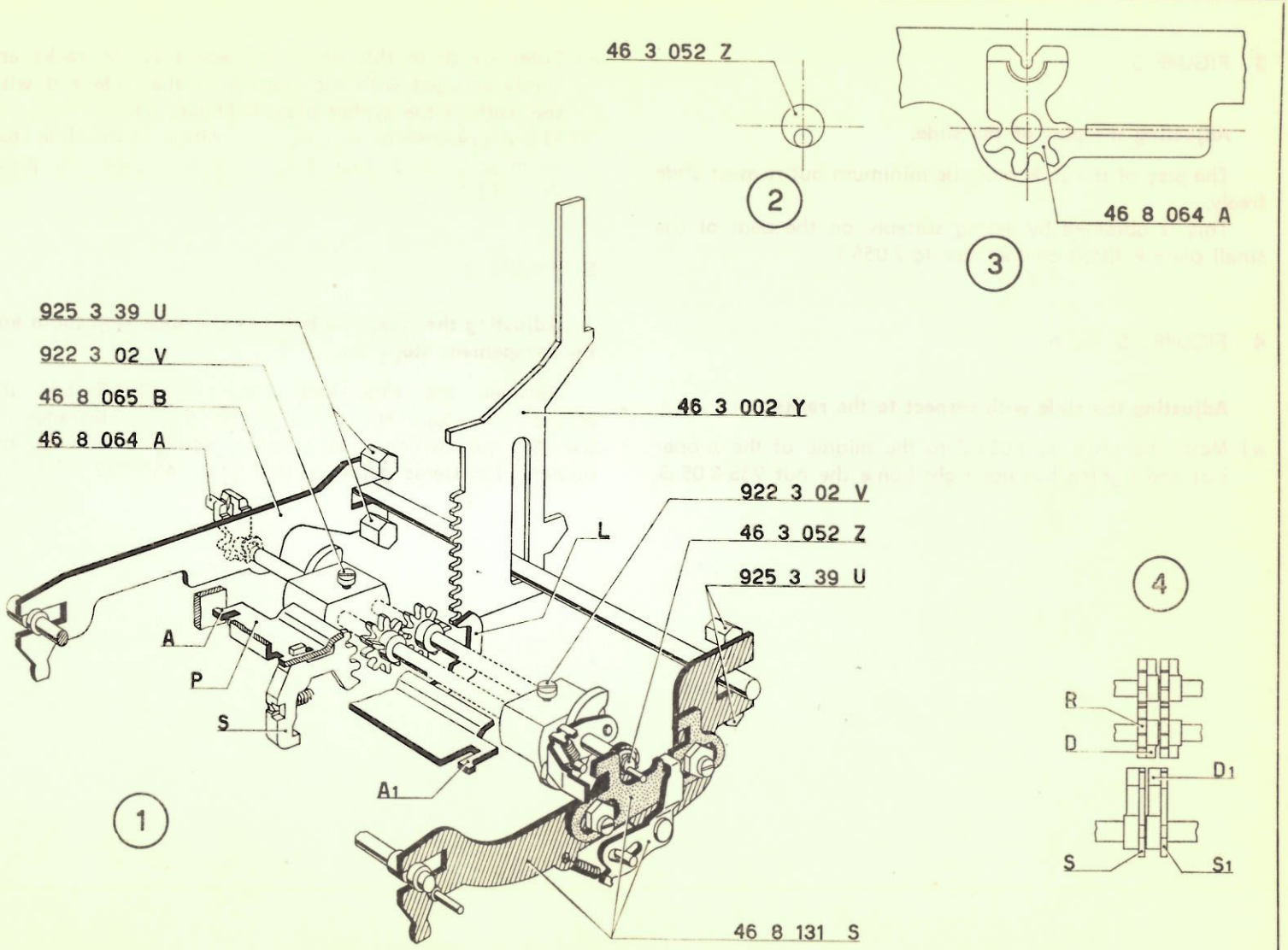
Centering the transmission sectors unit with respect to the register wheels.

The axial position of the transmission sectors unit should be such to obtain (figure 4):

— the centering of the sector **S** with respect to the proper wheel **R**;

— a sure engagement between the transfer tooth **D** of this wheel **R** and the transfer tooth D_1 of the next sector S_1.

These conditions are obtained by acting suitably on the wings **A** and A_1 of the comb **P** of the sectors unit. Since the two wings are resting on the internal side-plates of the machine ti will be possible to establish with them a minimum axial play of the sectors unit which comb **P** should be free to rotate.


46 3 052 Z
2
46 8 064 A
3
925 3 39 U
922 3 02 V
46 8 065 B
46 8 064 A
46 3 002 Y
922 3 02 V
46 3 052 Z
925 3 39 U
L
A
P
S
A1
1
4
R
D
D1
S
S1
46 8 131 S

*

3 - FIGURE 5.

Adjusting the play of the slide.

The play of the slide must be minimum but it must slide freely.

This is obtained by acting suitably on the bent of the small plate **P** fitted on the stay 46 2 055 T.

4 - FIGURES 5 and 6.

Adjusting the slide with respect to the racks.

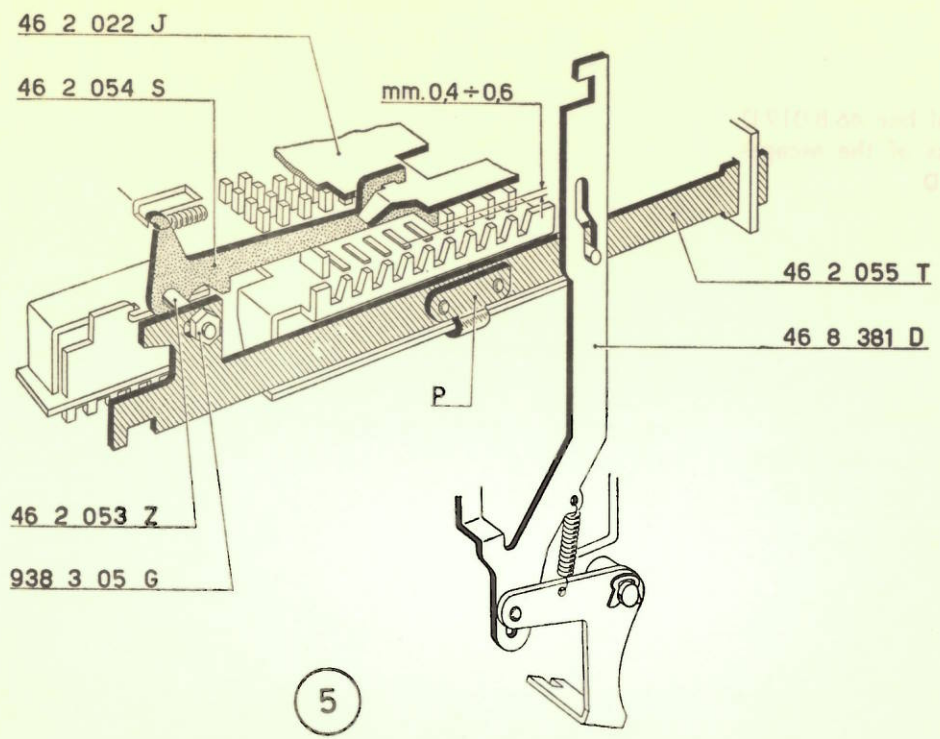
a) Move the pivot 46 2 053 Z to the middle of the proper slot and tighten but not right home the nut 938 3 05 G.

b) Enter six 0; in this position check that the racks are surely engaged with the stops **S** of the slide and with the teeth of the cypher plate **D** (figure 6).
This is obtained by varying the position of the slide stop tooth 46 2 054 S, that is by moving suitably the pivot 46 2 053 Z.

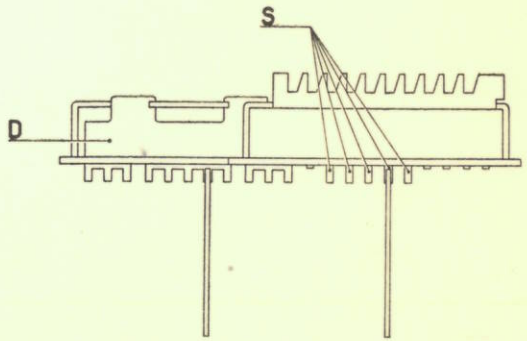
5 - FIGURE 5.

Adjusting the clearance between the slide stop tooth and the escapement stops set.

Between the slide stop tooth 46 2 054 S and the escapement stops set there should be a clearance of 0.4÷0.6 mm. which is obtained by acting suitably on the numeral key-stems guide vertical plate 46 2 022 J.


46 2 022 J
46 2 054 S
mm. 0,4 ÷ 0,6
46 2 055 T
46 8 381 D
P
46 2 053 Z
938 3 05 G

5

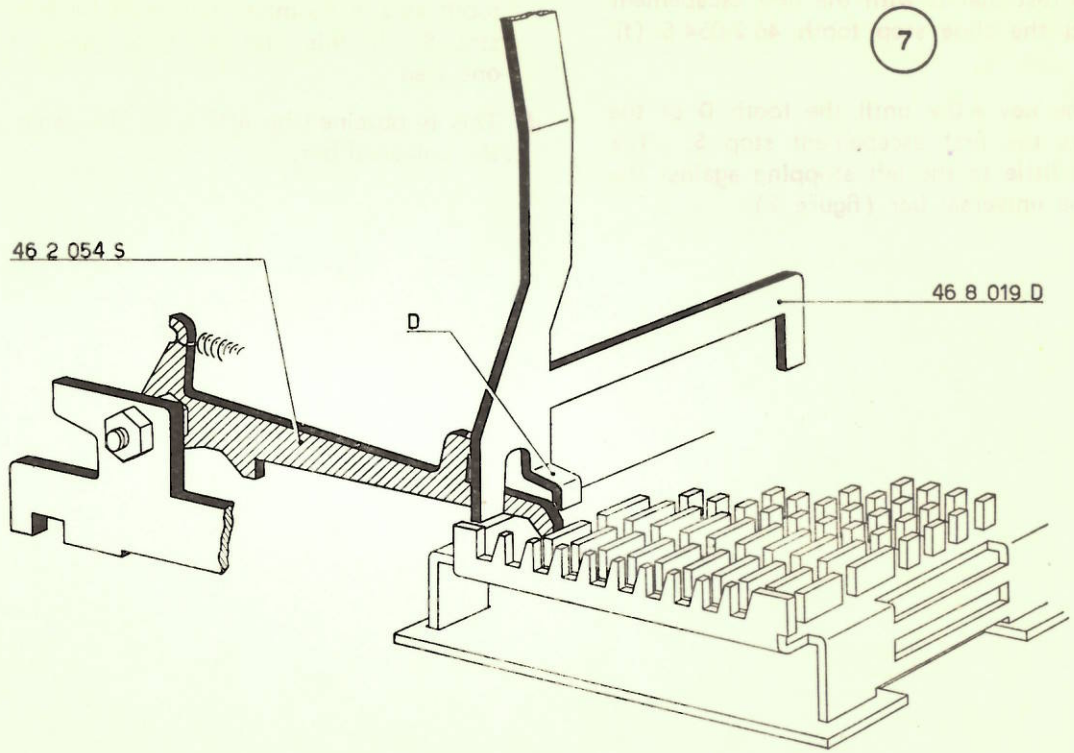

S
D

6

6 - FIGURE 7.

Adjusting the keyboard universal bar.

Check that the tooth **D** of the universal bar 46 8 019 D engages, during the entry, all the thickness of the escapement stops. Act if necessary on the tooth **D.**


7
46 2 054 S
D
46 8 019 D

7 - FIGURES 8 - 9 and 10.

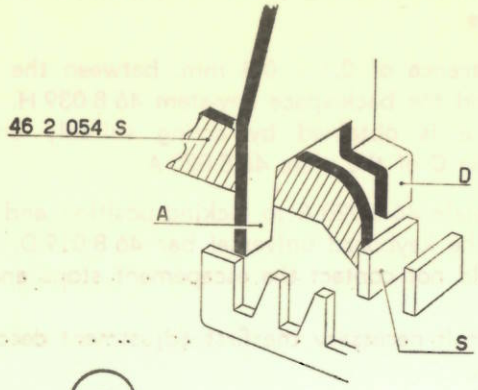
Adjusting the entry of the escapement stops.

a) Move the slide to rest that is with the first escapement stop **S** to contact the slide stop tooth 46 2 054 S (figure 8).

b) Depress slowly the key « 0 » until the tooth **D** of the universal bar sets the first escapement stop **S**. The slide will move a little to the left stopping against the extension **A** of the universal bar (figure 9).

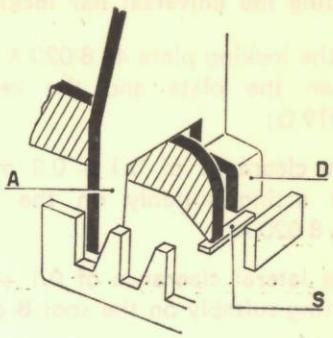
c) Carry on depressing the key « 0 » to the end. The extension **A** of the universal bar, by working on the inclined plane of the slide rack, will restore a little the slide to the right. It is absolutely necessary that the tooth 46 2 054 S might not move back to the left of the stop **S**. In this case the slide should not advance by one step.

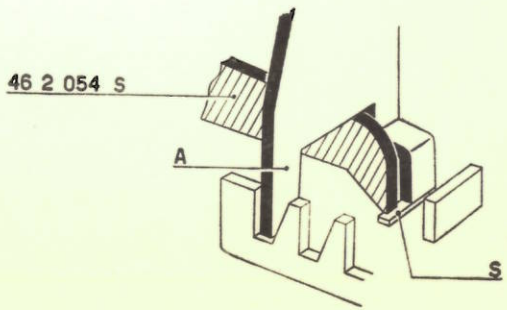
d) This is obtained by acting on the same extension **A** of the universal bar.



8

9





10

8 - FIGURE 11.

Adjusting the universal bar locking.

a) With the locking plate 46 8 020 A at rest we should have between the plate and the keyboard universal bar 46 8 019 D:

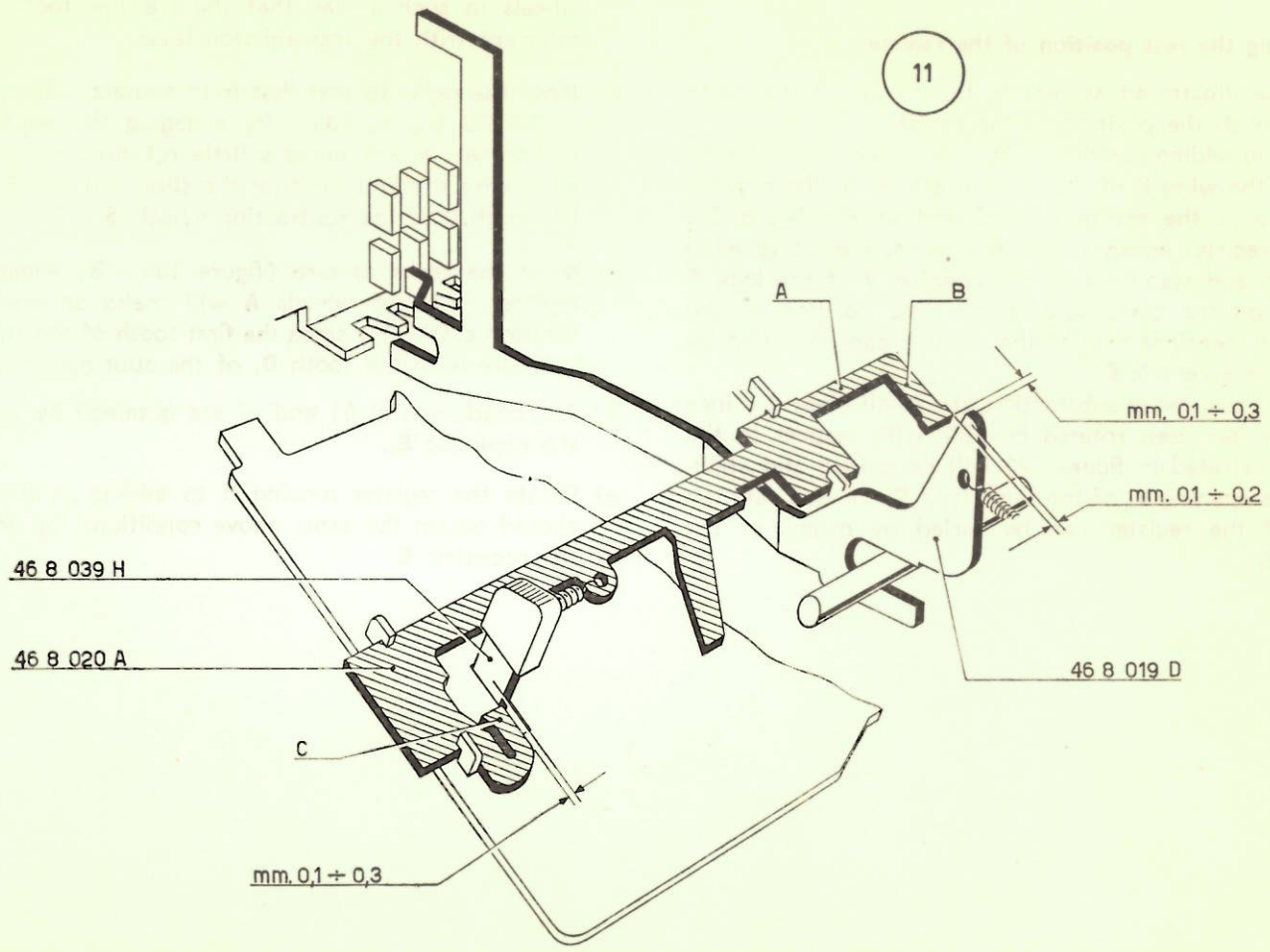
— the clearance of 0.1 ÷ 0.3 mm. which is obtained by acting suitably on the spot **A** of the plate 46 8 020 A;

— the lateral clearance of 0.1 ÷ 0.2 mm. obtained by acting suitably on the spot **B** of the plate 46 2 020 A.

b) Always with the locking plate 46 8 020 A at rest we should have:

— the clearance of 0.1 ÷ 0.3 mm. between the same plate and the back-space key-stem 46 8 039 H. This clearance is obtained by acting suitably on the extension **C** of the plate 46 8 020 A.

c) Move the plate 46 8 020 A to locking position and push against it the keyboard universal bar 46 8 019 D. This latter should not contact the escapement stops and the slide rack.
Check again if necessary the first adjustment described at point *a)*.


11
A
B
mm. 0,1 ÷ 0,3
mm. 0,1 ÷ 0,2
46 8 039 H
46 8 020 A
46 8 019 D
C
mm. 0,1 ÷ 0,3

9 - FIGURES 12 - 13 and 14.

Adjusting the rest position of the register.

We have illustrated at rest in the figure 12 the parts which establish the position of the register.

We are in adding position, that is with the small locking bar down; the wing **K** of the small plate set to the register is therefore in the position illustrated in the figure 12. When the register engages with the racks, the above wing **K** is guided and stabilized by the opening **V** of the lock **C** assembled on the plate 46 8 131 S. The position of the wing **K** and therefore that of the register can be varied by means of the eccentric **E**.

With the register in subtraction, the small plate **K** (since the register has been rotated by 180° with respect to the position illustrated in figure 12) will be guided and stabilized by the opening $\mathbf{V}_1$ of the same lock **C**. In this case the position of the register can be varied by means of the eccentric $\mathbf{E}_1$.

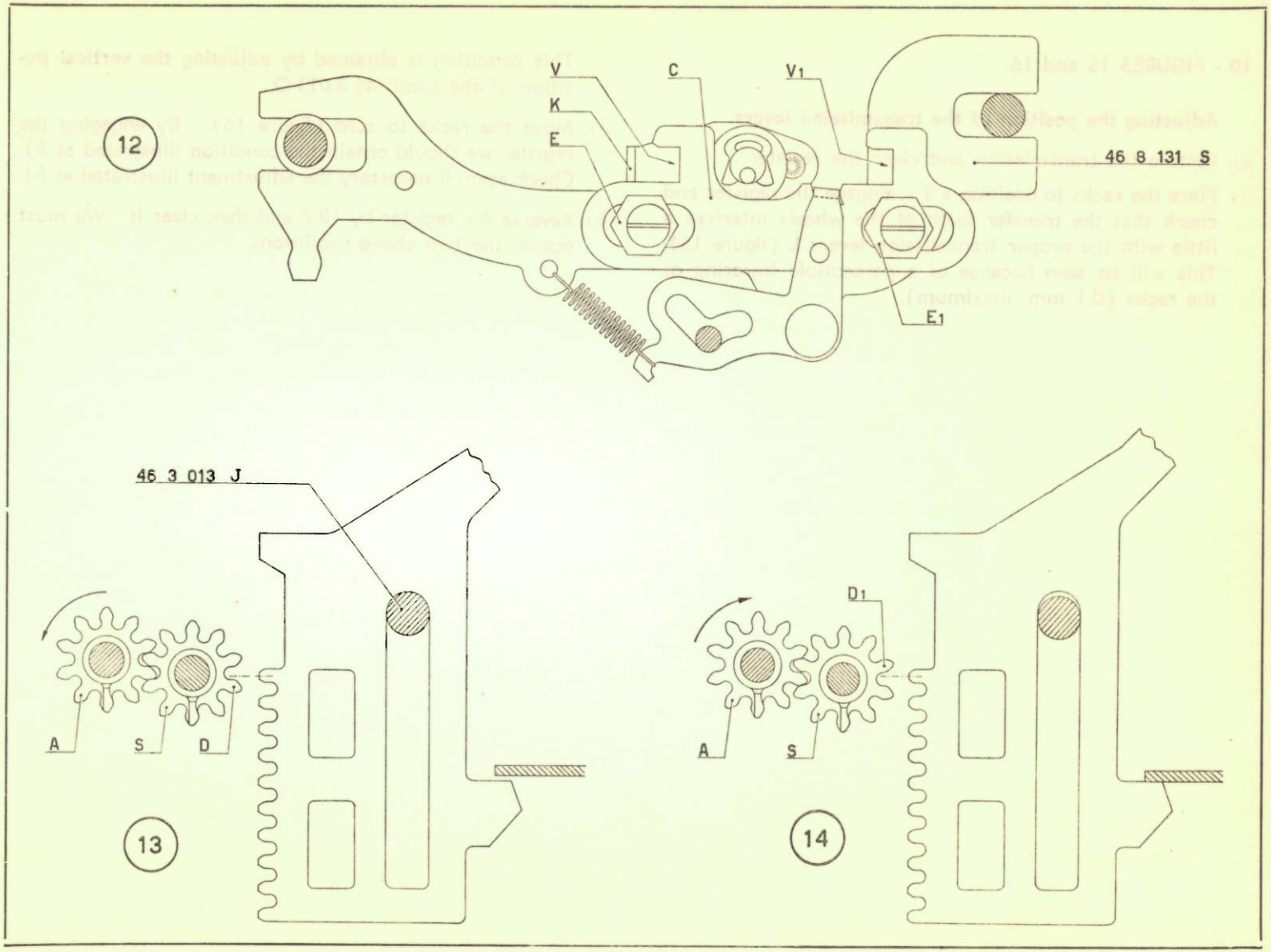
a) Move the register to subtracting position; place the wheels in such a way that the transfer tooth doesn't interfere with the transmission levers.

b) Move the racks to rest that is to contact with the shaft 46 3 013 J (figure 13). By engaging the register, the add wheels **A** will make a little rotation counter-clock-wise since the first tooth of the slide will interfere with the tooth **D** of the subtracting wheels **S**.

c) Move the racks to zero (figure 14). By engaging the register, the add wheels **A** will make an equal little rotation clock-wise since the first tooth of the racks will interfere with the tooth $\mathbf{D}_1$ of the subtracting wheel **S**.

d) The conditions at *b)* and *c)* are obtained by acting on the eccentric $\mathbf{E}_1$.

e) Rotate the register moving it to adding position. We should obtain the same above conditions, by acting on the eccentric **E**.


12
V
K
E
C
V1
46 8 131 S
E1
46 3 013 J
A
S
D
13
D1
A
S
14

10 - FIGURES 15 and 16.

Adjusting the position of the transmission levers.

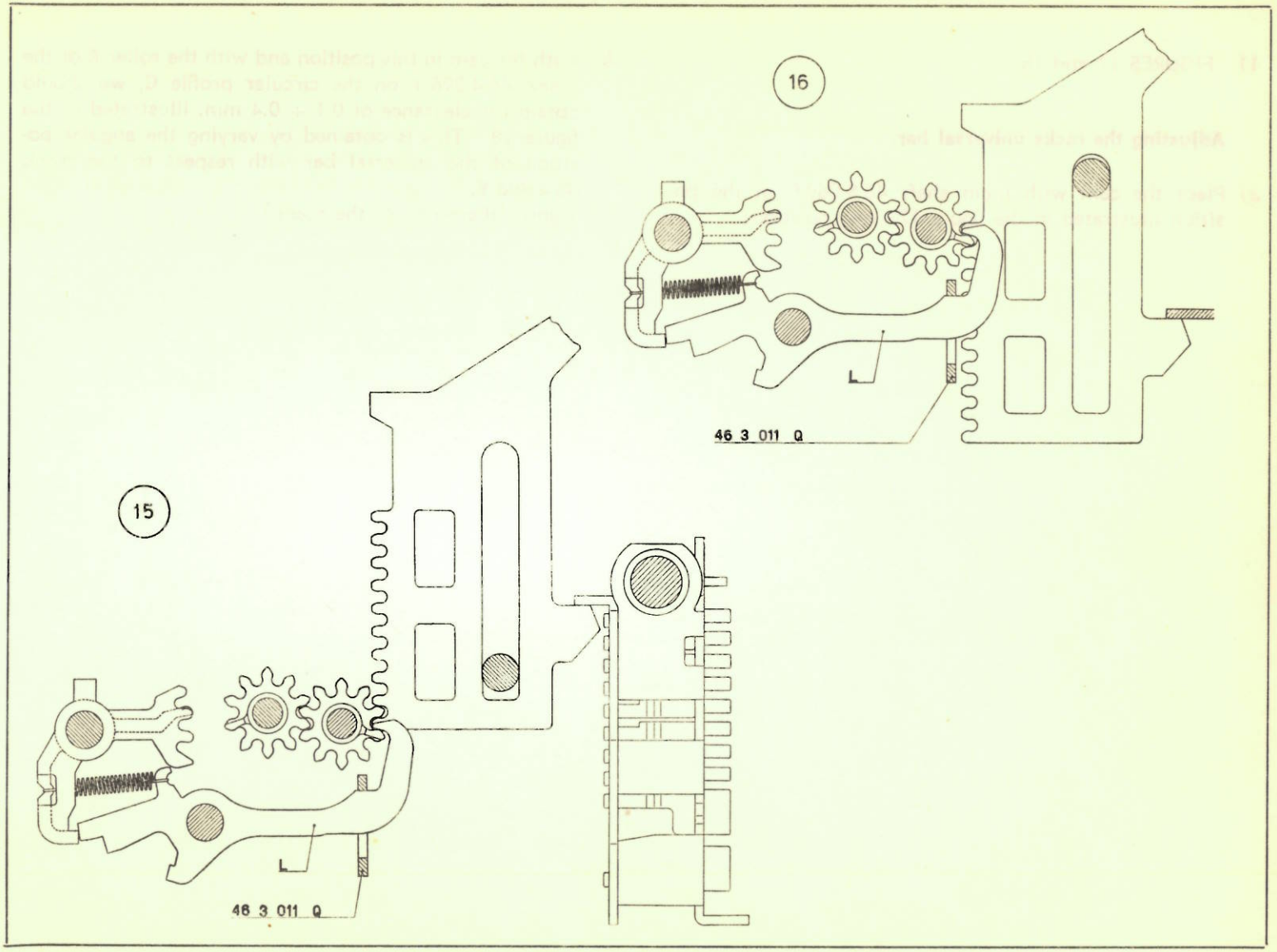
a) Restore the transmission and clear the register.

b) Place the racks to position « 9 ». Engage the register and check that the transfer teeth of the wheels interfere a little with the proper transmission levers **L** (figure 15). This will be seen because of a perceptible lowering of the racks (0.1 mm. maximum).

This condition is obtained by adjusting the vertical position of the comb 46 3 011 Q.

c) Move the racks to zero (figure 16). By engaging the register we should obtain the condition illustrated at *b)*. Check again if necessary the adjustment illustrated at *b)*.

b) Reverse the register by 180° and then clear it. We must obtain the two above conditions.

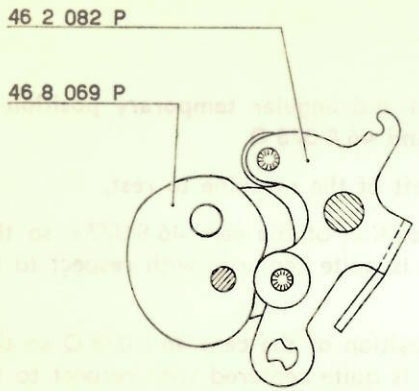

16
46 3 011 Q
15
46 3 011 Q

11 - FIGURES 17 and 18.

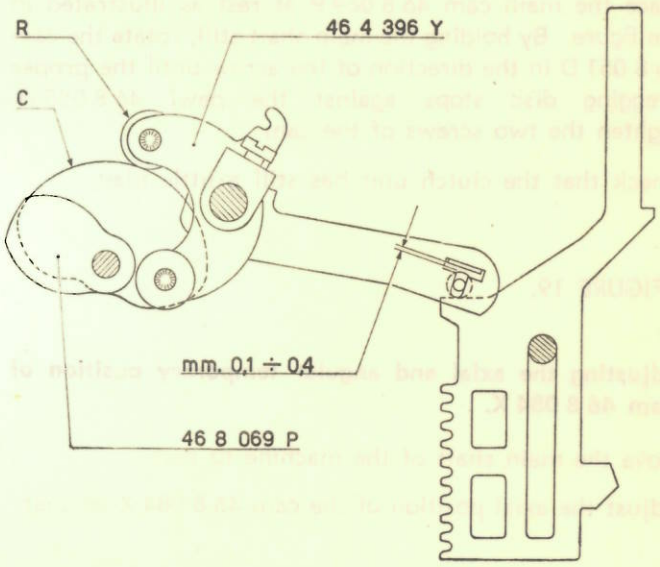
Adjusting the racks universal bar.

a) Place the cam with main shaft 46 8 069 P in the position illustrated in the figure 17 (rest position).

b) With the cam in this position and with the roller **R** of the crank 46 4 396 Y on the circular profile **C**, we should obtain the clearance of 0.1 ÷ 0.4 mm. illustrated in the figure 18. This is obtained by varying the angular position of the universal bar with respect to the crank 46 4 396 Y.
Tighten the screw of the crank.



17



18

12 - FIGURE 19.

Adjusting the axial and angular position of the cam with dragging disc 46 8 051 D.

a) Push toward the inside the main cam 46 8 069 P and move the cam with dragging disc 46 8 051 D to contact slightly the right internal side-plate.
Tighten but not right home one of the screws of the cam.

b) Place the main cam 46 8 069 P at rest as illustrated in the figure. By holding the main shaft still, rotate the cam 46 8 051 D in the direction of the arrow until the proper dragging disc stops against the pawl 46 8 055 H. Tighten the two screws of the cam.

c) Check that the clutch unit has still a little play.

13 - FIGURE 19.

Adjusting the axial and angular temporary position of the cam 46 8 084 X.

a) Move the main shaft of the machine to rest.

b) Adjust the axial position of the cam 46 8 084 X so that:

— its external profile is centered with respect to the lever **K** of the transmission levers unit;

— the cam 46 8 084 X is a little away from the bush set in the right internal side-plate.

c) Adjust temporarily the angular position of this same cam so that one of its screws is placed vertically and the other turned forward.

14 - FIGURE 19.

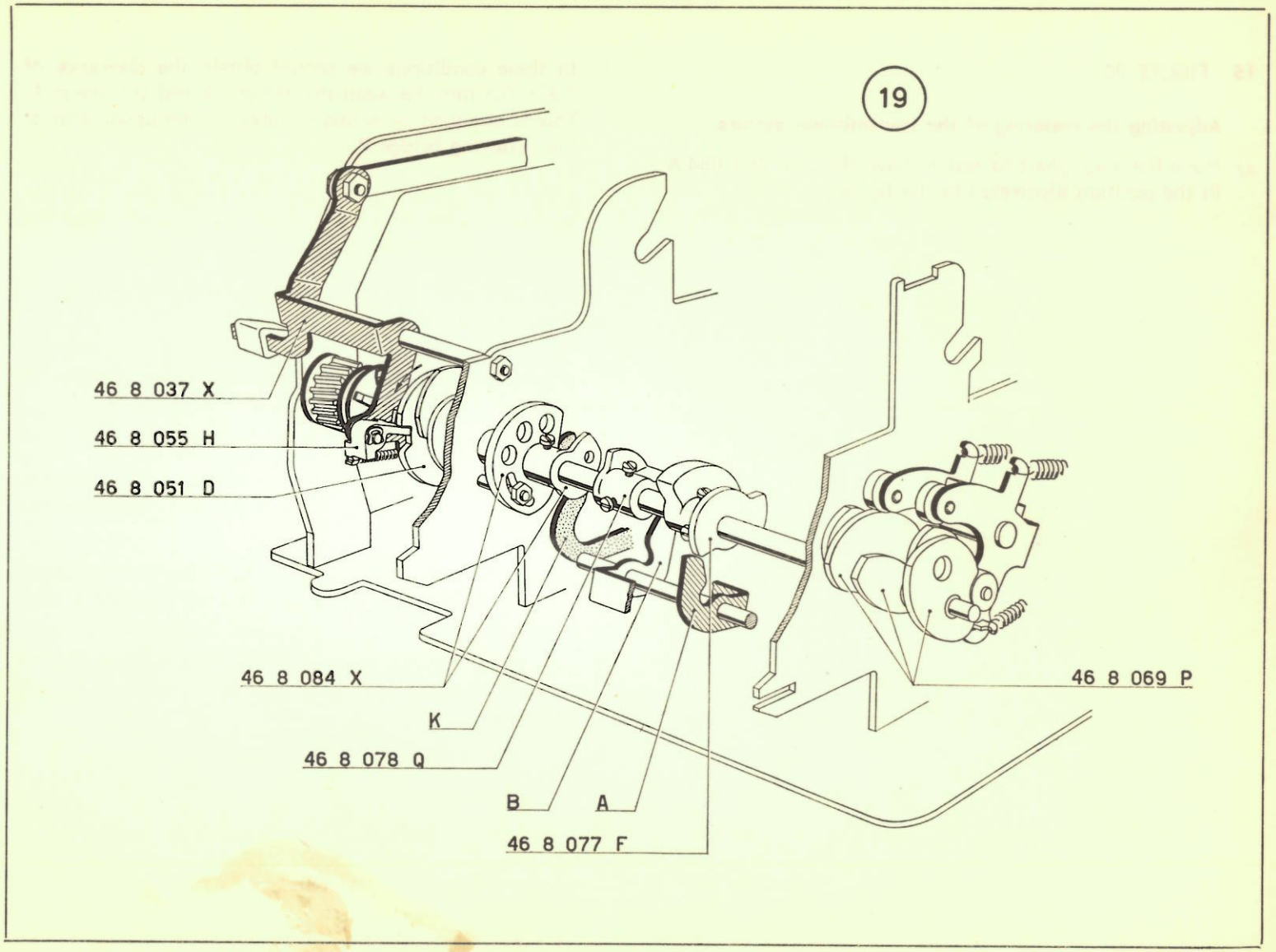
Adjusting the axial and angular temporary position of the cams 46 8 077 F and 46 8 078 Q.

a) Move the main shaft of the machine to rest.

b) Adjust the axial position of the cam 46 8 077 F so that its external profile is quite centered with respect to the bridge **A**.

c) Adjust the axial position of the cam 46 8 078 Q so that its internal profile is quite centered with respect to the bridge **B**.

d) Adjust the angular position of the two cams so that a screw is placed vertically and the other is turned rearward.


19
46 8 037 X
46 8 055 H
46 8 051 D
46 8 084 X
K
46 8 078 Q
B
A
46 8 077 F
46 8 069 P

*

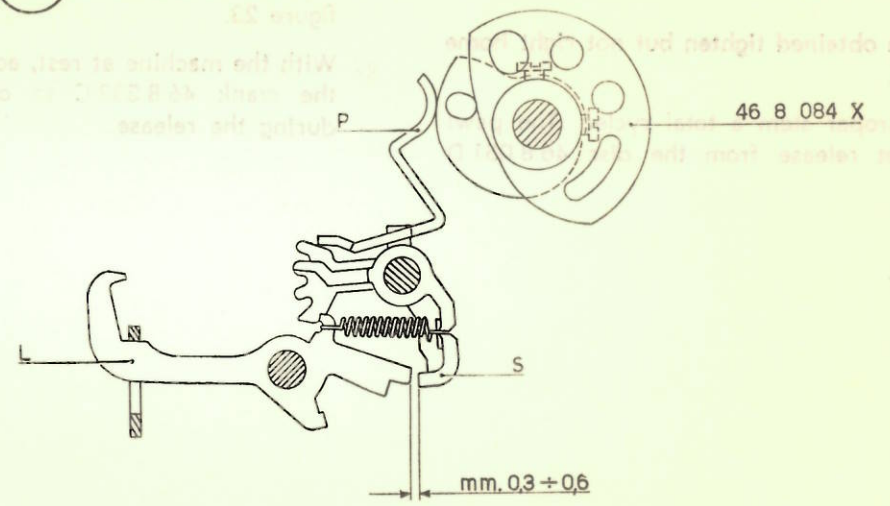
15 - FIGURE 20.

Adjusting the restoring of the transmission sectors.

a) Move the main shaft to rest to have the cam 46 8 084 X in the position illustrated in the figure.

b) In these conditions we should obtain the clearance of 0.3 ÷ 0.6 mm. between the sectors **A** and the levers **L**. This is obtained by acting suitably on the upper arm of the restoring bridge **P**.

20



16 - FIGURES 21 - 22 and 23.

Adjusting the clutch release.

a) Move the main shaft of the machine to rest.

b) Loosen the screw of the crank 46 8 333 C.

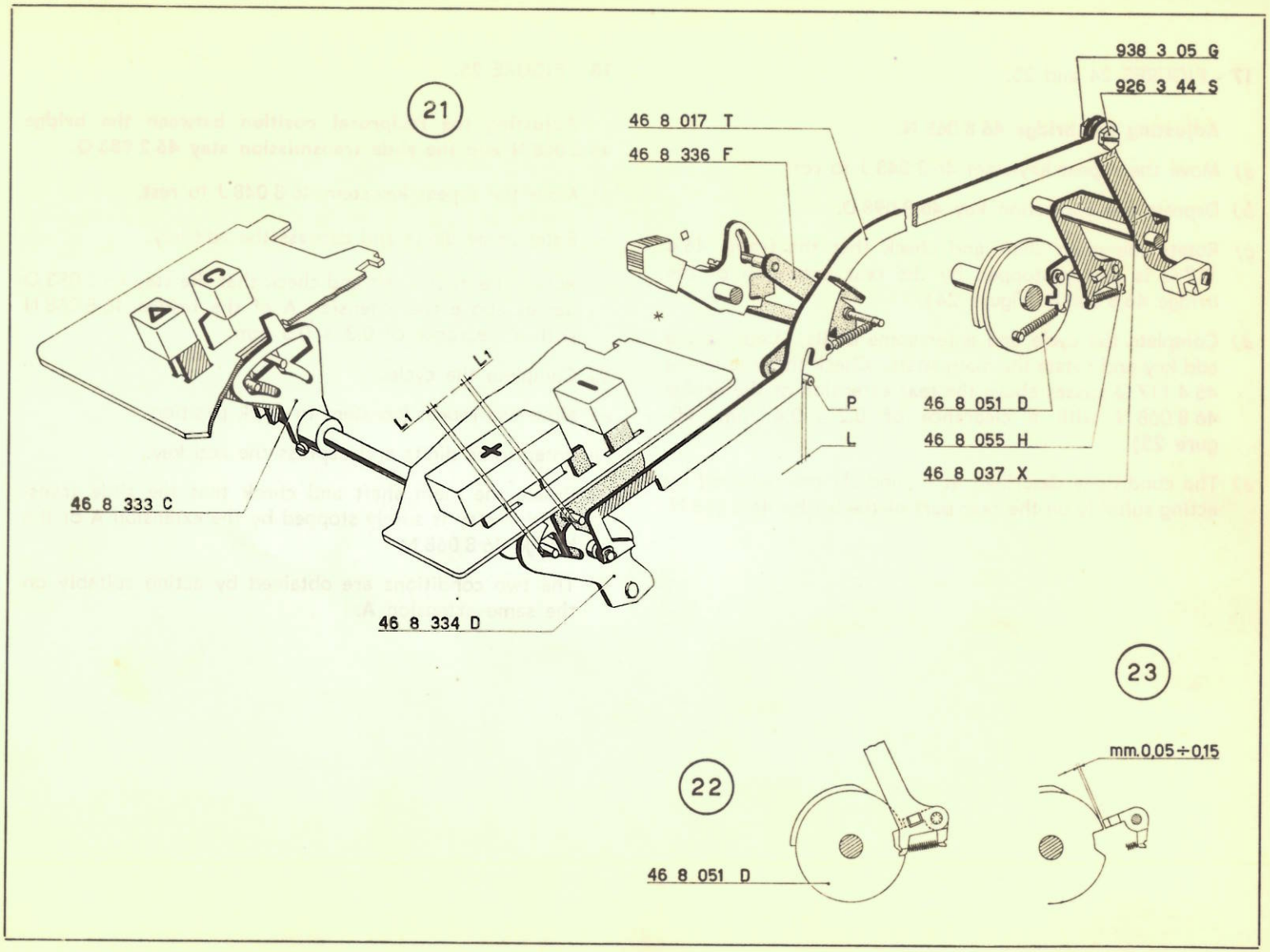
c) Adjusting the coupling between the slider 46 8 017 T and the starting lever 46 8 037 X to obtain a little clearance **L** between the slider and the pivot **P** of the arm 46 8 336 F.
Once this condition obtained tighten but not right home the nut 938 3 05 G.

d) Control with the proper stem a total cycle. The pawl 46 8 055 H will get release from the disc 46 8 051 D (figure 22).
In these conditions we should have the clearance of 0.05 ÷ 0.15 mm. shown in the figure 23.
Check again if necessary the adjustment described at *c)*.

e) Move the main shaft back to rest.

f) Between the slider 46 8 017 T and the pivots of the adding and subtracting keys there must be a clearance L_1 also. This clearance is obtained by acting on the hachured spot of this slider.
Try the release to check the clearance shown in the figure 23.

g) With the machine at rest, adjust the angular position of the crank 46 8 333 C to obtain the same conditions during the release.


21
938 3 05 G
926 3 44 S
46 8 017 T
46 8 336 F
L1
L1
P
L
46 8 051 D
46 8 055 H
46 8 037 X
46 8 333 C
46 8 334 D
23
22
mm.0,05÷0,15
46 8 051 D

17 - FIGURES 24 and 25.

Adjusting the bridge 46 8 068 N.

a) Move the repeat key-stem 46 8 048 J to rest.

b) Depress the correction key 46 8 098 D.

c) Rotate the main shaft and check that the frame 46 4 117 Q is surely stopped by the rear extension of the bridge 46 8 068 N (figure 24).

d) Complete the cycle and enter some digits. Depress the add key and rotate the main shaft. Check that the frame 46 4 117 Q passes above the rear extension of the bridge 46 8 068 N with a clearance of 0.2 ÷ 0.4 mm. (figure 25).

e) The conditions described at *c)* and *d)* are obtained by acting suitably on the rear part of the bridge 46 8 068 N.

18 - FIGURE 25.

Adjusting the reciprocal position between the bridge 46 8 068 N and the slide transmission stay 46 2 083 Q.

a) Move the repeat key-stem 46 8 048 J to rest.

b) Enter some digits and depress the add key.

c) Rotate the main shaft and check that the stay 46 2 083 Q passes above the extension **A** of the bridge 46 8 068 N with a clearance of 0.3 ÷ 0.5 mm.

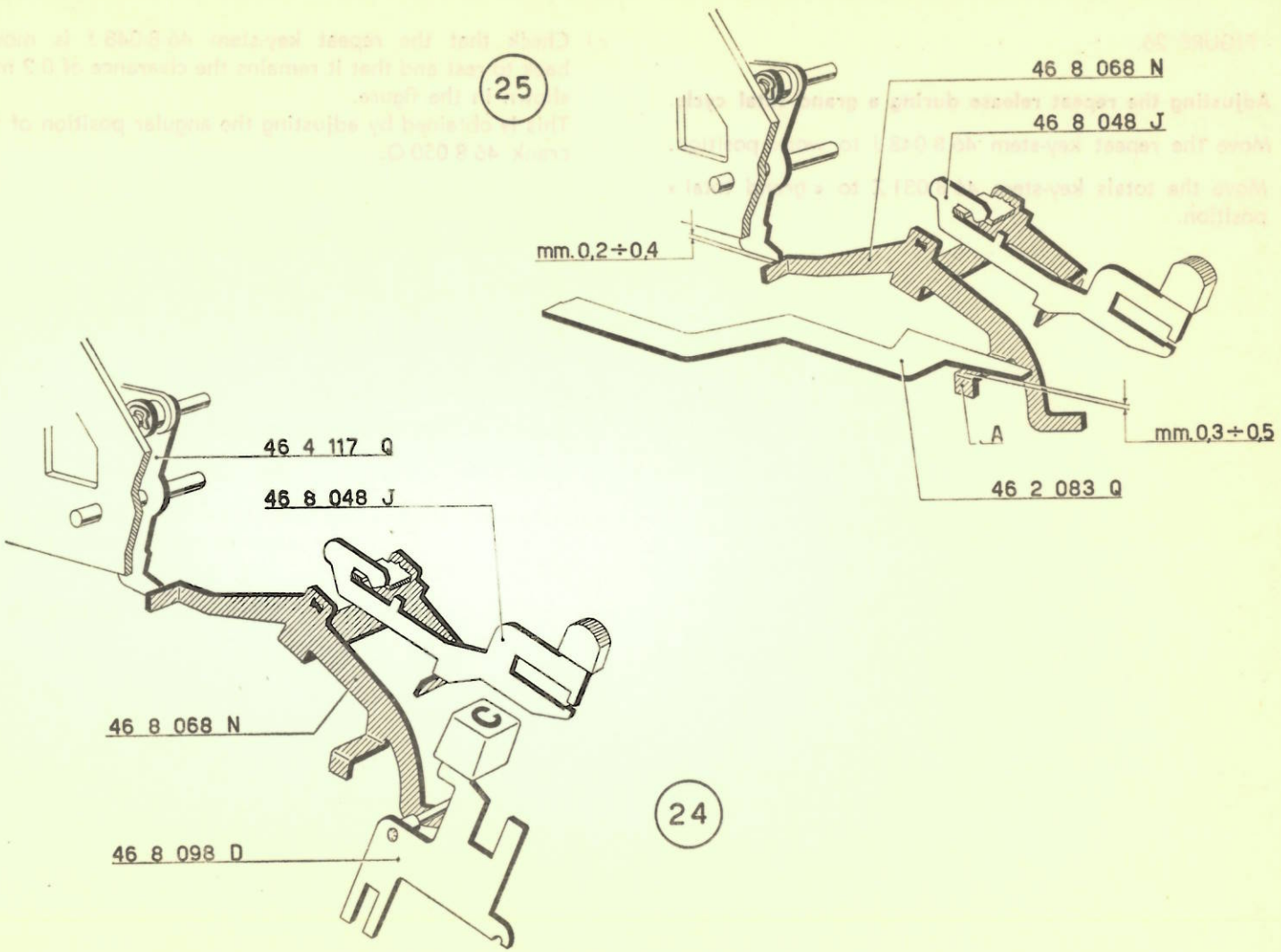
d) Complete the cycle.

e) Move the repeat key-stem to work position.

f) Enter some digits and depress the add key.

g) Rotate the main shaft and check that the slide transmission stay is surely stopped by the extension **A** of the bridge 46 8 068 N.

h) The two conditions are obtained by acting suitably on the same extension **A**.


25
46 8 068 N
46 8 048 J
mm. 0,2 ÷ 0,4
A
mm. 0,3 ÷ 0,5
46 2 083 Q
46 4 117 Q
46 8 048 J
46 8 068 N
46 8 098 D
24

19 - FIGURE 26.

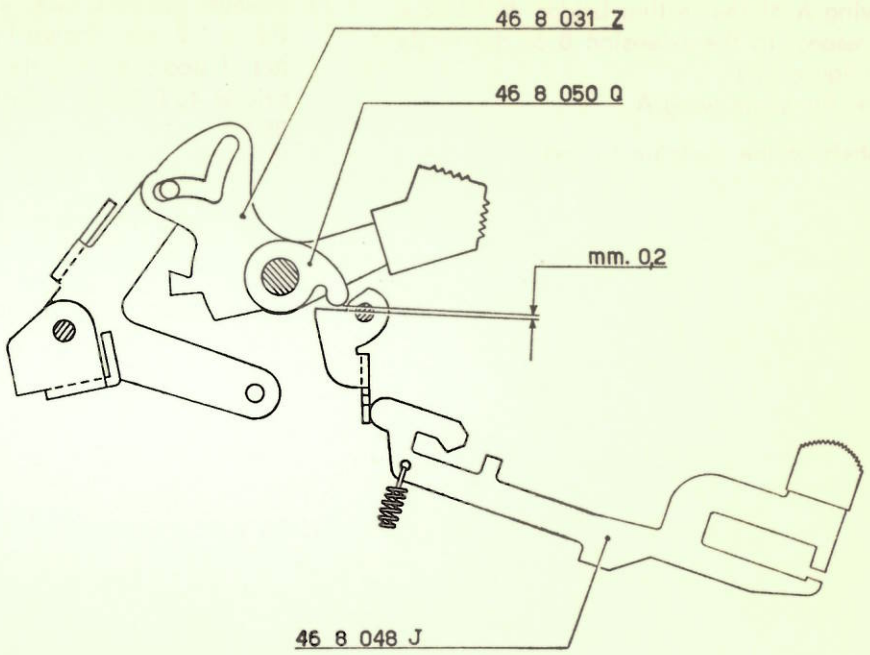
Adjusting the repeat release during a grand total cycle.

a) Move the repeat key-stem 46 8 048 J to work position.

b) Move the totals key-stem 46 8 031 Z to « grand total » position.

c) Check that the repeat key-stem 46 8 048 J is moved back to rest and that it remains the clearance of 0.2 mm. shown in the figure.
This is obtained by adjusting the angular position of the crank 46 8 050 Q.

26



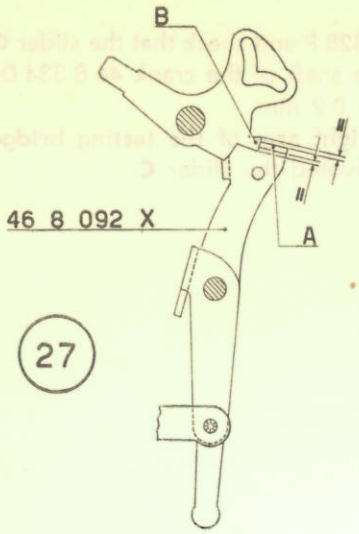
20 - FIGURES 27 - 28 and 29.

Adjusting the rest position of the testing bridge 46 8 092 X.

a) Start « non-add » cycle and rotate the main shaft.
Check that the wing **A** of the testing bridge 46 8 092 X is centered with respect to the extension **B** of the totals stem 46 8 031 Z (figure 27).
Act if necessary of the same wing **A**.

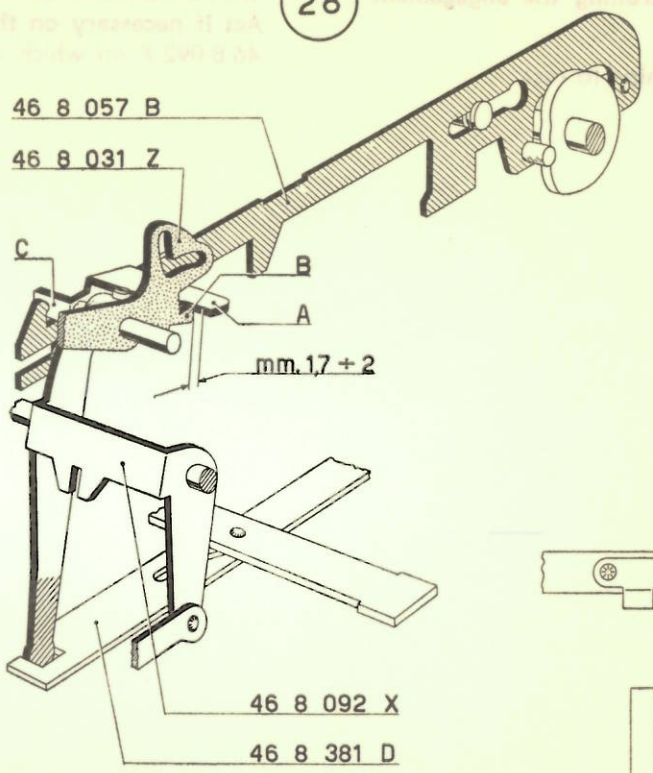
b) Move the main shaft of the machine to rest.
Between the wing **A** of the testing bridge 46 8 092 X and the extension **B** of the totals stem 46 8 031 Z there should be a clearance of 1.7 ÷ 2 mm. (figure 28).
This condition is obtained by acting on the wing **C** of the testing bridge.

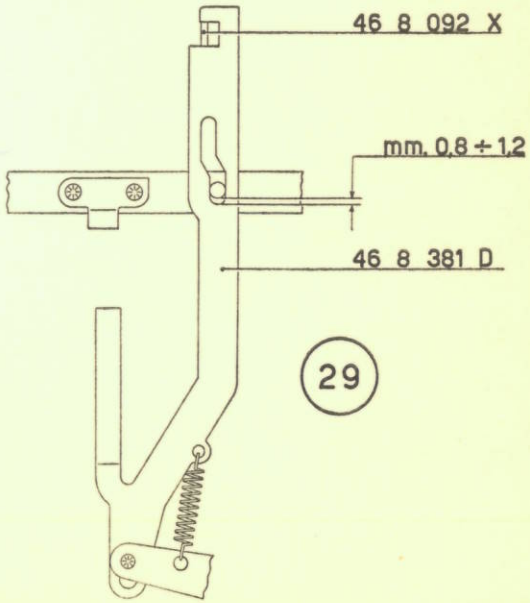
c) Always at rest, we should have the clearance of 0.8 ÷ 1.2 mm. shown in the figure 29.
Act if necessary on the lower extension of the testing bridge 46 8 092 X (identified by hachures in the figure 28).


B
46 8 092 X
A

27

28


46 8 057 B
46 8 031 Z
C
B
A
mm. 1,7 ÷ 2
46 8 092 X
46 8 381 D


46 8 092 X
mm. 0,8 ÷ 1,2
46 8 381 D

29

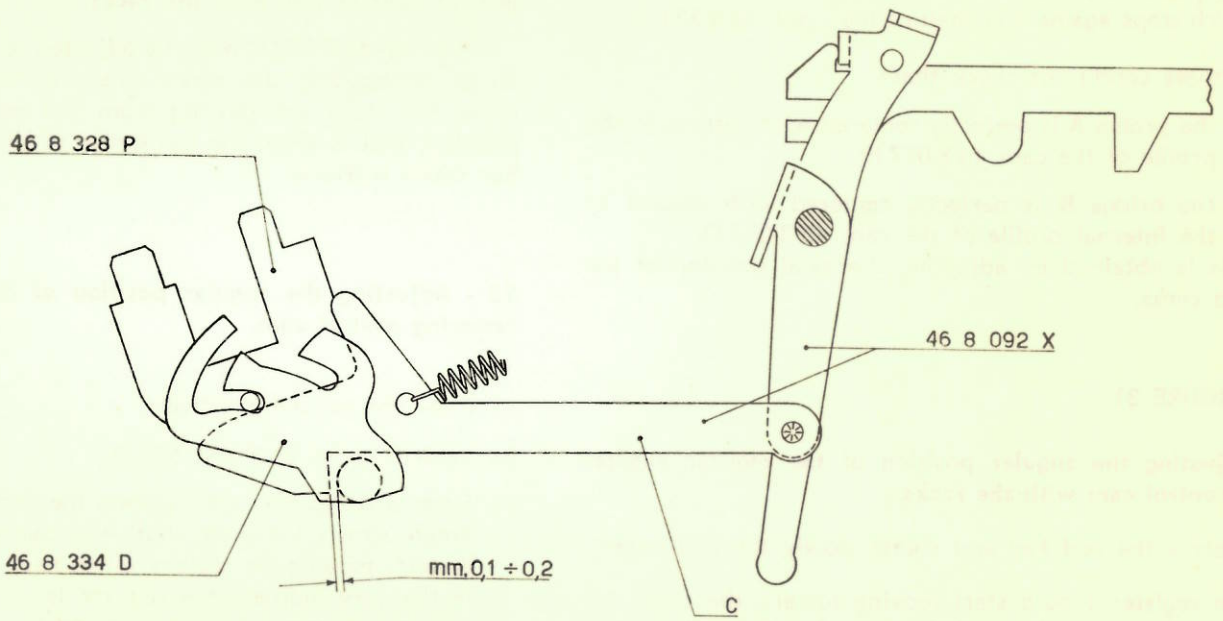
21 - FIGURE 30.

Adjusting the action chain controlling the engagement during calculation.

a) Move the main shaft of the machine to rest.

b) Depress the add key 46 8 328 P and check that the slider **C** passes, with respect to the shaft of the crank 46 8 334 D, with a clearance of 0.1 ÷ 0.2 mm.
Act if necessary on the right arm of the testing bridge 46 8 092 X on which is pivoted the slider **C.**

30



22 - FIGURE 31.

Final adjustment of the register engagement control cam.

a) Move the main shaft to rest.

b) Depress the add key and rotate the main shaft.
The plate 46 8 110 H will be stabilized by the slider **C** which stops against the shaft of the crank 46 8 334 D.

c) In these conditions check that:

— the profile **A** is perfectly centered with respect to the profile of the cam 46 8 077 F;

— the bridge **B** is perfectly centered with respect to the internal profile of the cam 46 8 078 Q.

This is obtained by adjusting the axial position of the two cams.

23 - FIGURE 31.

Adjusting the angular position of the register engagement control cam with the racks.

a) Depress the add key and rotate slowly the main shaft.

b) The register should start moving toward the racks 10° after the universal bar of the racks has finished rotating upward.

This is obtained by adjusting suitably the angular position of the cam 46 8 077 F.

24 - FIGURE 31.

Adjusting the angular position of the register disengagement control cam with the racks.

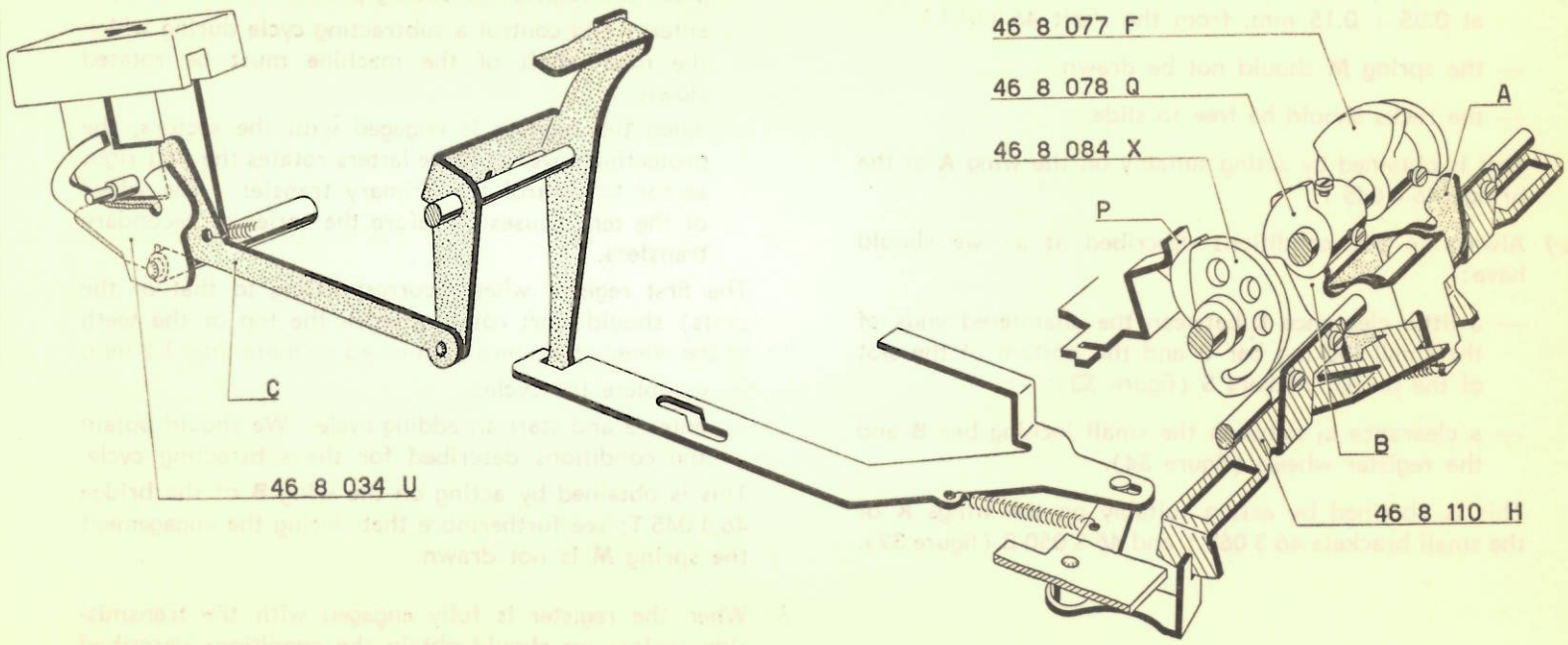
The cam 46 8 078 Q must be adjusted so that the register starts disengaging the racks when, during a calculation cycle, the racks are passing from the position 0 to rest position, that is when the leaf-spring of the racks universal bar starts working.

25 - Adjusting the angular position of the transmissions restoring control cam.

a) Clear the register positively.

b) Enter a series of 9 and add it.

c) Enter a series of 1 and depress the add key.
Rotate slowly the main shaft and check that the bridge **P** starts moving the sectors which have received a signal in the very moment the register is completely engaged with the sectors. This is obtained by adjusting the angular position of the cam 46 8 084 X.


31
46 8 077 F
46 8 078 Q
46 8 084 X
A
P
C
B
46 8 034 U
46 8 110 H

26 - FIGURES 32 - 33 and 34.

Adjusting the register engagement depth with the racks.

a) Make a subtracting cycle and stop the main shaft when the cam 46 8 077 F has reached the position illustrated in the figure 32.

b) In these conditions:

— the two plates 46 8 065 B and 46 8 131 S should be at 0.05 ÷ 0.15 mm. from the shaft 46 3 013 J;

— the spring **M** should not be drawn;

— the racks should be free to slide.

This is obtained by acting suitably on the wing **A** of the bridge 46 4 045 T.

c) Always in the conditions described at *a)* we should have:

— a little clearance **L** between the chamfered ends of the small locking bar **B** and the bottom of the slot of the proper rockers **S** (figure 33);

— a clearance L_1 between the small locking bar **B** and the register wheels (figure 34).

This is obtained by acting suitably on the wings **K** of the small brackets 46 3 062 T and 46 3 050 B (figure 32).

27 - Adjusting the register engagement depth with the transmission sectors.

a) The engagement of the register with the transmission sectors is controlled by the cam 46 8 078 Q which works on the secondo bridge 46 4 054 T (not dotted in the figure).
To check the engagement depth between register and transmission sectors do the following test:

— place the register in adding position and clear it;

— enter 1 and control a subtracting cycle during which the main shaft of the machine must be rotated slowly;

— when the register is engaged with the sectors, the protecting cover of these latters rotates the first right sector to control the primary transfer. The wheel of the tens causes therefore the series of secondary transfers.

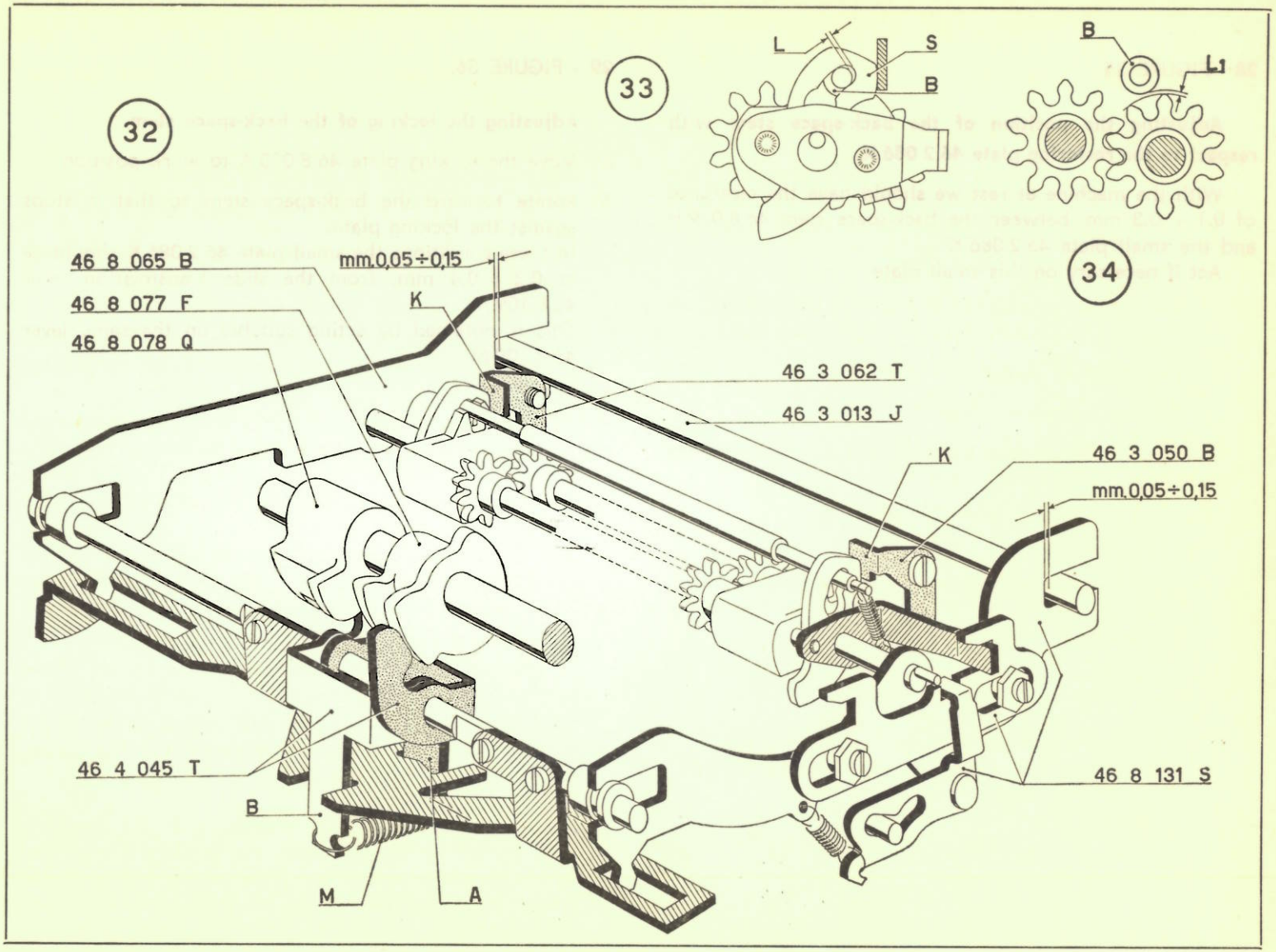
The first register wheel (corresponding to that of the units) should start rotating when the top of the teeth of the wheel of the tens has moved no more than 1.2 mm.

— complete the cycle;

— enter 2 and start an adding cycle. We should obtain the conditions described for the subtracting cycle.

This is obtained by acting on the wing **B** of the bridge 46 4 045 T; see furthermore that during the engagement the spring **M** is not drawn.

b) When the register is fully engaged with the transmission sectors we should obtain the conditions described at *c)* (par. 26) which are obtained by acting on the lower wings of the small brackets 46 3 062 T and 46 3 050 B.


32
33
34
L
S
B
B
L1
46 8 065 B
46 8 077 F
46 8 078 Q
mm.0,05÷0,15
K
46 3 062 T
46 3 013 J
K
46 3 050 B
mm.0,05÷0,15
46 4 045 T
B
M
A
46 8 131 S

28 - FIGURE 35.

Adjusting the position of the back-space stem with respect to the restoring plate 46 2 086 K.

With the machine at rest we should have the clearance of 0.1 ÷ 0.3 mm. between the back-space stem 46 8 039 H and the small plate 46 2 086 K.

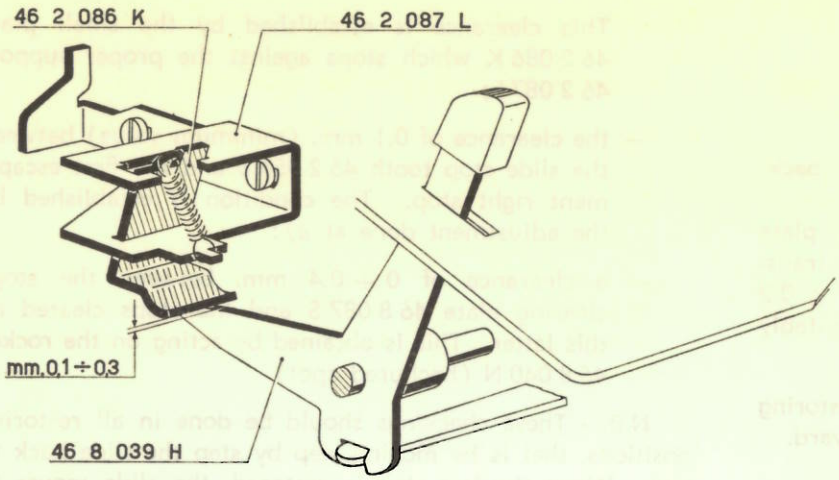
Act if necessary on this small plate.

29 - FIGURE 36.

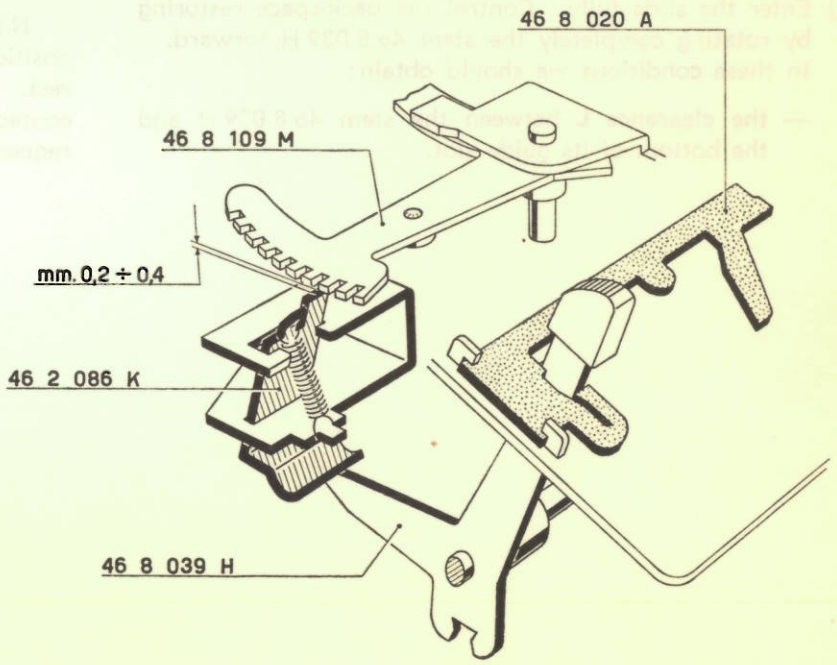
Adjusting the locking of the back-space stem.

a) Move the locking plate 46 8 020 A to work position.

b) Rotate forward the back-space stem so that it stops against the locking plate.
In these conditions the small plate 46 2 086 K should be at 0.2 ÷ 0.4 mm. from the slide transmission lever 46 8 109 M.
This is obtained by acting suitably on the same lever 46 8 109 M.


46 2 086 K
46 2 087 L
mm.0,1÷0,3
46 8 039 H

35


46 8 020 A
46 8 109 M
mm.0,2÷0,4
46 2 086 K
46 8 039 H

36

30 - FIGURES 37 and 38.

Adjusting the back-space.

a) Rotate slowly in the direction of the arrow the back-space key-stem 46 8 039 H.
Check that the upper extension of the small plate 46 2 086 K enters into the openings of the slide transmission lever 46 8 109 M with a clearance of 0.1 ÷ 0.2 mm. (figure 37). This is obtained by moving suitably the support 46 2 087 L.

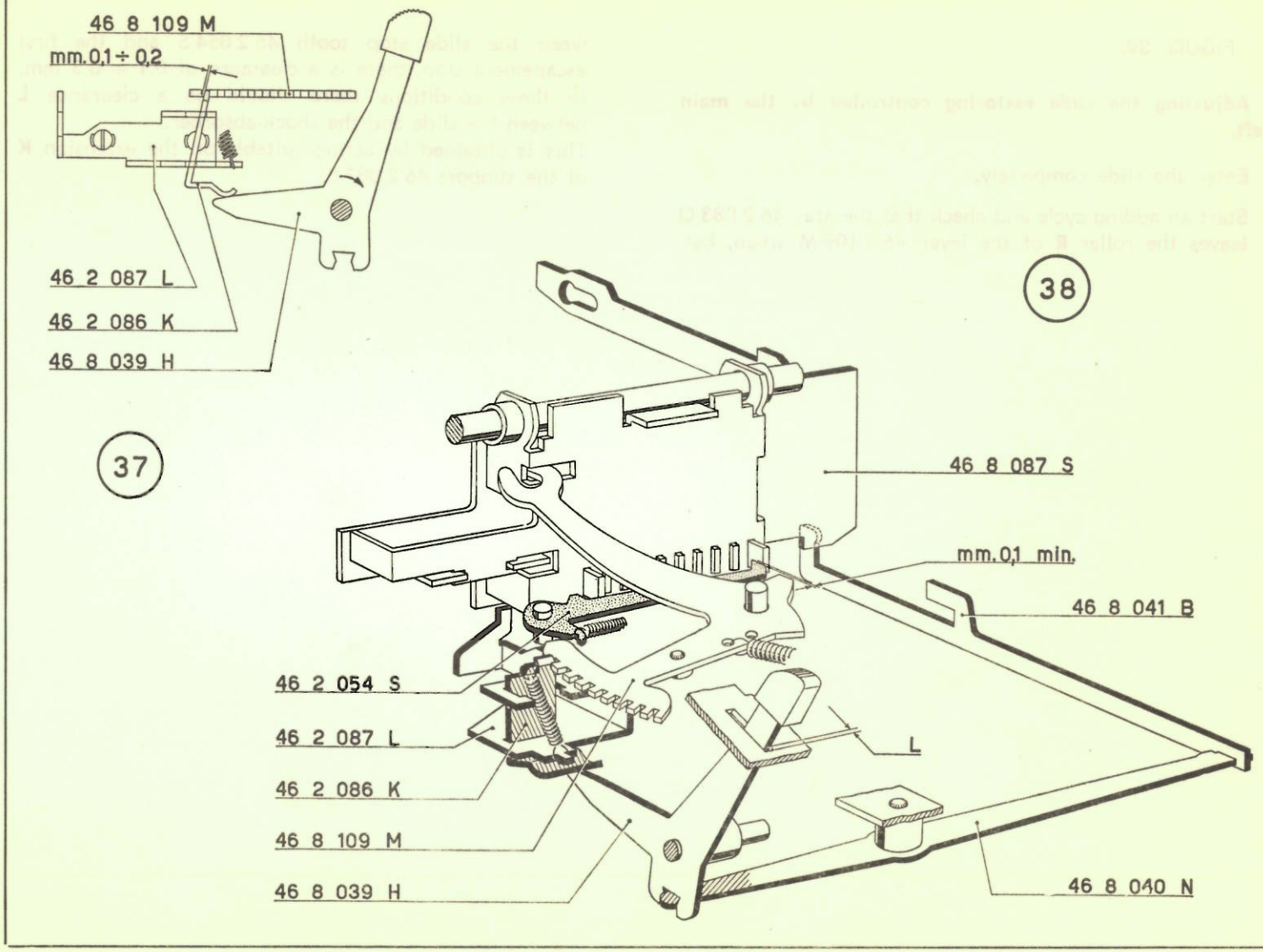
b) Enter the slide fully. Control the back-space restoring by rotating completely the stem 46 8 039 H forward.
In these conditions we should obtain:

— the clearance **L** between the stem 46 8 039 H and the bottom of its guide slot.
This clearance is established by the small plate 46 2 086 K which stops against the proper support 46 2 087 L;

— the clearance of 0.1 mm. (minimum value) between the slide stop tooth 46 2 054 S and the first escapement right stop. The condition is established by the adjustment done at *a)*:

— a clearance of 0 ÷ 0.4 mm. between the stops clearing plate 46 8 087 S and the stops cleared by this latter. This is obtained by acting on the rocker 46 8 040 N (hachured spot).

N.B. - These checkings should be done in all restoring positions, that is by moving step by step the slide back to rest. When the last step is restored, the slide moves to contact its shock-absorber (washer + rubber pad). If the requested clearance is not obtained replace the rubber pad.

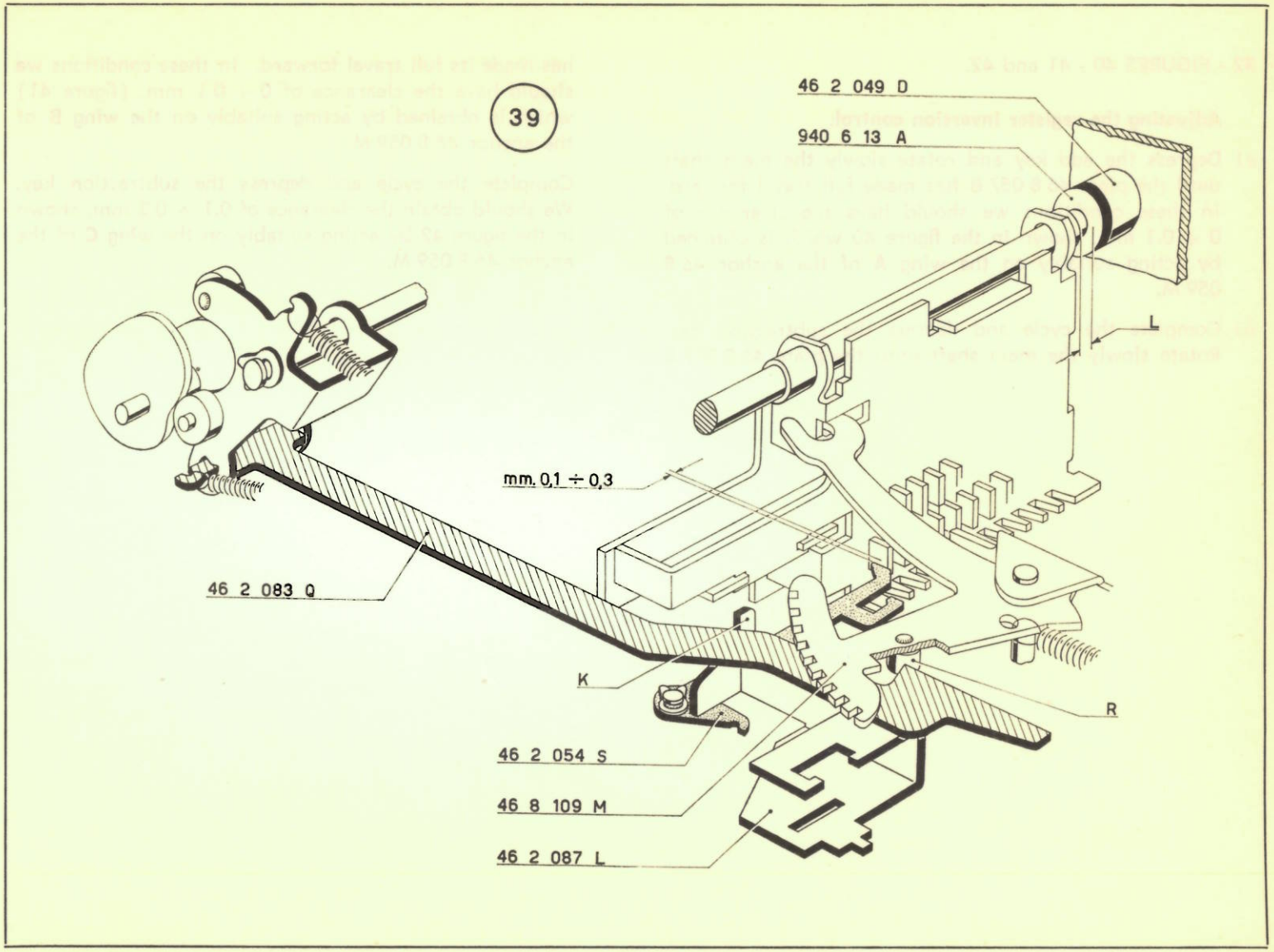

46 8 109 M
mm.0,1 ÷ 0,2
46 2 087 L
46 2 086 K
46 8 039 H
37
38
46 8 087 S
mm.0,1 min.
46 8 041 B
46 2 054 S
46 2 087 L
46 2 086 K
46 8 109 M
46 8 039 H
L
46 8 040 N

31 - FIGURE 39.

Adjusting the slide restoring controlled by the main shaft.

a) Enter the slide completely.

b) Start an adding cycle and check that the stay 46 2 083 Q leaves the roller **R** of the lever 46 8 109 M when, between the slide stop tooth 46 2 054 S and the first escapement stop, there is a clearance of 0.1 ÷ 0.3 mm. In these conditions there should be a clearance **L** between the slide and the shock-absorber.
This is obtained by acting suitably on the extension **K** of the support 46 2 087 L.


39
46 2 049 D
940 6 13 A
L
mm. 0,1 ÷ 0,3
46 2 083 Q
K
R
46 2 054 S
46 8 109 M
46 2 087 L

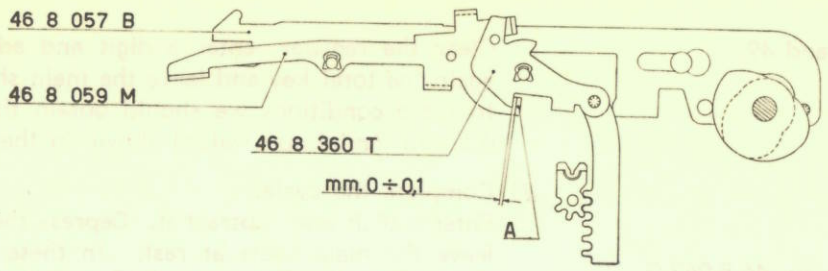
32 - FIGURES 40 - 41 and 42.

Adjusting the register inversion control.

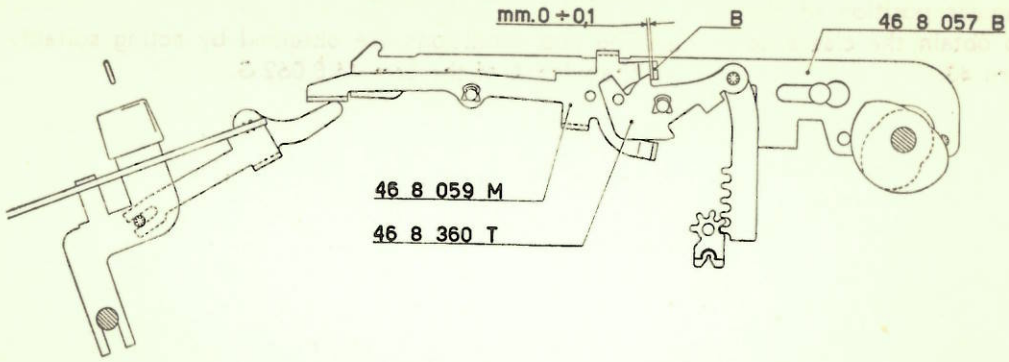
a) Depress the add key and rotate slowly the main shaft until the plate 46 8 057 B has made full travel forward. In these conditions we should have the clearance of 0 ÷ 0.1 mm. shown in the figure 40 which is obtained by acting suitably on the wing **A** of the anchor 46 8 059 M.

b) Complete the cycle and depress the subtraction key. Rotate slowly the main shaft until the plate 46 8 057 B has made its full travel forward. In these conditions we should have the clearance of 0 ÷ 0.1 mm. (figure 41) which is obtained by acting suitably on the wing **B** of the anchor 46 8 059 M.

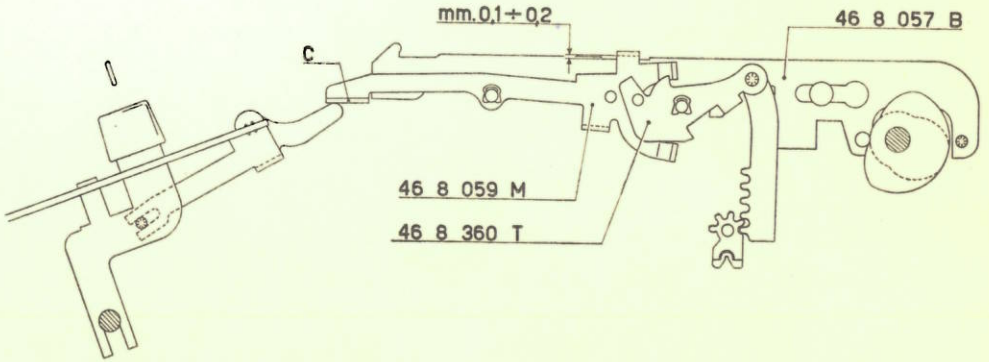
c) Complete the cycle and depress the subtraction key. We should obtain the clearance of 0.1 ÷ 0.2 mm. shown in the figure 42 by acting suitably on the wing **C** of the anchor 46 8 059 M.


46 8 057 B
46 8 059 M
46 8 360 T
mm. 0 ÷ 0,1
A

40


mm. 0 ÷ 0,1
B
46 8 057 B
46 8 059 M
46 8 360 T

41


mm. 0,1 ÷ 0,2
C
46 8 057 B
46 8 059 M
46 8 360 T

42

33 - FIGURES 43 - 44 - 45 - 46 - 47 - 48 and 49.

Adjusting the balance mechanism.

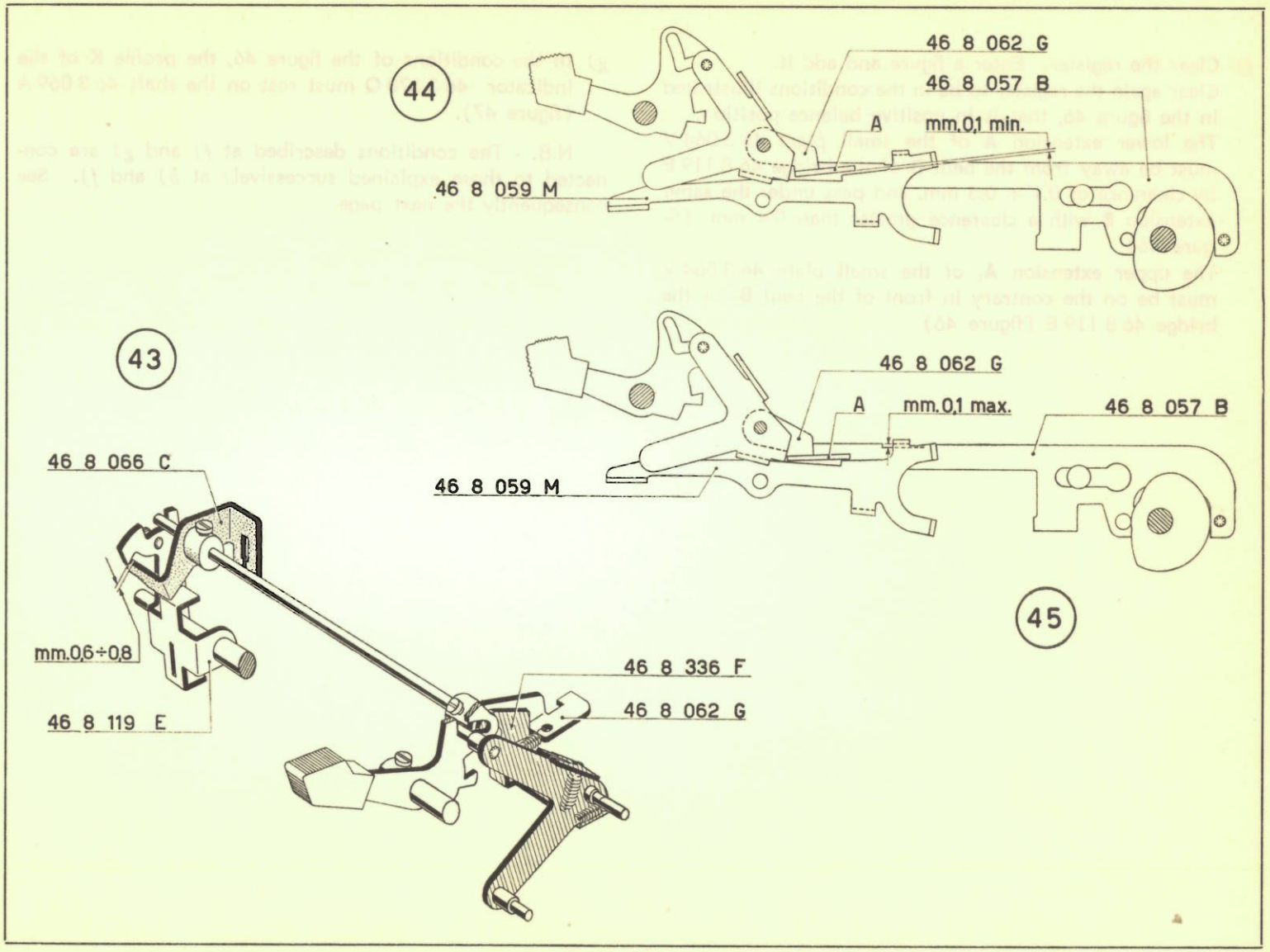
a) Move the machine to rest.

b) Check that the subtraction right arm 46 8 062 G is resting on the bridge 46 8 336 D.
In these conditions adjust the angular position of the subtraction left arm 46 8 066 C to obtain the clearance of 0.8 ÷ 1 mm. shown in the figure 43.

c) Clear the register; enter a digit and add it. Depress again the total key and leave the main shaft at rest.
In these conditions we should obtain the clearance of 0.1 mm. (minimum value) shown in the figure 44.

d) Complete the cycle.
Enter a digit and subtract it. Depress the total key and leave the main shaft at rest. In these conditions we should have the clearance of 0.1 mm. (maximum value) shown in the figure 45.

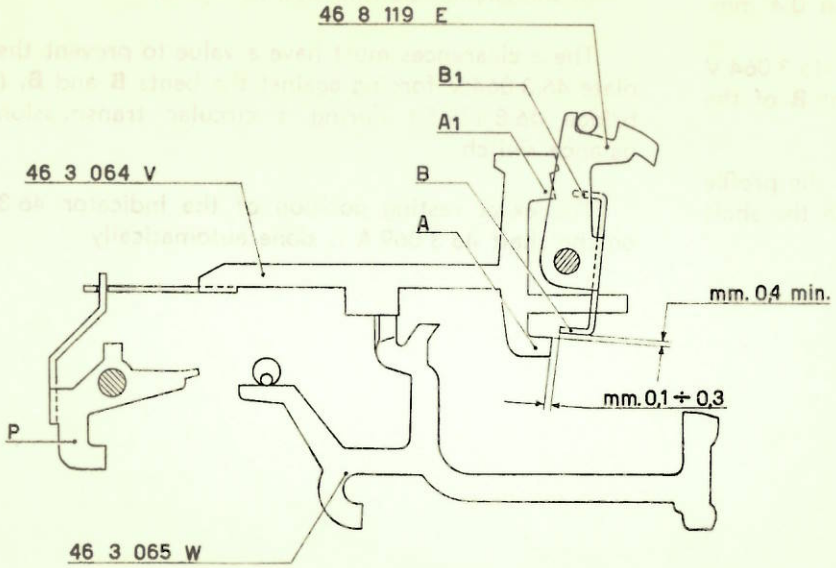
e) The two conditions are obtained by acting suitably on the wing **A** of the arm 46 8 062 G.


44
46 8 062 G
46 8 057 B
A
mm.0,1 min.
46 8 059 M
43
46 8 062 G
A
mm.0,1 max.
46 8 057 B
46 8 059 M
45
46 8 066 C
mm.0,6÷0,8
46 8 119 E
46 8 336 F
46 8 062 G

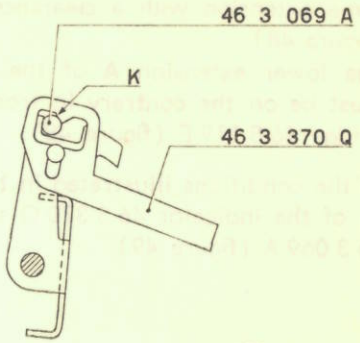
f) Clear the register. Enter a figure and add it.
Clear again the register to be in the conditions illustrated in the figure 46, that is in positive balance position.
The lower extension **A** of the small plate 46 3 064 V must be away from the bent **B** of the bridge 46 8 119 E by clearance of 0.1 ÷ 0.3 mm. and pass under the same extension **B** with a clearance greater than 0.4 mm. (figure 46).
The upper extension $\mathbf{A}_1$ of the small plate 46 3 064 V must be on the contrary in front of the bent $\mathbf{B}_1$ of the bridge 46 8 119 E (figure 46).

g) In the conditions of the figure 46, the profile **K** of the indicator 46 3 370 Q must rest on the shaft 46 3 069 A (figure 47).

N.B. - The conditions described at *f)* and *g)* are connected to those explained successively at *h)* and *f)*. See consequently the next page.


46 8 119 E
B1
A1
46 3 064 V
B
A
mm. 0,4 min.
mm. 0,1 ÷ 0,3
P
46 3 065 W

46


46 3 069 A
K
46 3 370 Q

47

b) Enter a digit and subtract it. Clear the register to be in the conditions illustrated in the figure 48, that is in credit balance position.
The upper extension $\mathbf{A_1}$ of the small plate 46 3 064 V must be away from the bent $\mathbf{B_1}$ of the bridge 46 8 119 E by a clearance of 0.1 ÷ 0.3 mm. and pass above the same extension with a clearance greater than 0.4 mm. (figure 48).
The lower extension **A** of the small plate 46 3 064 V must be on the contrary in front of the bent **B** of the bridge 46 8 119 E (figure 48).

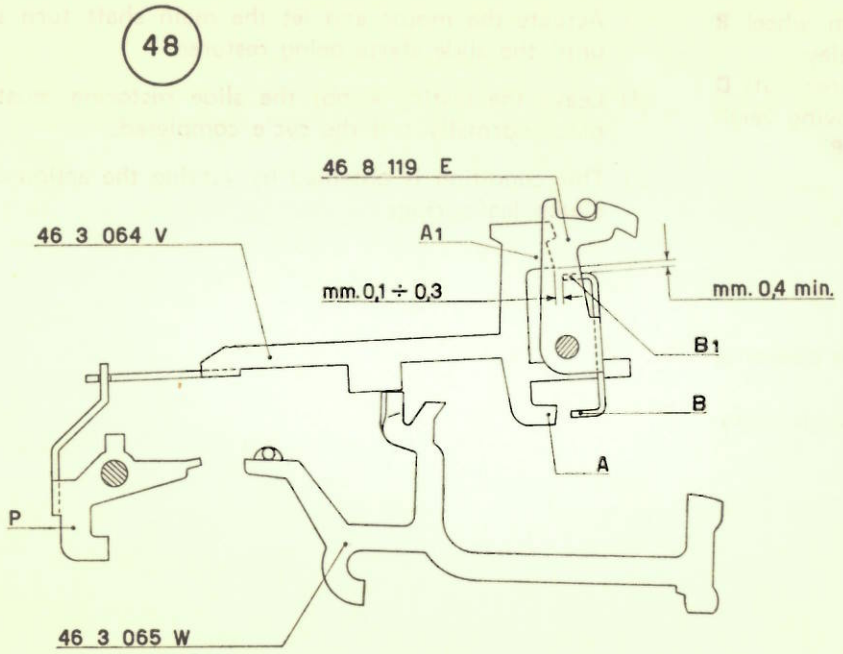
i) In the conditions illustrated in the figure 47, the profile $\mathbf{K_1}$ of the indicator 46 3 370 Q should rest on the shaft 46 3 069 A (figure 49).

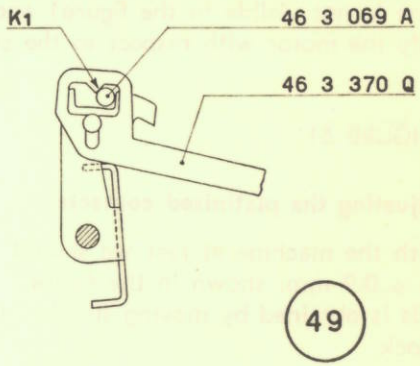
N.B. - The clearances of 0.1 ÷ 0.3 mm. shown in the figures 46 and 48 are obtained by acting on the bents **B** and $\mathbf{B_1}$ of the bridge 46 8 119 E.

The clearances greater than 0.4 mm. shown in the figures 46 and 48 are obtained by acting on the upper bent of the circular transmission bridge **P.**

These clearances must have a value to prevent the small plate 46 3 064 V forcing against the bents **B** and $\mathbf{B_1}$ (of the bridge 46 8 119 E) during a circular transmission with balance switch.

The exact resting position of the indicator 46 3 370 Q on the shaft 46 3 069 A is done automatically.


48
46 8 119 E
46 3 064 V
A1
mm. 0,1 ÷ 0,3
mm. 0,4 min.
B1
B
A
P
46 3 065 W


K1
46 3 069 A
46 3 370 Q
49

34 - FIGURE 50.

Adjusting the engagement of the motor shaft worm with the main shaft worm wheel.

a) Set right home the motor to the base of the machine.

b) The engagement between worm **V** and worm wheel **R** must be complete and with a minimum of play.
This condition is obtained by loosening the three nuts **D** (one is not visible in the figure) and by moving vertically the motor with respect to the support **P**.

35 - FIGURE 51.

Adjusting the platinized contacts.

With the machine at rest we should have the clearance of 0.6 ÷ 0.9 mm. shown in the figure.
This is obtained by moving suitably the pin-plugs carrying block.

36 - Adjusting the clutch.

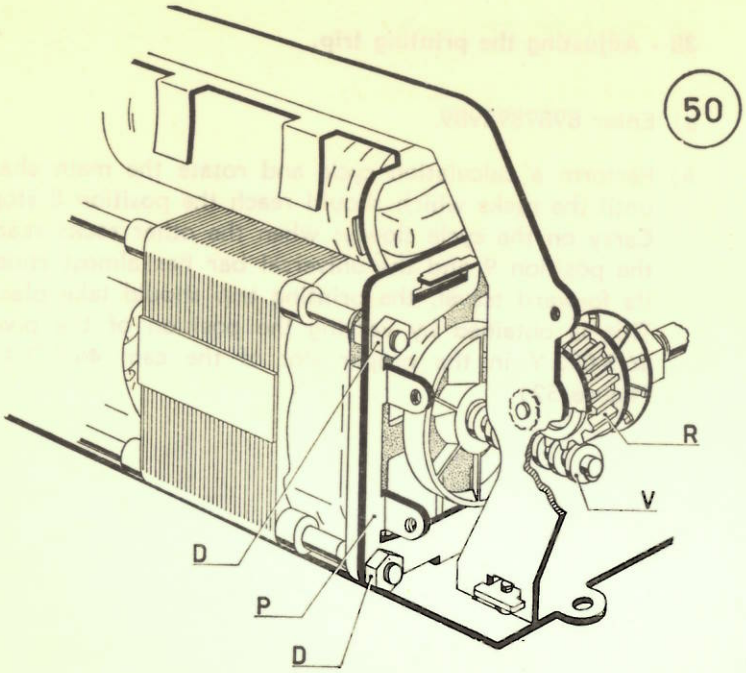
a) Enter the slide completely.

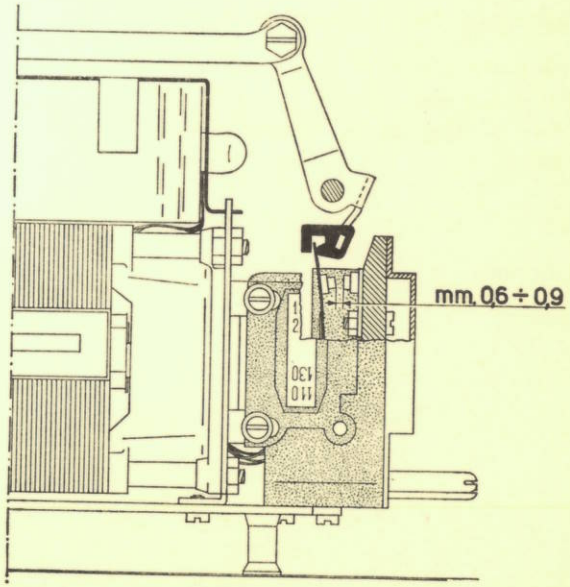
b) Hold firmly the testing knob 7135789D assembled on the main shaft.

c) Actuate the motor and let the main shaft turn slowly until the slide starts being restored.

d) Leave the testing knob; the slide restoring must take place normally and the cycle completed.

e) This condition is obtained by varying the action of the clutch leaf-springs.


50
R
V
D
P
D


51
mm. 0,6 ÷ 0,9

*

37 - FIGURE 52.

Adjusting the printing control.

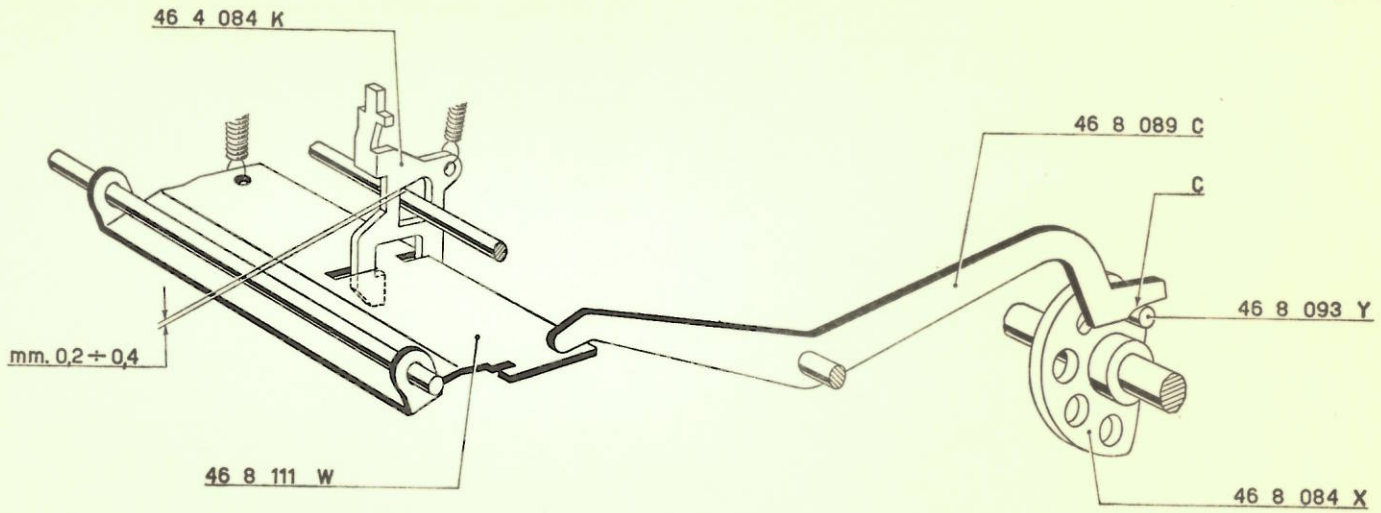
a) Rotate the main shaft of the machine until the pivot 46 8 093 Y has moved onto the circular profile **C** of the printing control lever 46 8 089 C.

b) In these conditions we should have the clearance of 0.2 ÷ 0.4 mm. shown in the figure. Act if necessary on the lever 46 8 089 C.

38 - Adjusting the printing trip.

a) Enter 8989898989.

b) Perform a calculation cycle and rotate the main shaft until the racks which should reach the position 8 stop. Carry on the cycle slowly; when the other racks reach the position 9 and the universal bar has almost ended its forward travel, the printing trip should take place. This is obtained by varying the position of the pivot 46 8 093 Y in the proper slot of the cam 46 8 084 X (figure 52).



52

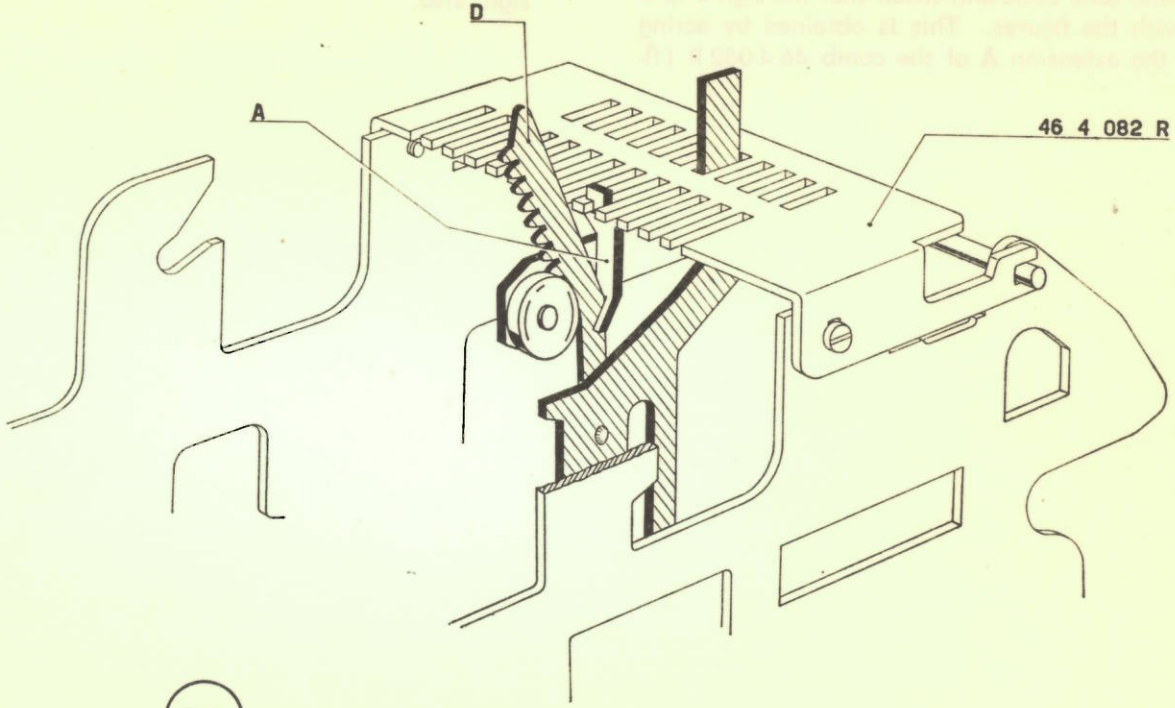
39 - FIGURE 53.

Adjusting the printing.

a) By moving vertically the comb 46 4 082 R find a suitable position to obtain an even printing of the figures on the tape.
Once the correct position is reached tighten the screws setting the comb.

b) Make all the racks raising to 9 and perform the printing trip. In these conditions there must be no play between the small printing racks **D** and the wheel of the proper sliders.
This is obtained by acting suitably on the wings **A** of the printing sliders with the appropriate grip.

c) Align the printing by acting on the guide slots of the comb 46 4 082 R with the appropriate grip.



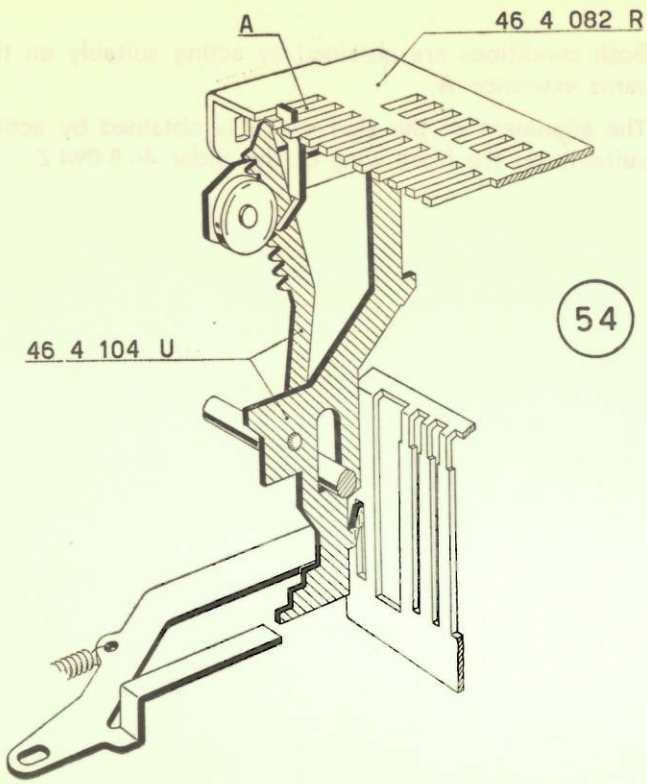
53

40 - FIGURES 54 and 55.

Adjusting the special signs.

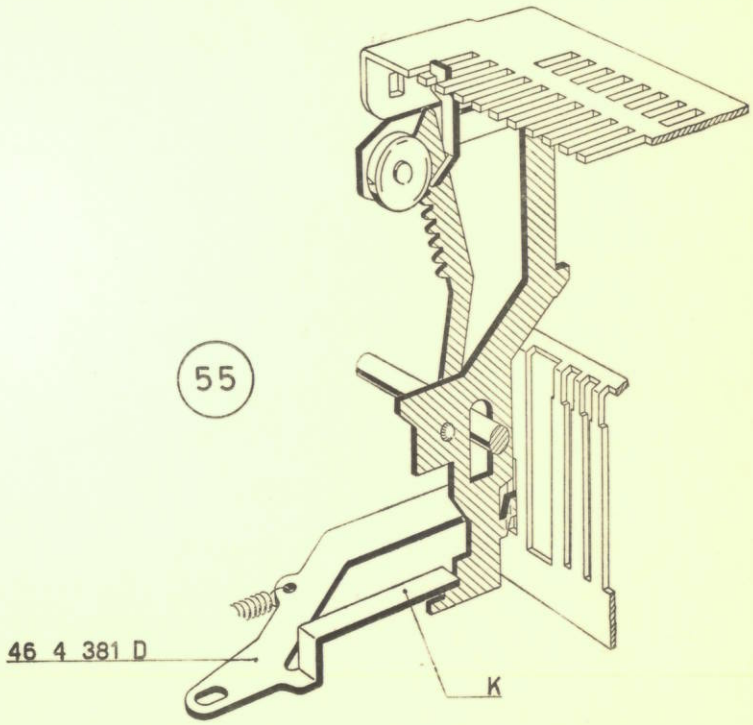
a) Control a grand total cycle and check that the sign « ✻ » is aligned with the figures. This is obtained by acting suitably on the extension **A** of the comb 46 4 082 R (figure 54).

b) Control a non-add cycle and check that the sign « < » is aligned with the figures. This is obtained by acting suitably on the extension **K** of the plate 46 8 381 D. (figure 55). In this way we shall align the sub-total sign also.



54

55



41 - FIGURES 56 and 57.

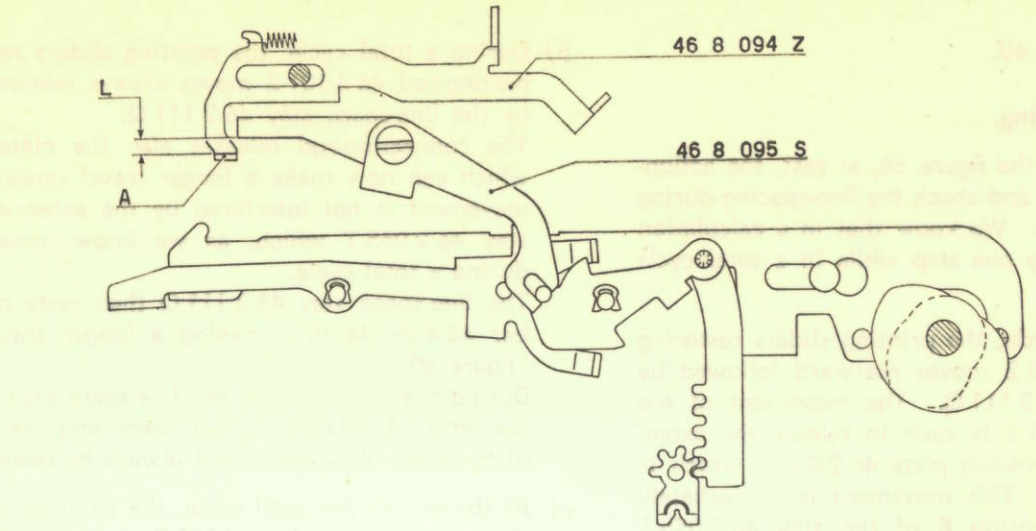
Adjusting the printing of the sign « — ».

a) In a subtracting cycle, the extension **A** of the slider 46 8 094 Z should pass with a clearance **L** with respect to the arm 46 8 095 S (figure 56).

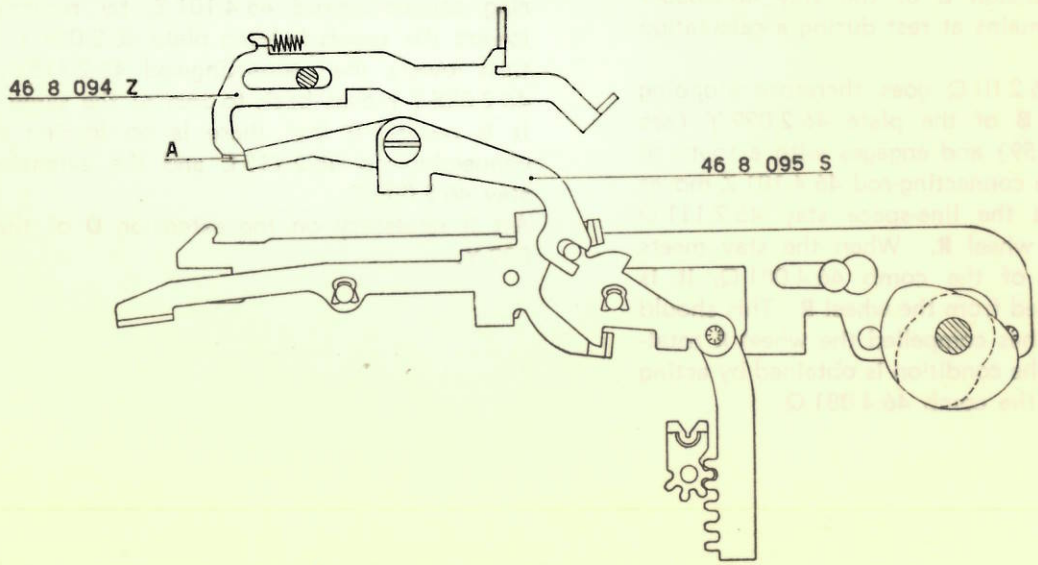
b) In an adding, cycle the extension **A** of the slider 46 8 094 Z should be on the contrary stopped by the arm 46 8 095 S (figure 57).

c) Both conditions are obtained by acting suitably on the same extension **A**.

d) The alignment of the sign « — » is obtained by acting suitably on the front wing of the slider 46 8 094 Z.



56



57

42 - FIGURES 58 - 59 and 60.

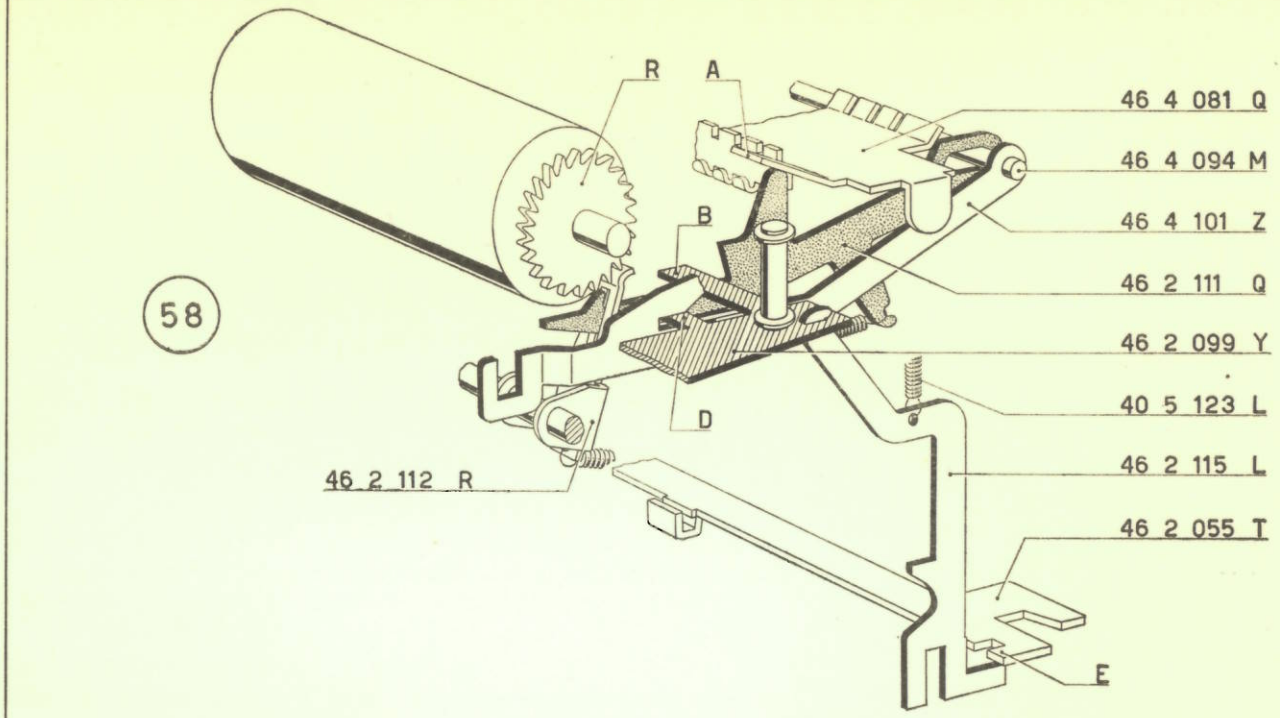
Adjusting the line-spacing.

We have illustrated in the figure 58, at rest, the action-mechanisms which control and check the line-spacing during calculation and total cycle. We know that in a calculation cycle the platen rotates by one step while in a total cycle it rotates by two steps.

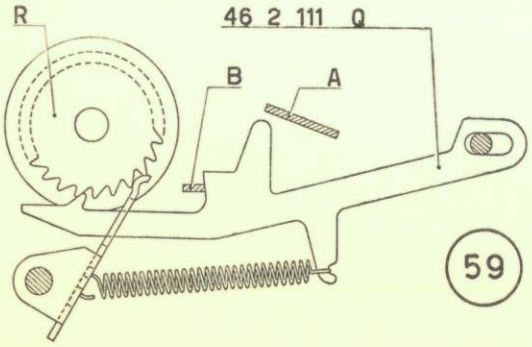
a) During a calculation cycle, the printing sliders restoring connecting-rod 46 4 101 Z moves rearward followed by the line-space stay 46 2 111 Q. The movement of the connecting-rod 46 4 101 Z is such to release the extension **D** of the spools holding plate 46 2 099 Y which is actuated to move up. This movement is immediately interfered by the extension **E** of the stay 46 2 055 T which, as we know, remains at rest during a calculation cycle.
The line-space stay 46 2 111 Q goes therefore stopping against the extension **B** of the plate 46 2 099 Y (see particularly the figure 59) and engages with a tooth of the wheel **R**. When the connecting-rod 46 4 101 Z moves back to rest, it drags the line-space stay 46 2 111 Q which will rotate the wheel **R**. When the stay meets with the extension **A** of the comb 46 4 081 Q, it is lowered and gets released from the wheel **R**. This should happen when the stay has compelled the wheel **R** rotating by one exact step; the condition is obtained by acting on the extension **A** of the comb 46 4 081 Q.

b) During a total cycle, the printing sliders restoring connecting-rod 46 4 101 Z moves always rearward followed by the line-space stay 46 2 111 Q.
The connecting-rod releases also the plate 46 2 099 Y which can now make a longer travel upward since the movement is not interfered by the extension **E** of the stay 46 2 055 T which, as we know, moves leftward during a total cycle.
The line-space stay 46 2 111 Q then rests on the small bar 46 4 094 M thus making a longer travel rearward (figure 60).
During the return travel the line-space stay will compel the wheel **R** rotating by two steps and the extension **A** of the comb 46 4 081 Q will always be released.

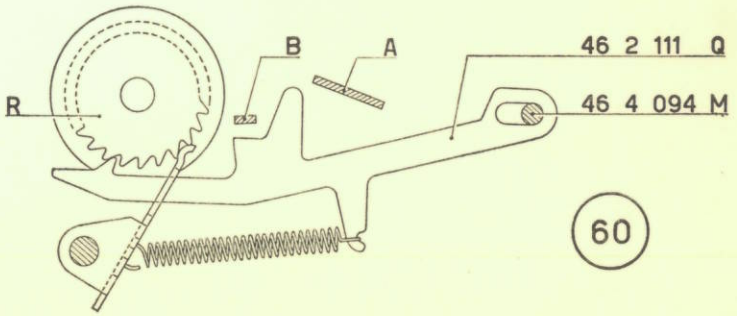
c) At the end of the total cycle, the printing sliders restoring connecting-rod 46 4 101 Z, by returning to rest, lowers the spools holding plate 46 2 099 Y which at its turn lowers the connecting-rod 46 2 115 L. The stay 46 2 055 T moves back to rest at the same time.
It is necessary that there is no forcing between the connecting-rod 46 2 115 L and the extension **E** of the stay 46 2 055 T.
Act if necessary on the extension **D** of the plate 46 2 099 Y.


R
A
B
D
46 2 112 R
46 4 081 Q
46 4 094 M
46 4 101 Z
46 2 111 Q
46 2 099 Y
40 5 123 L
46 2 115 L
46 2 055 T
E

58

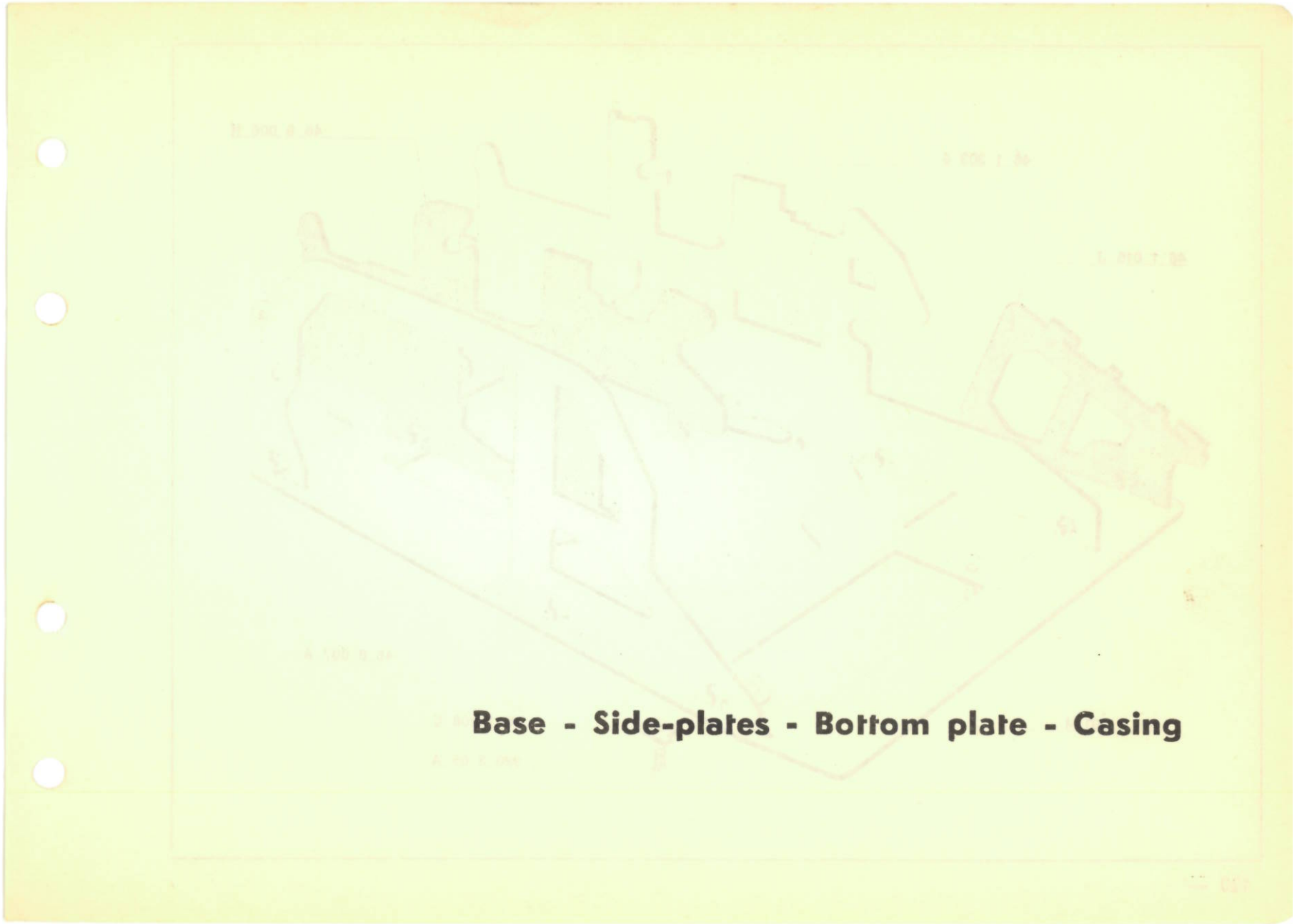

R
46 2 111 Q
B
A

59

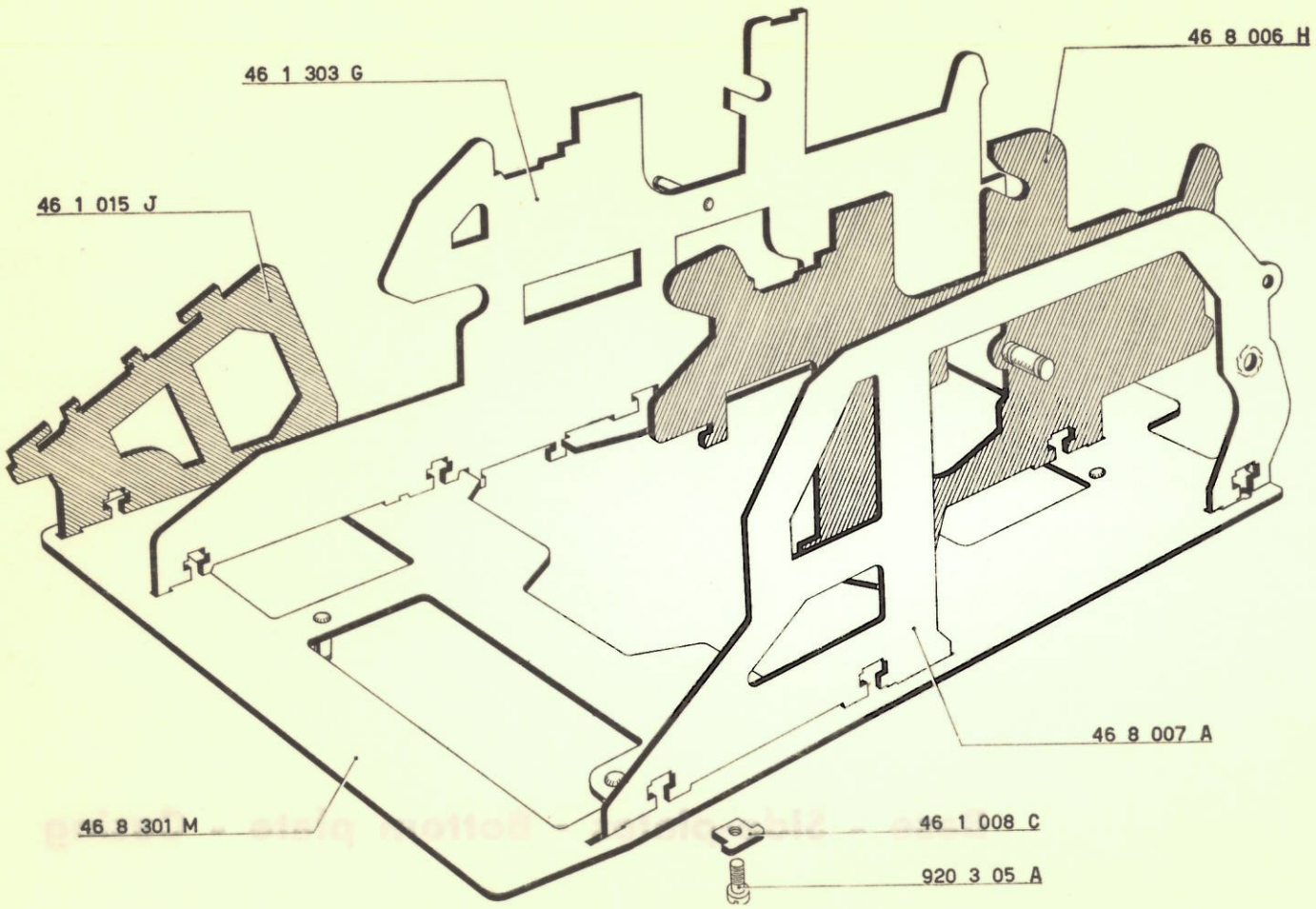

B
A
46 2 111 Q
R
46 4 094 M

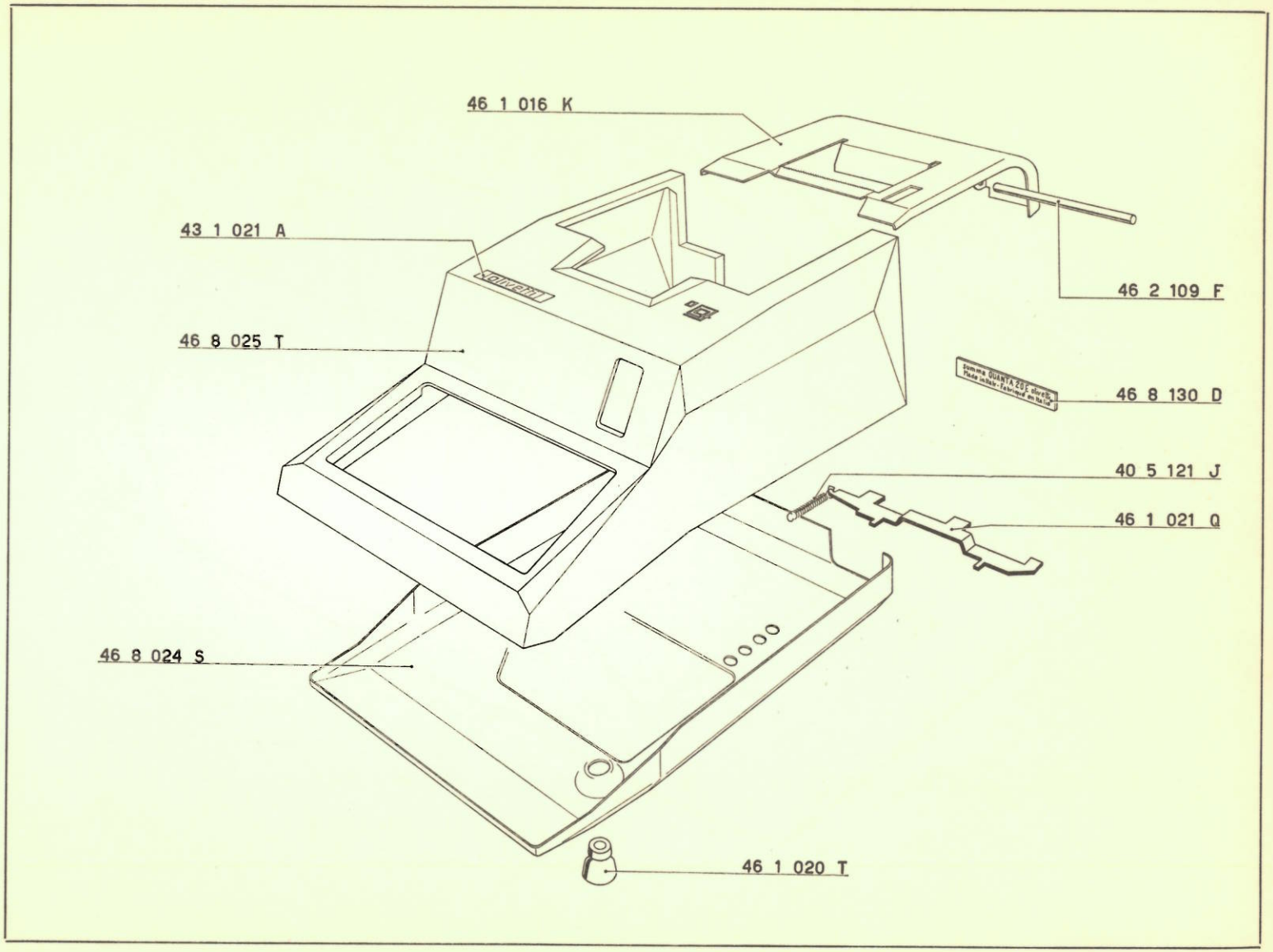
60

SPARE PARTS CATALOGUE



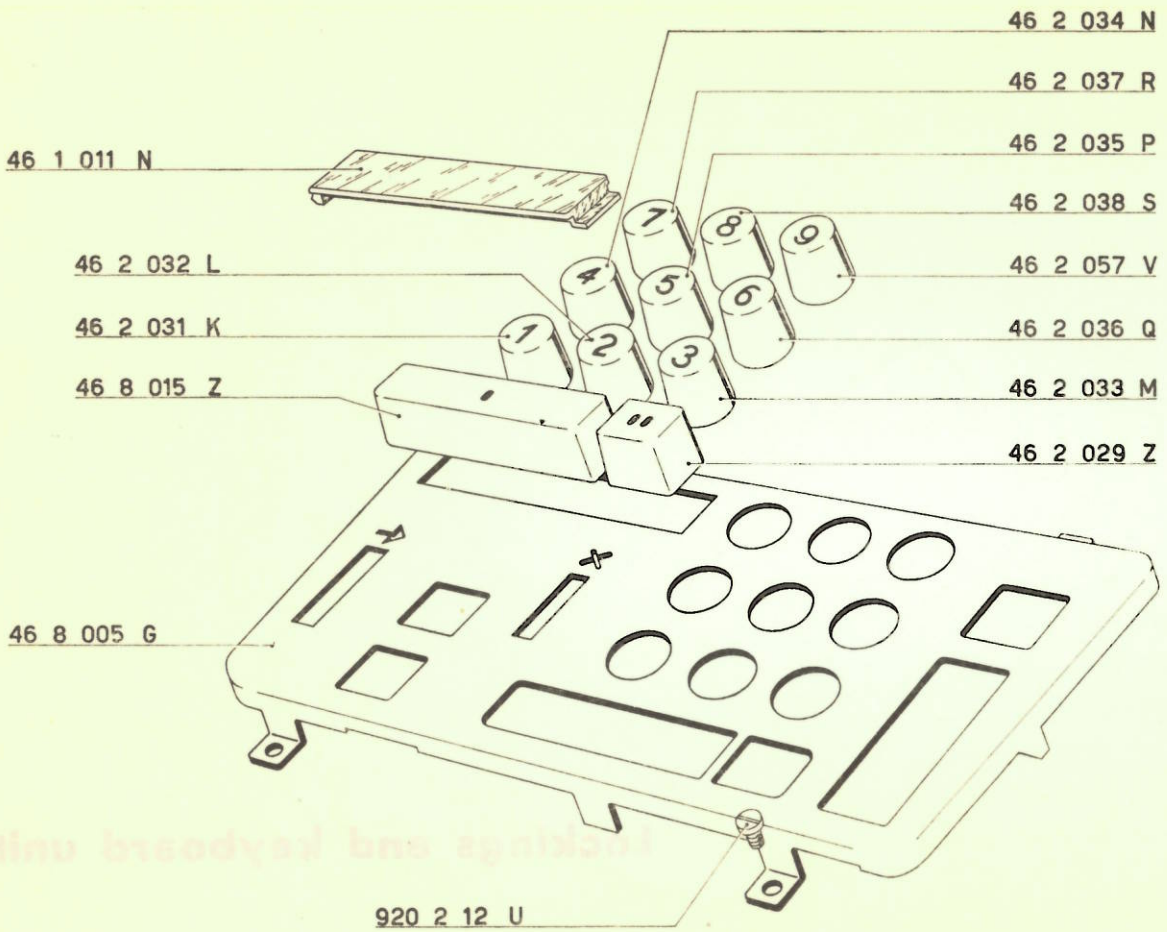
Base - Side-plates - Bottom plate - Casing

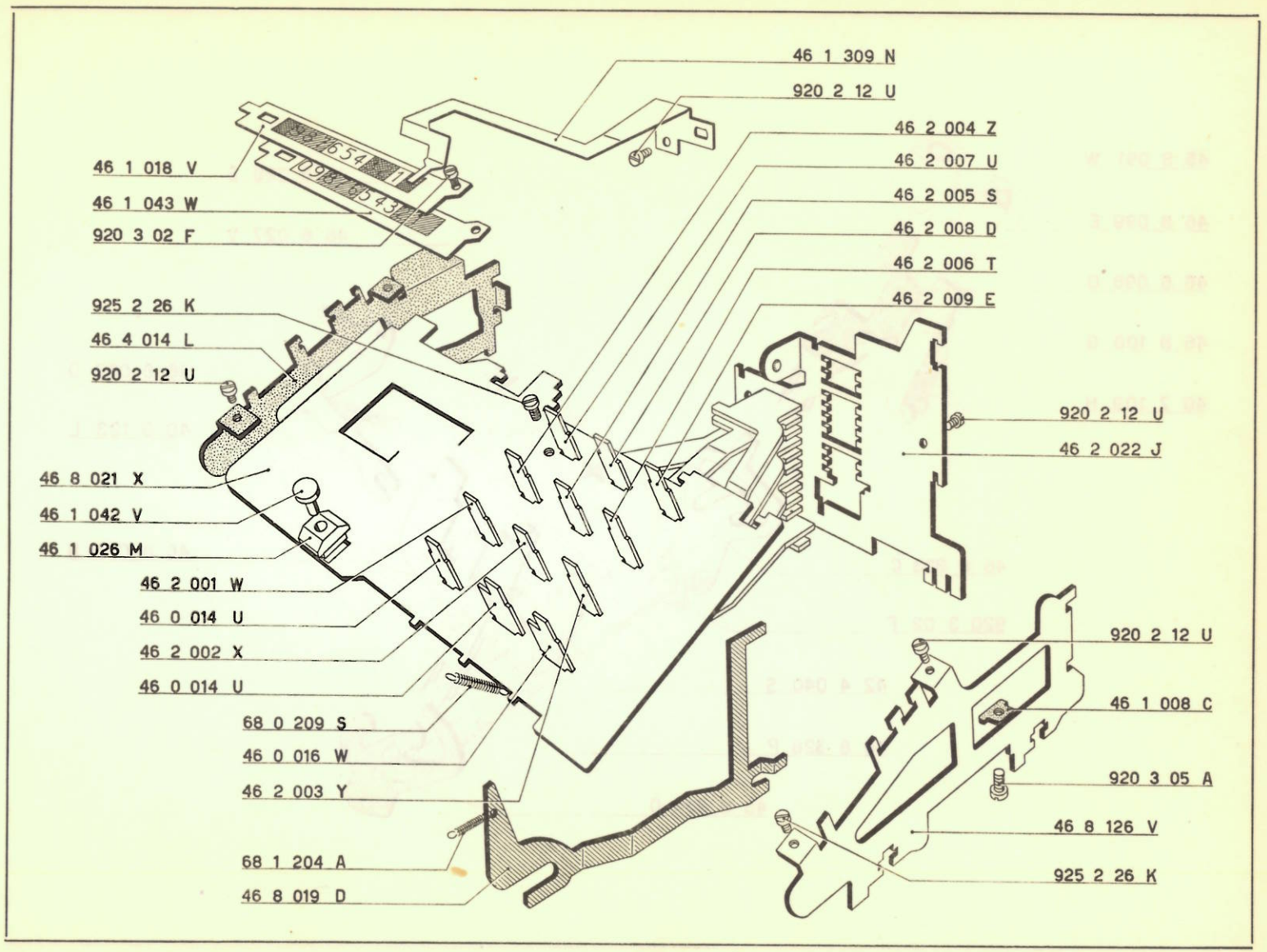

46 8 006 H
46 1 303 G
46 1 015 J
46 8 007 A
46 8 301 M
46 1 008 C
920 3 05 A

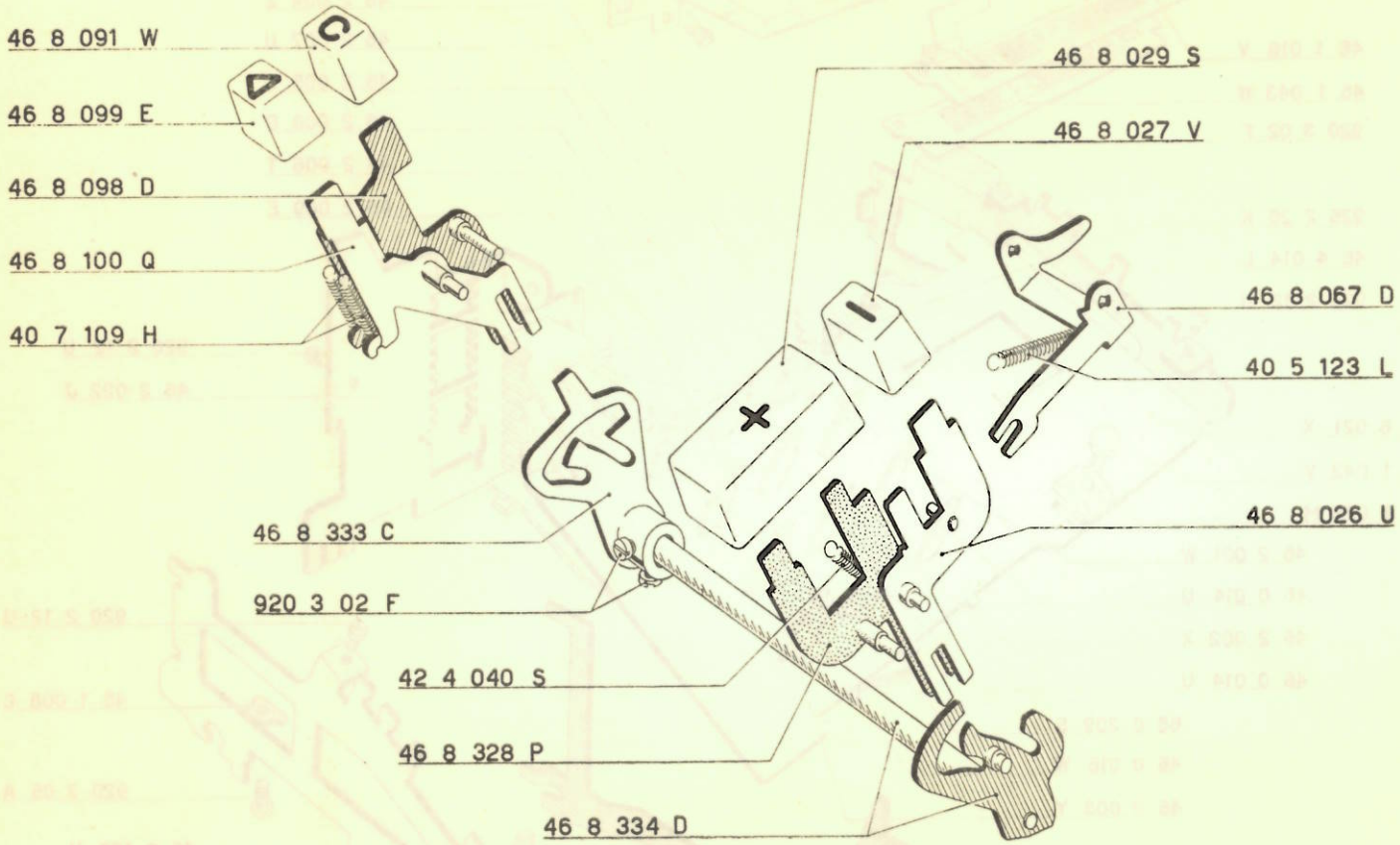

46 1 016 K
43 1 021 A
46 2 109 F
46 8 025 T
46 8 130 D
40 5 121 J
46 1 021 Q
46 8 024 S
46 1 020 T

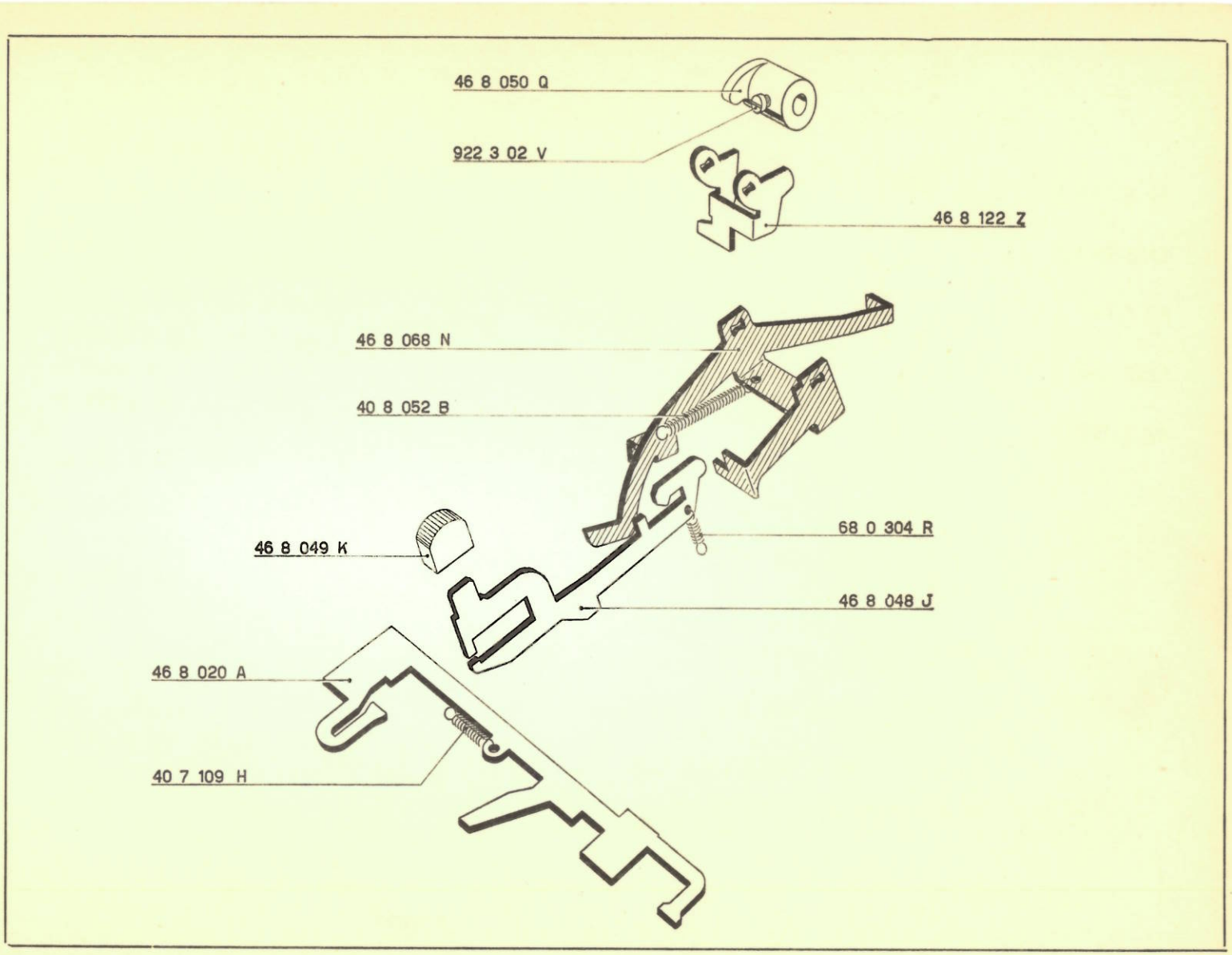
*

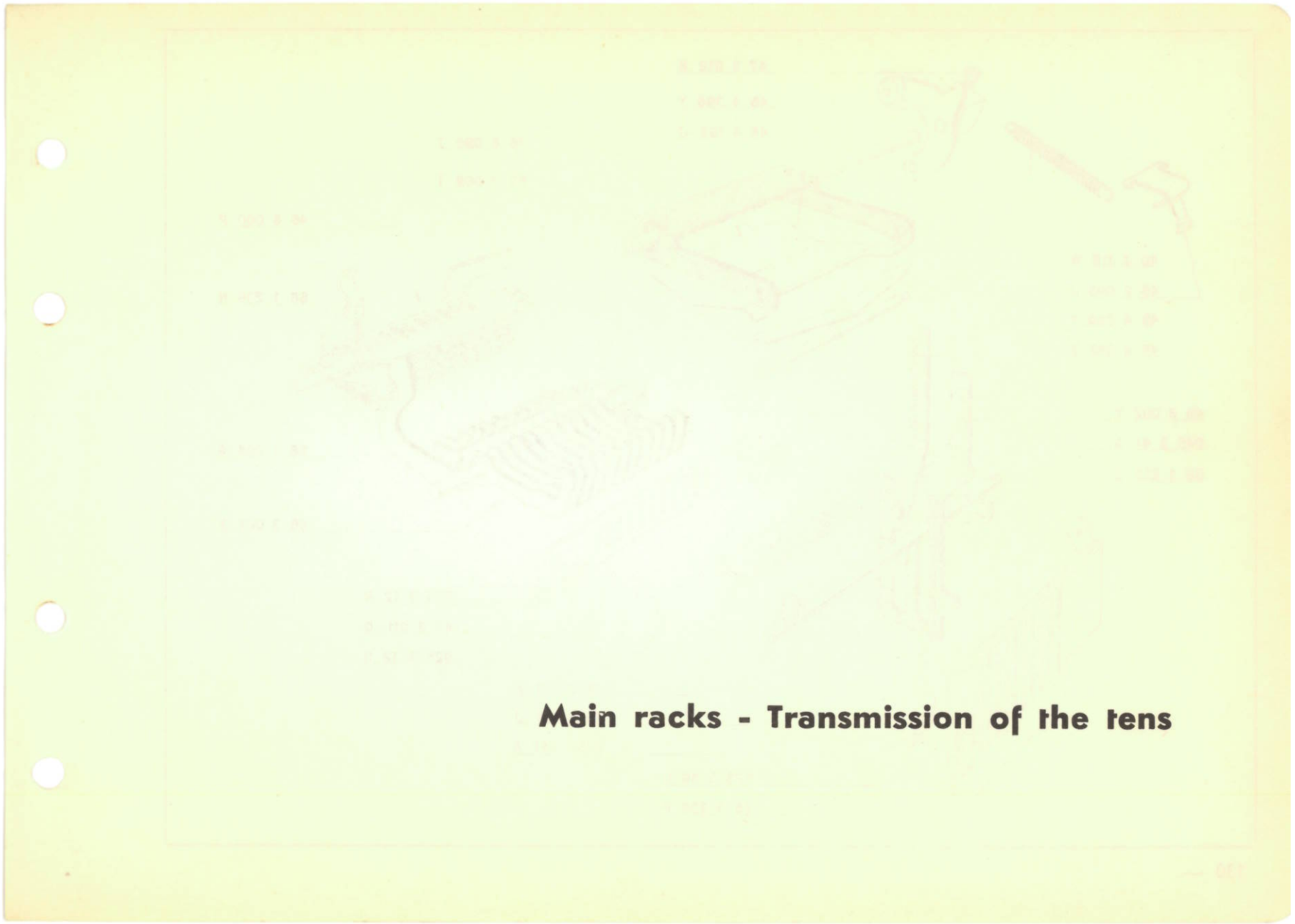
Lockings and keyboard unit


46 2 034 N
46 2 037 R
46 1 011 N
46 2 035 P
46 2 038 S
46 2 032 L
46 2 057 V
46 2 031 K
46 2 036 Q
46 8 015 Z
46 2 033 M
46 2 029 Z
46 8 005 G
920 2 12 U

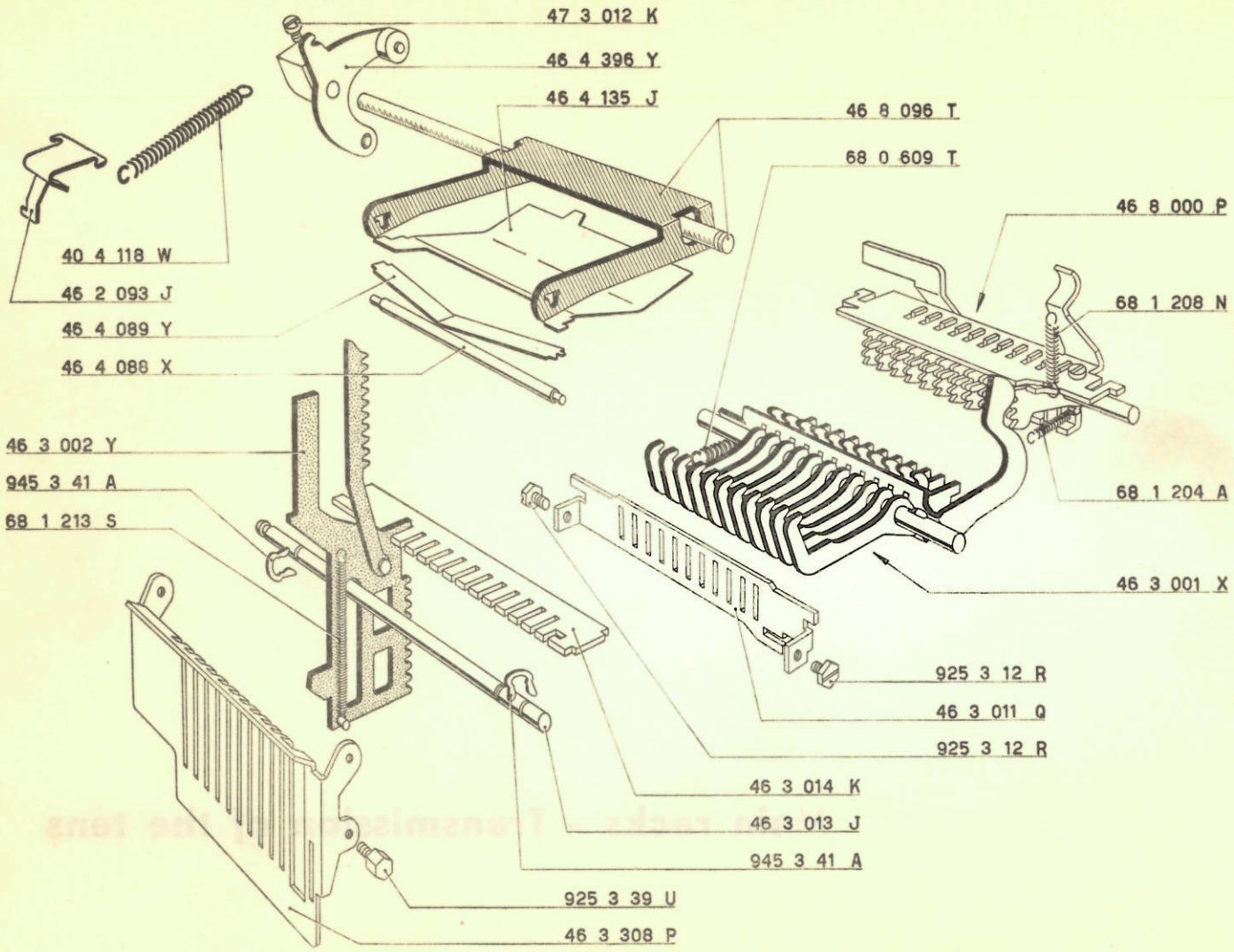

46 1 309 N
920 2 12 U
46 2 004 Z
46 2 007 U
46 2 005 S
46 2 008 D
46 2 006 T
46 2 009 E
46 1 018 V
46 1 043 W
920 3 02 F
925 2 26 K
46 4 014 L
920 2 12 U
46 8 021 X
46 1 042 V
46 1 026 M
46 2 001 W
46 0 014 U
46 2 002 X
46 0 014 U
68 0 209 S
46 0 016 W
46 2 003 Y
68 1 204 A
46 8 019 D
920 2 12 U
46 2 022 J
920 2 12 U
46 1 008 C
920 3 05 A
46 8 126 V
925 2 26 K

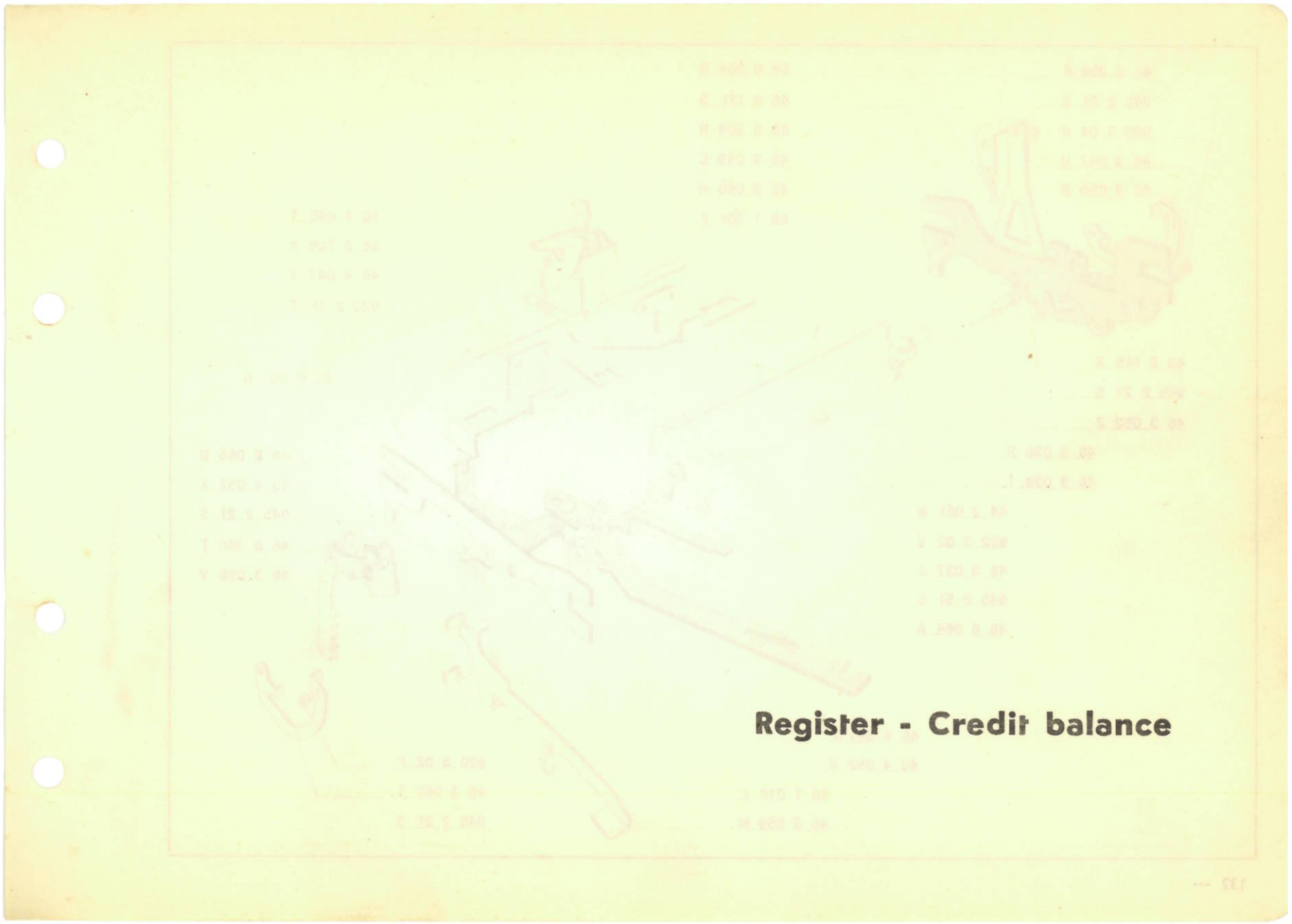

46 8 091 W
46 8 099 E
46 8 098 D
46 8 100 Q
40 7 109 H
46 8 029 S
46 8 027 V
46 8 067 D
40 5 123 L
46 8 026 U
46 8 333 C
920 3 02 F
42 4 040 S
46 8 328 P
46 8 334 D


46 8 050 Q
922 3 02 V
46 8 122 Z
46 8 068 N
40 8 052 B
68 0 304 R
46 8 049 K
46 8 048 J
46 8 020 A
40 7 109 H

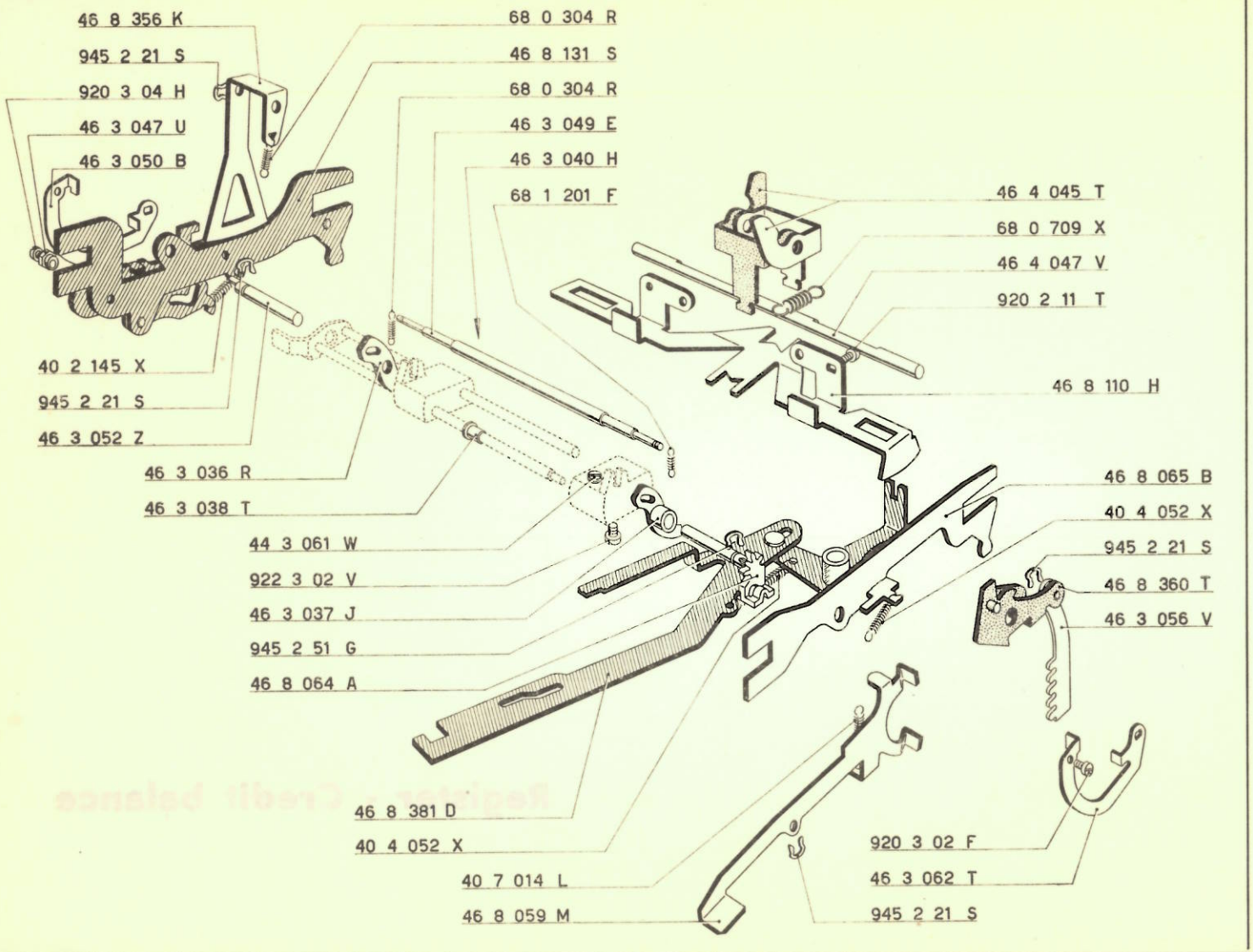


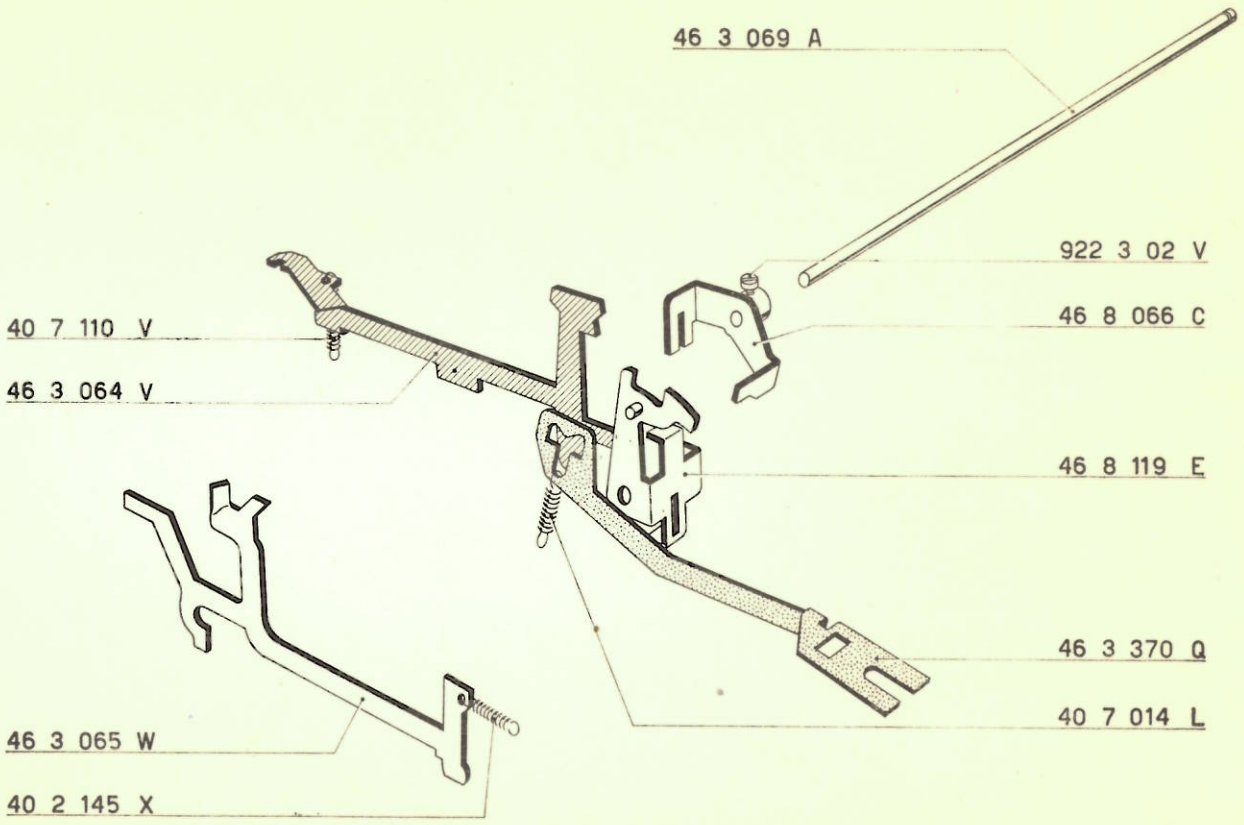
Main racks - Transmission of the tens

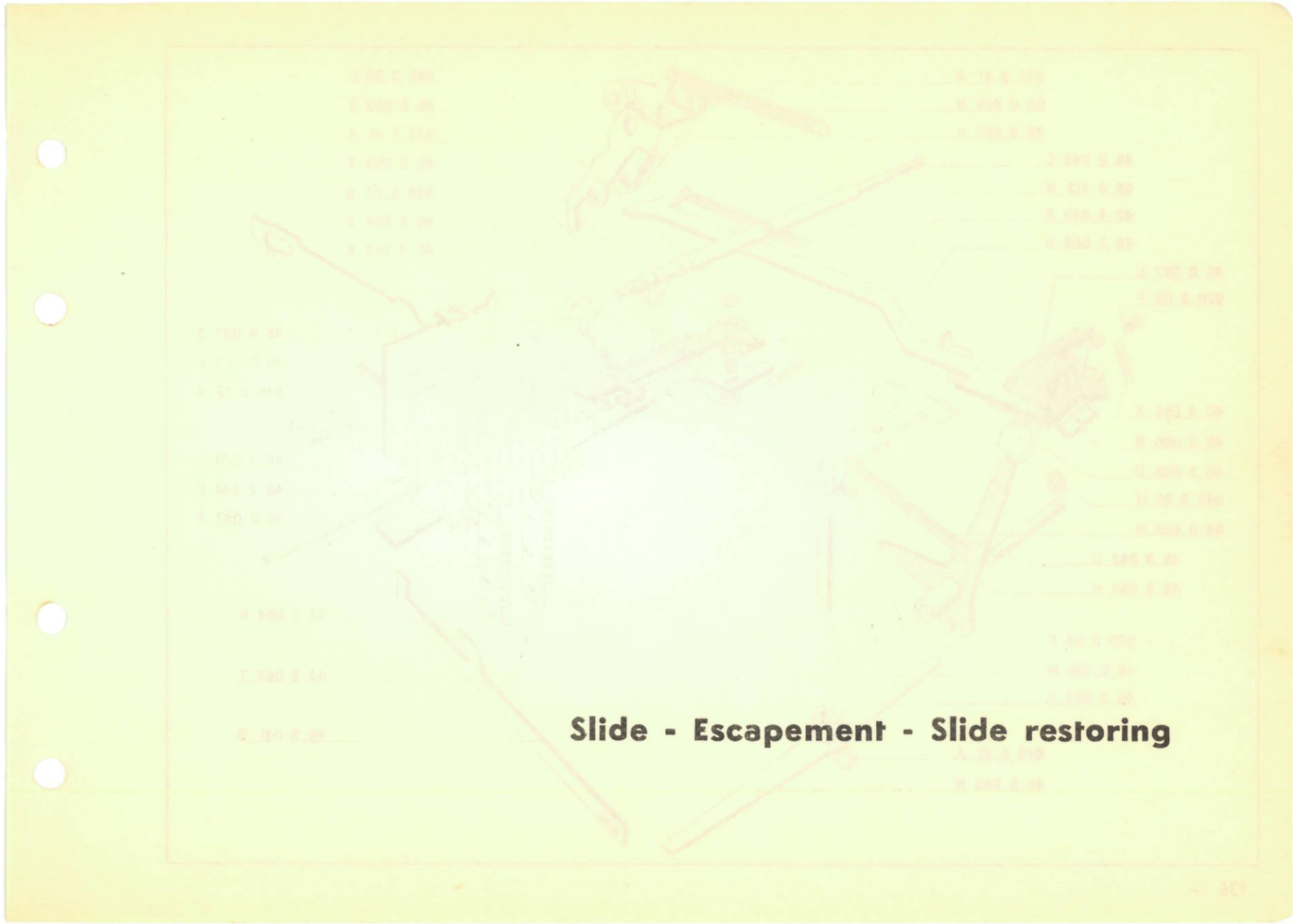

47 3 012 K
46 4 396 Y
46 4 135 J
46 8 096 T
68 0 609 T
46 8 000 P
68 1 208 N
40 4 118 W
46 2 093 J
46 4 089 Y
46 4 088 X
46 3 002 Y
945 3 41 A
68 1 213 S
68 1 204 A
46 3 001 X
925 3 12 R
46 3 011 Q
925 3 12 R
46 3 014 K
46 3 013 J
945 3 41 A
925 3 39 U
46 3 308 P



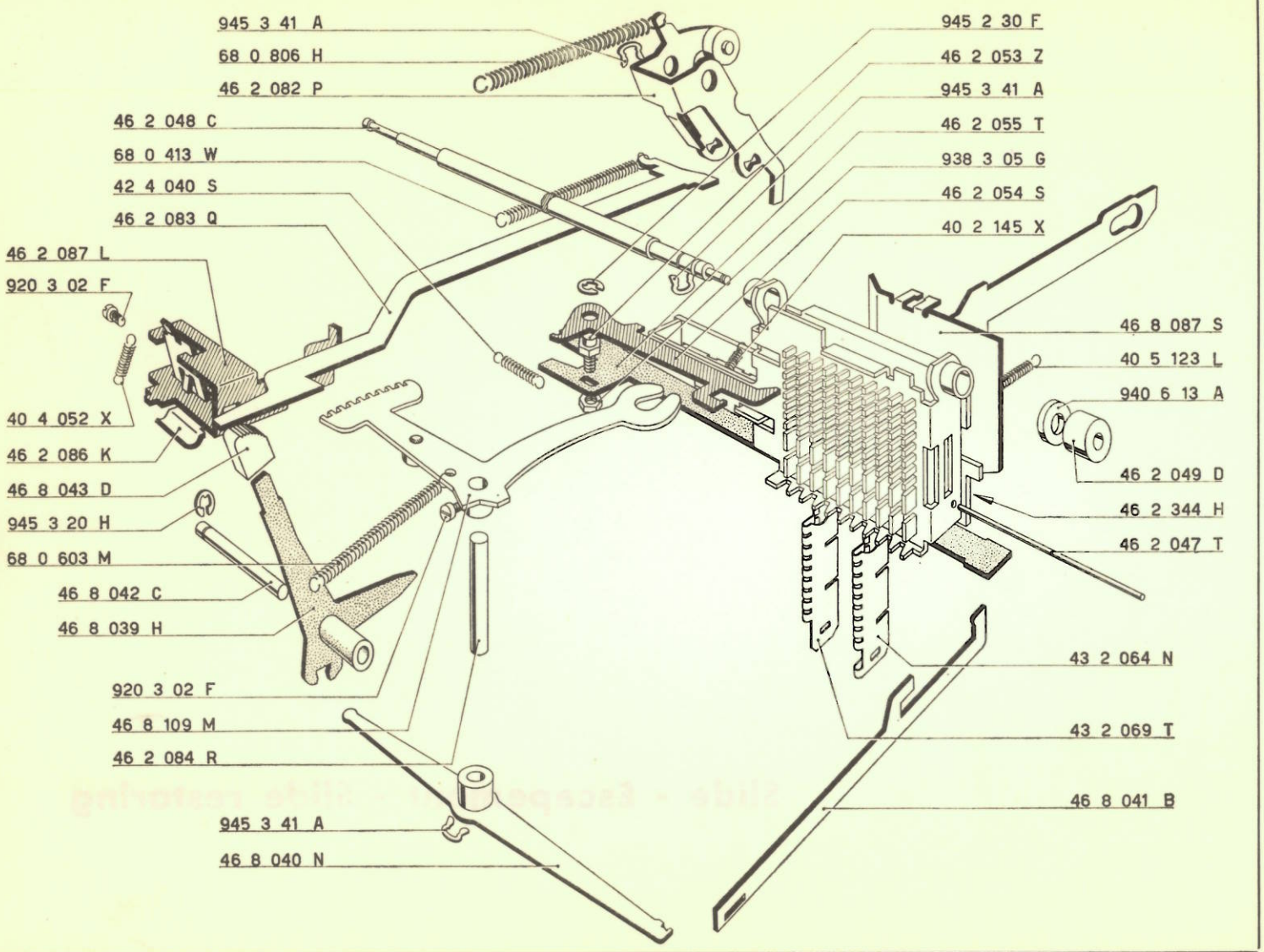
Register - Credit balance


46 8 356 K
945 2 21 S
920 3 04 H
46 3 047 U
46 3 050 B
40 2 145 X
945 2 21 S
46 3 052 Z
46 3 036 R
46 3 038 T
44 3 061 W
922 3 02 V
46 3 037 J
945 2 51 G
46 8 064 A
68 0 304 R
46 8 131 S
68 0 304 R
46 3 049 E
46 3 040 H
68 1 201 F
46 4 045 T
68 0 709 X
46 4 047 V
920 2 11 T
46 8 110 H
46 8 065 B
40 4 052 X
945 2 21 S
46 8 360 T
46 3 056 V
46 8 381 D
40 4 052 X
40 7 014 L
46 8 059 M
920 3 02 F
46 3 062 T
945 2 21 S

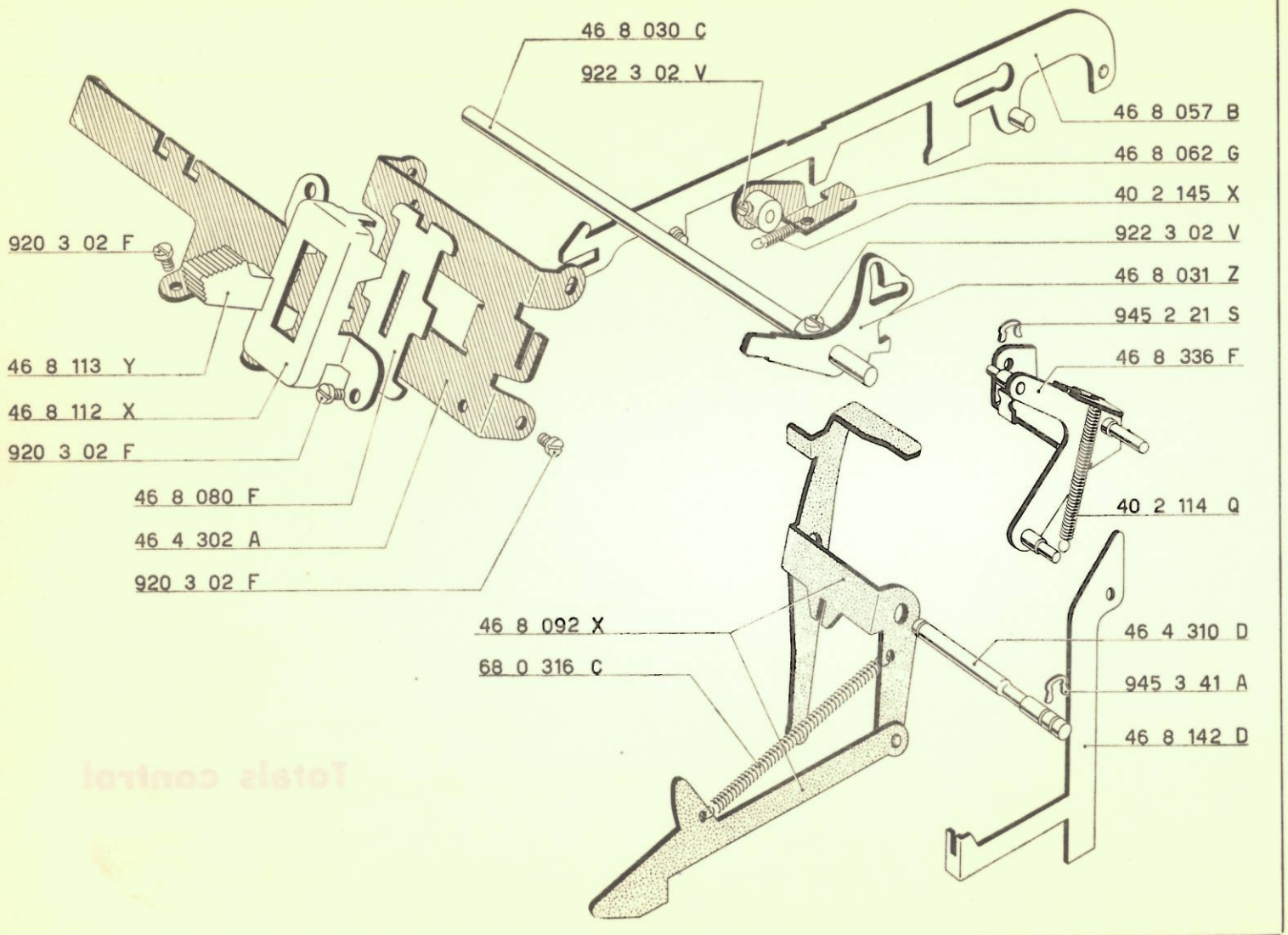

46 3 069 A
922 3 02 V
46 8 066 C
40 7 110 V
46 3 064 V
46 8 119 E
46 3 370 Q
40 7 014 L
46 3 065 W
40 2 145 X



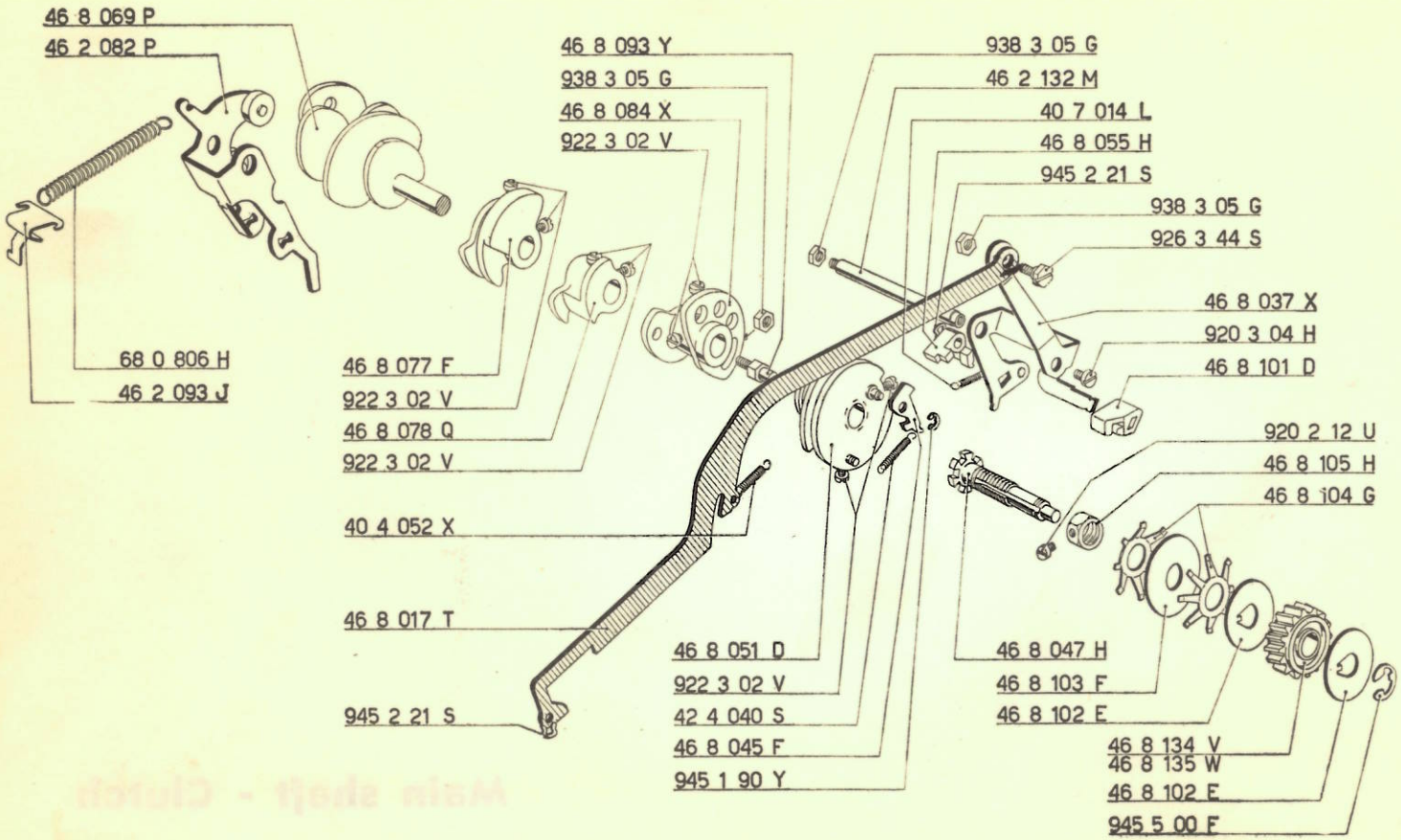
Slide - Escapement - Slide restoring

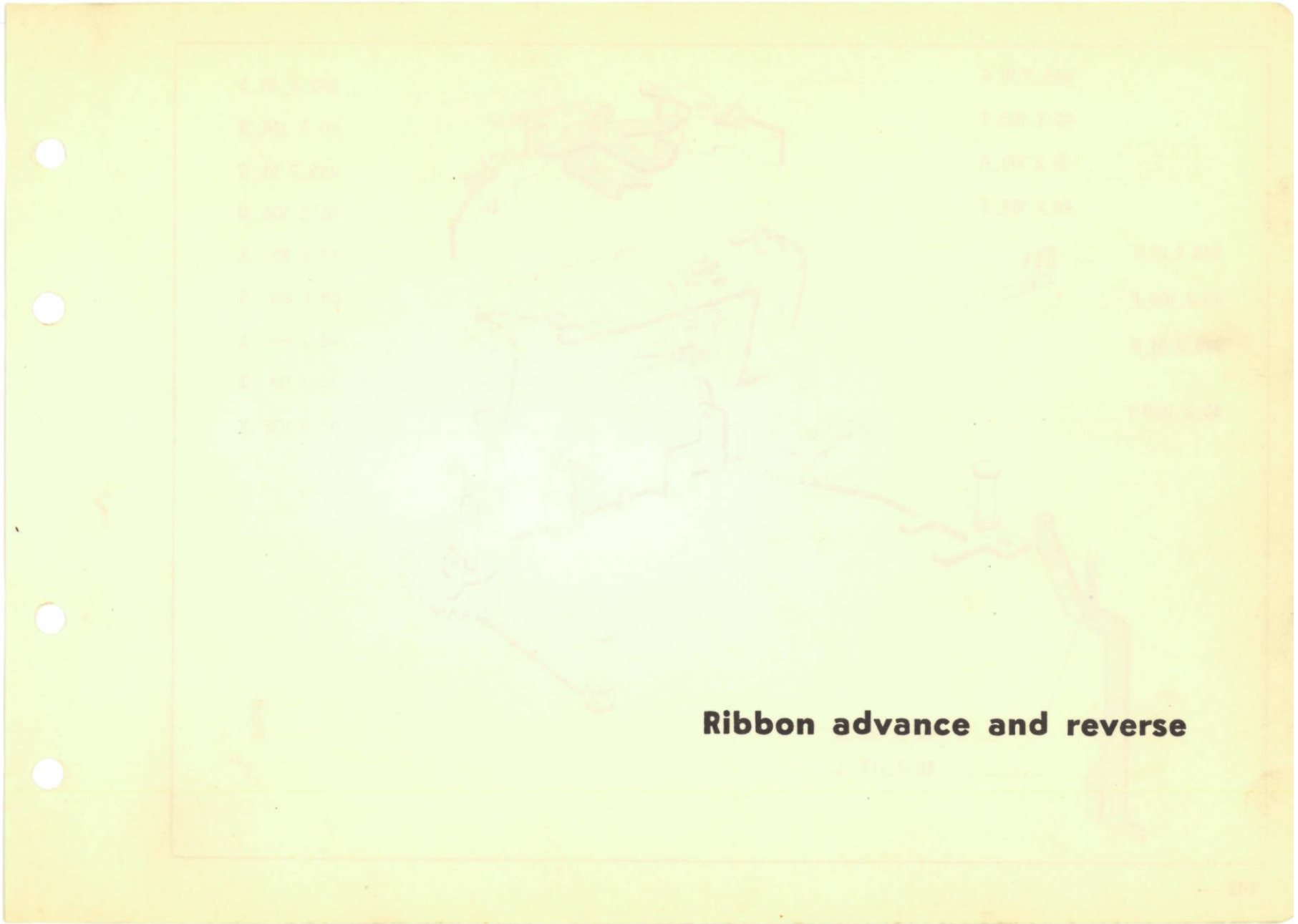

945 3 41 A
68 0 806 H
46 2 082 P
46 2 048 C
68 0 413 W
42 4 040 S
46 2 083 Q
46 2 087 L
920 3 02 F
40 4 052 X
46 2 086 K
46 8 043 D
945 3 20 H
68 0 603 M
46 8 042 C
46 8 039 H
920 3 02 F
46 8 109 M
46 2 084 R
945 3 41 A
46 8 040 N
945 2 30 F
46 2 053 Z
945 3 41 A
46 2 055 T
938 3 05 G
46 2 054 S
40 2 145 X
46 8 087 S
40 5 123 L
940 6 13 A
46 2 049 D
46 2 344 H
46 2 047 T
43 2 064 N
43 2 069 T
46 8 041 B

Totals control

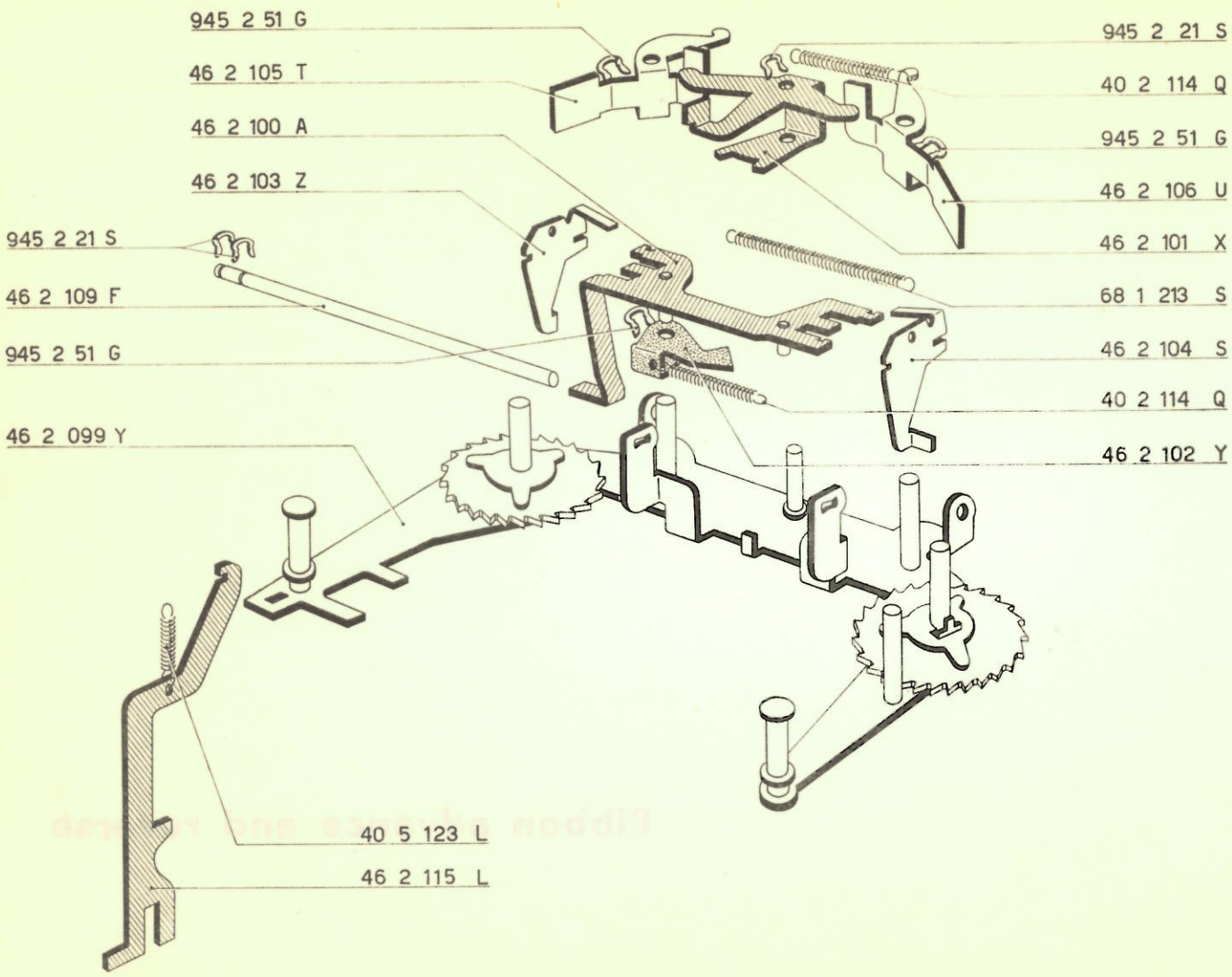

46 8 030 C
922 3 02 V
46 8 057 B
46 8 062 G
40 2 145 X
922 3 02 V
46 8 031 Z
945 2 21 S
46 8 336 F
920 3 02 F
46 8 113 Y
46 8 112 X
920 3 02 F
46 8 080 F
46 4 302 A
920 3 02 F
40 2 114 Q
46 8 092 X
68 0 316 C
46 4 310 D
945 3 41 A
46 8 142 D

Main shaft - Clutch


46 8 069 P
46 2 082 P
68 0 806 H
46 2 093 J
46 8 077 F
922 3 02 V
46 8 078 Q
922 3 02 V
40 4 052 X
46 8 017 T
945 2 21 S
46 8 093 Y
938 3 05 G
46 8 084 X
922 3 02 V
46 8 051 D
922 3 02 V
42 4 040 S
46 8 045 F
945 1 90 Y
938 3 05 G
46 2 132 M
40 7 014 L
46 8 055 H
945 2 21 S
938 3 05 G
926 3 44 S
46 8 037 X
920 3 04 H
46 8 101 D
920 2 12 U
46 8 105 H
46 8 104 G
46 8 047 H
46 8 103 F
46 8 102 E
46 8 134 V
46 8 135 W
46 8 102 E
945 5 00 F

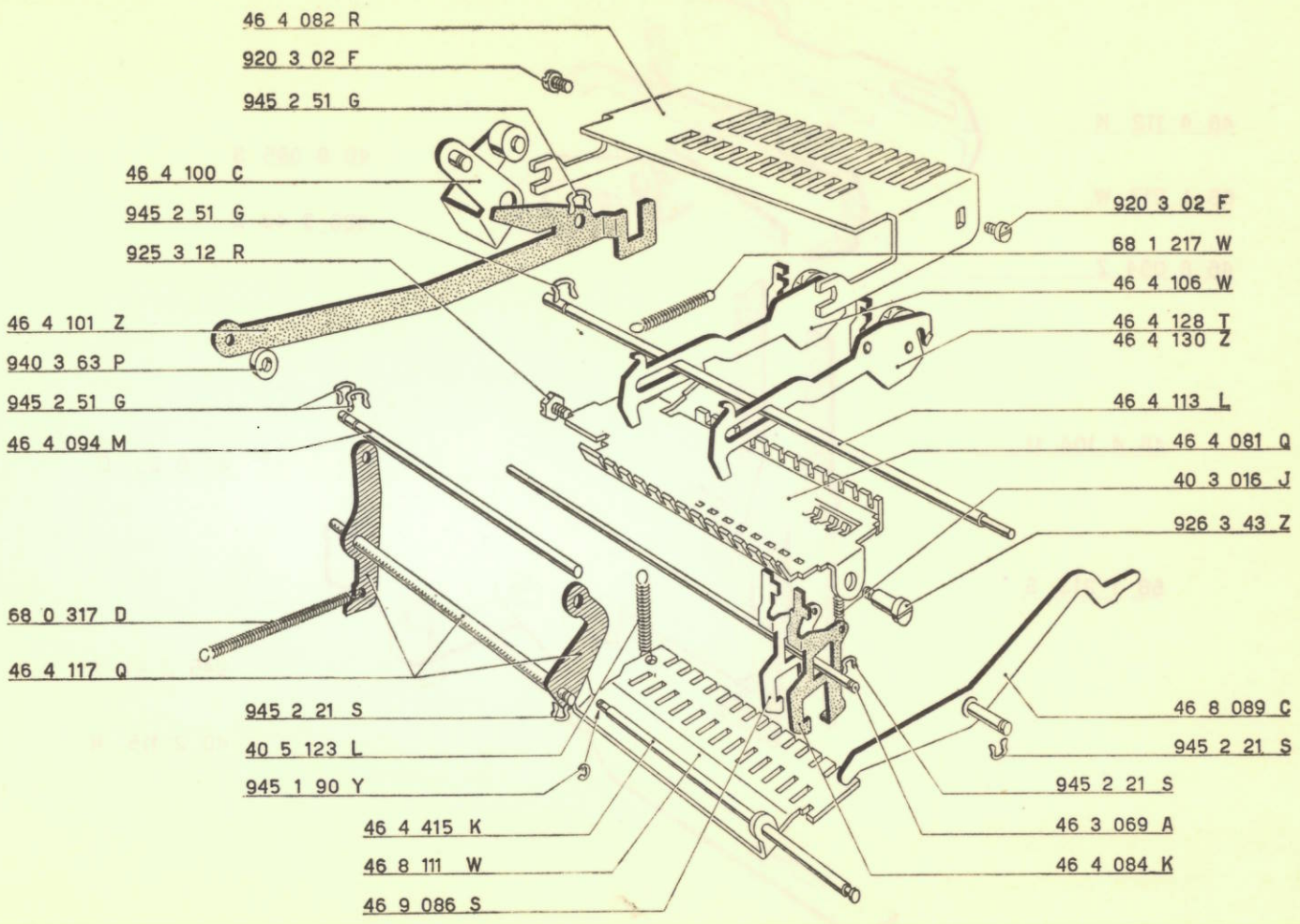


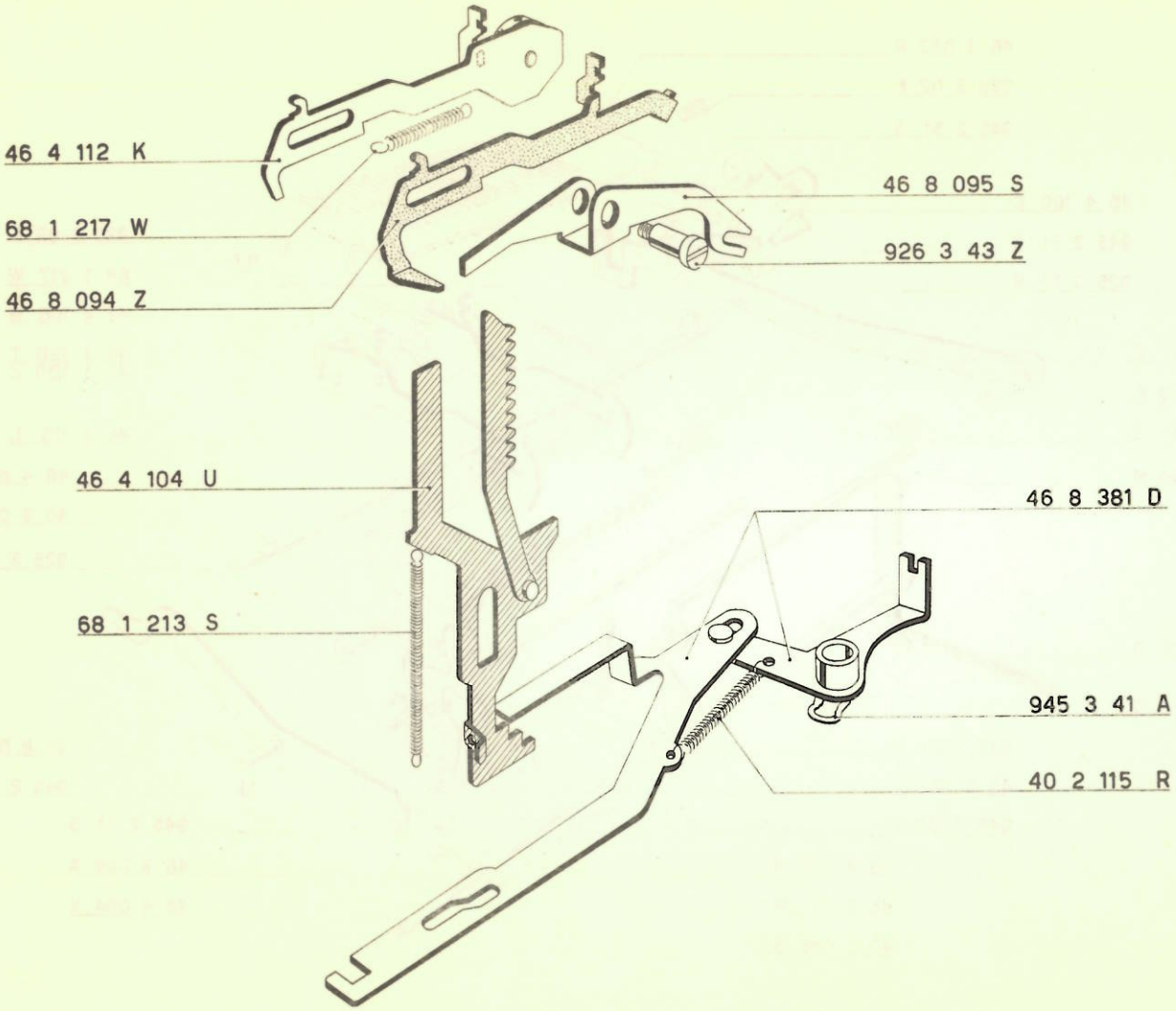
Ribbon advance and reverse


945 2 51 G
46 2 105 T
46 2 100 A
46 2 103 Z
945 2 21 S
46 2 109 F
945 2 51 G
46 2 099 Y
40 5 123 L
46 2 115 L
945 2 21 S
40 2 114 Q
945 2 51 G
46 2 106 U
46 2 101 X
68 1 213 S
46 2 104 S
40 2 114 Q
46 2 102 Y

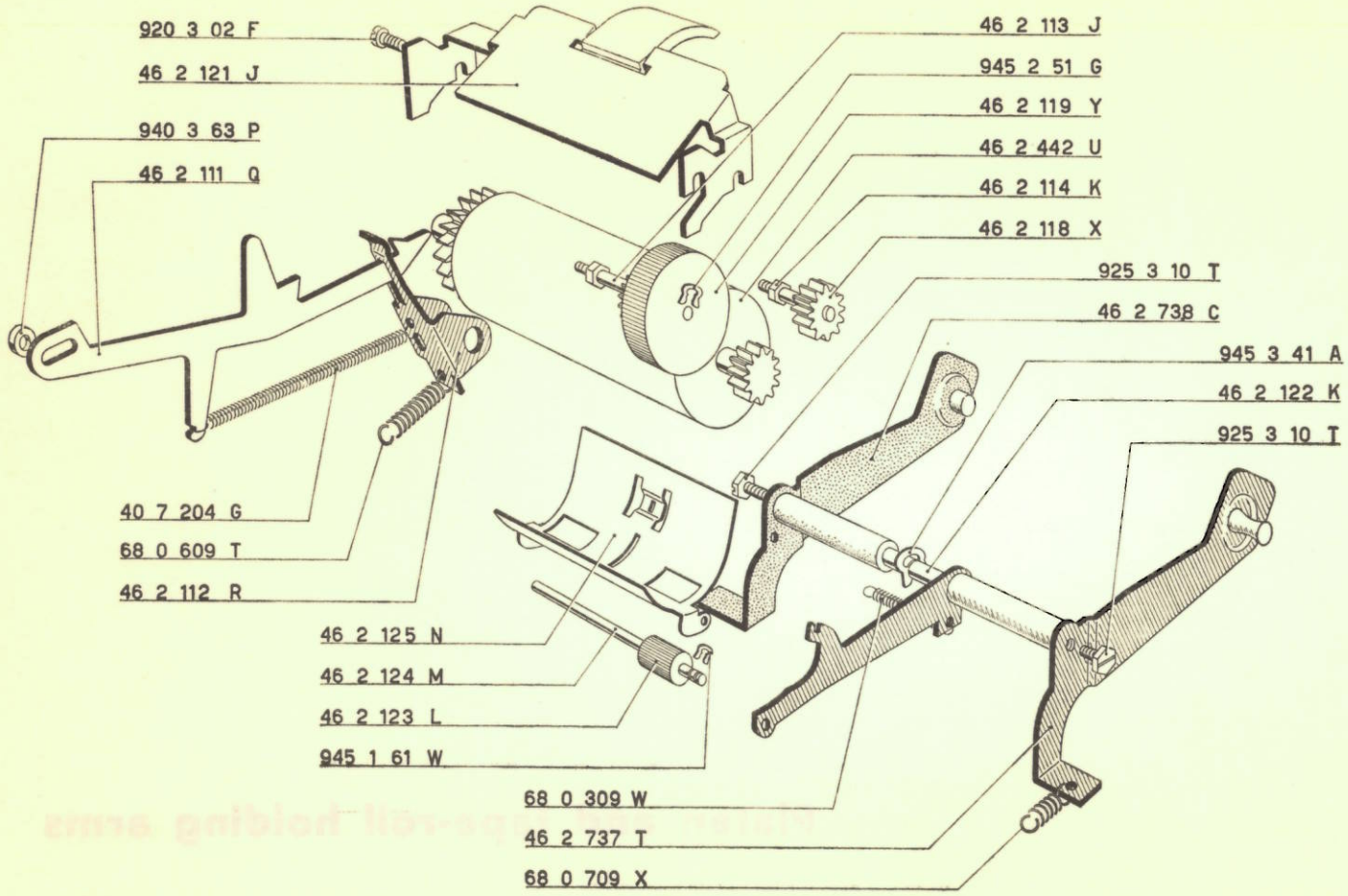
Printing - Special signs

46 4 106 W	Numeral printing slider
46 4 128 T	Numeral printing slider with full stop
46 4 130 Z	Numeral printing slider with coma

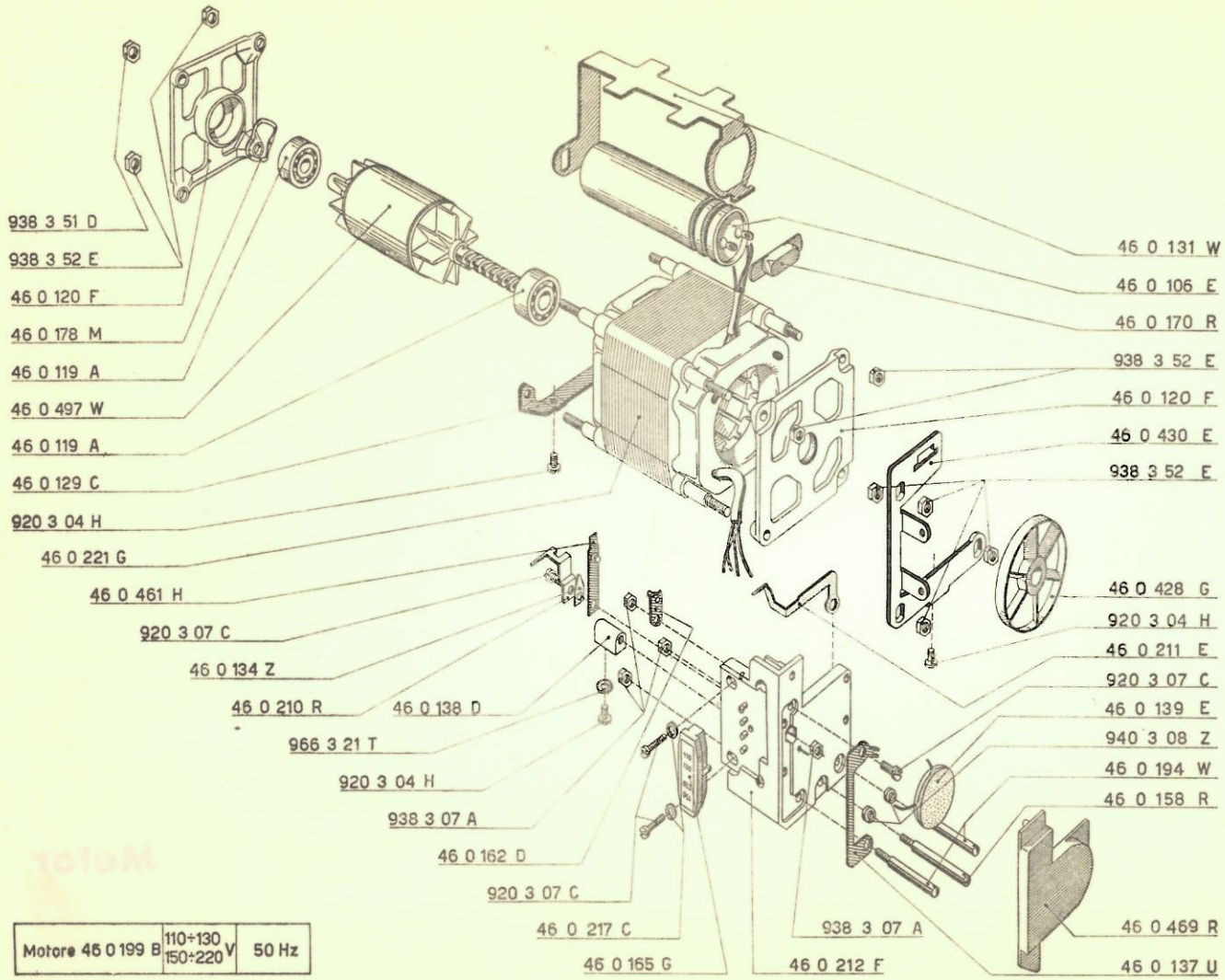

46 4 082 R
920 3 02 F
945 2 51 G
46 4 100 C
945 2 51 G
925 3 12 R
46 4 101 Z
940 3 63 P
945 2 51 G
46 4 094 M
68 0 317 D
46 4 117 Q
945 2 21 S
40 5 123 L
945 1 90 Y
46 4 415 K
46 8 111 W
46 9 086 S
920 3 02 F
68 1 217 W
46 4 106 W
46 4 128 T
46 4 130 Z
46 4 113 L
46 4 081 Q
40 3 016 J
926 3 43 Z
46 8 089 C
945 2 21 S
945 2 21 S
46 3 069 A
46 4 084 K


46 4 112 K
68 1 217 W
46 8 094 Z
46 8 095 S
926 3 43 Z
46 4 104 U
68 1 213 S
46 8 381 D
945 3 41 A
40 2 115 R

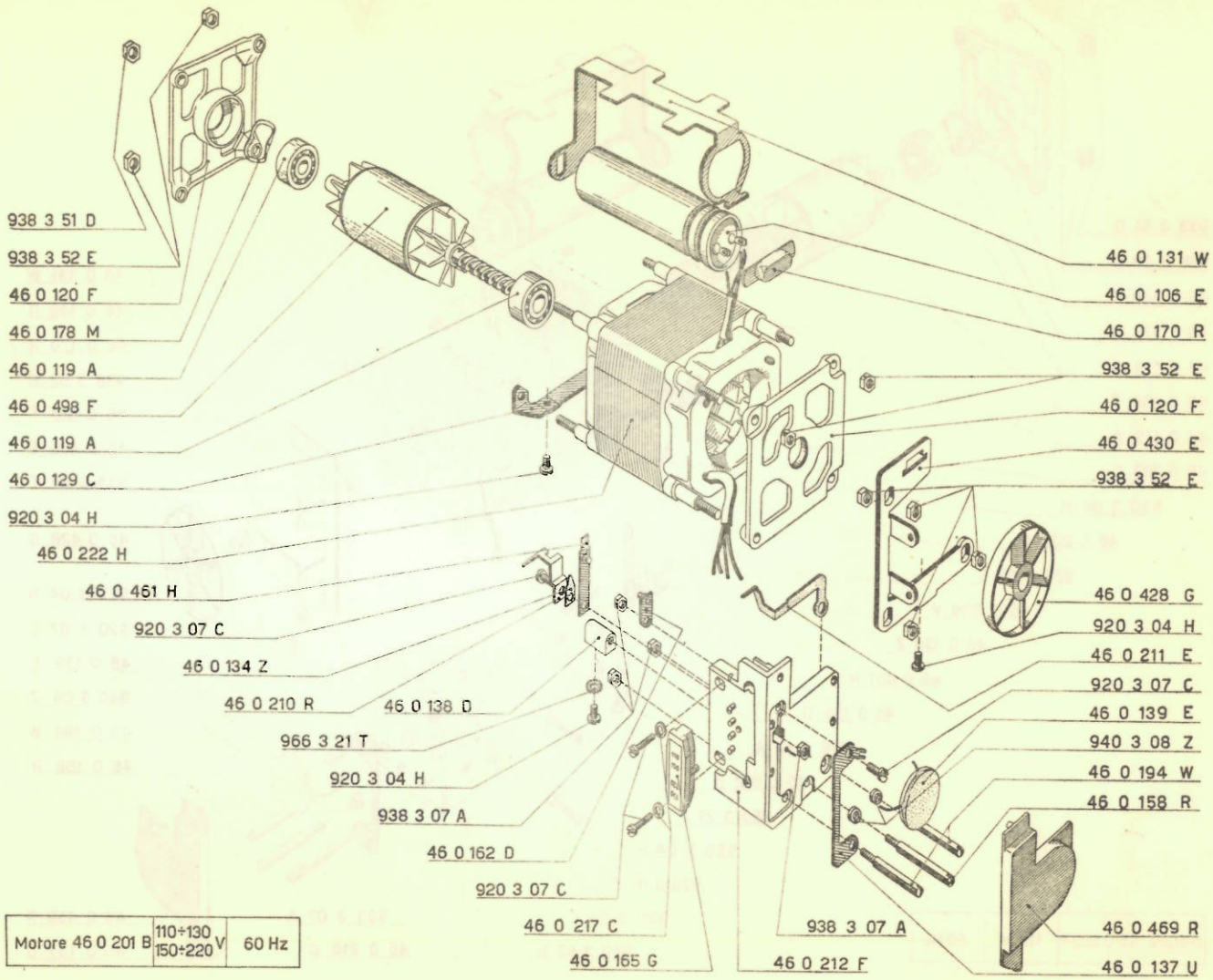
Platen and tape-roll holding arms


920 3 02 F
46 2 121 J
940 3 63 P
46 2 111 Q
40 7 204 G
68 0 609 T
46 2 112 R
46 2 125 N
46 2 124 M
46 2 123 L
945 1 61 W
68 0 309 W
46 2 737 T
68 0 709 X
46 2 113 J
945 2 51 G
46 2 119 Y
46 2 442 U
46 2 114 K
46 2 118 X
925 3 10 T
46 2 738 C
945 3 41 A
46 2 122 K
925 3 10 T

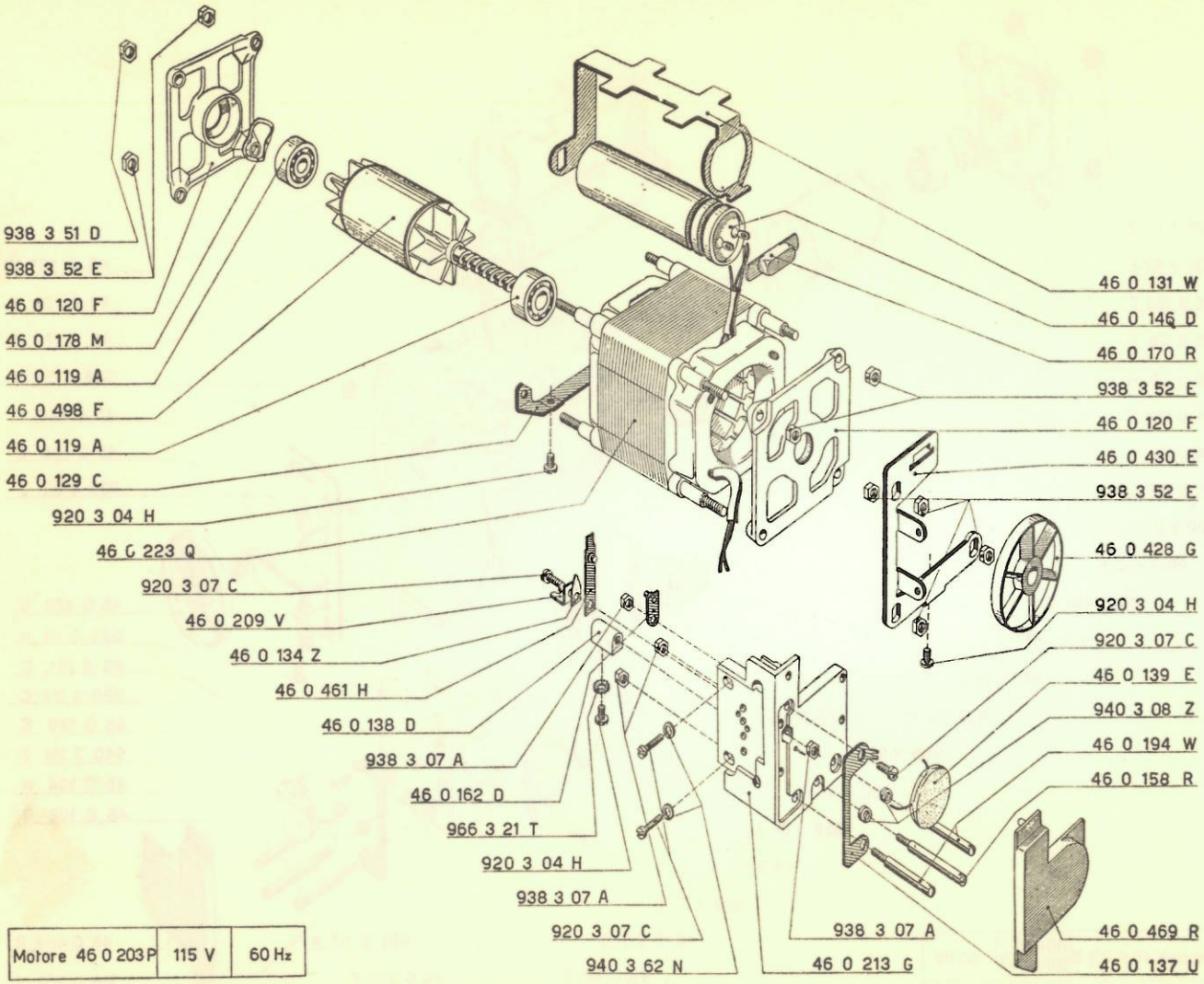
Motor



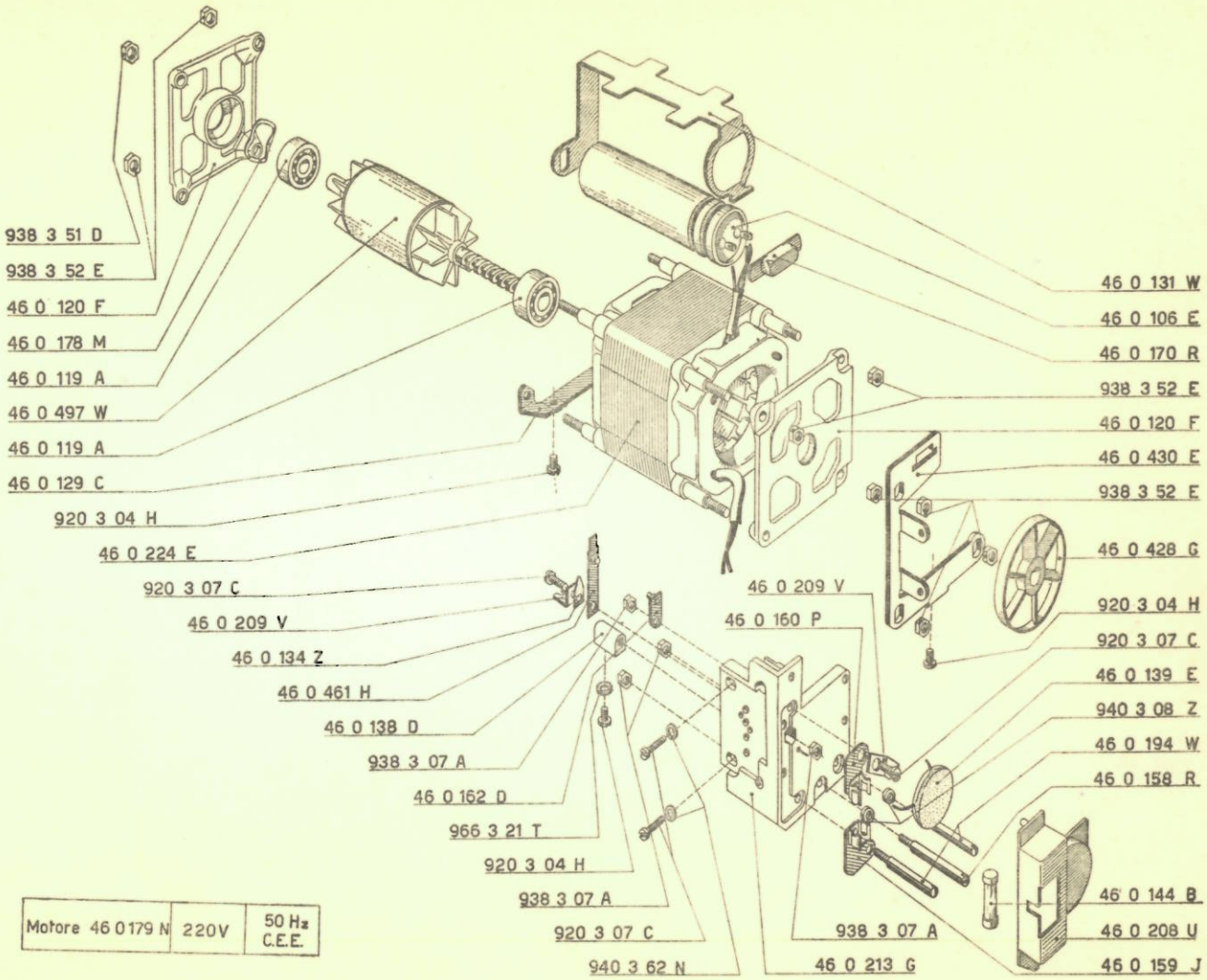
Motore 46 0 199 B	110÷130 150÷220 V	50 Hz



Motore 46 0 201 B	110÷130 150÷220 V	60 Hz



Motore 46 0 203 P	115 V	60 Hz


938 3 51 D
938 3 52 E
46 0 120 F
46 0 178 M
46 0 119 A
46 0 497 W
46 0 119 A
46 0 129 C
920 3 04 H
46 0 224 E
920 3 07 C
46 0 209 V
46 0 134 Z
46 0 461 H
46 0 138 D
938 3 07 A
46 0 162 D
966 3 21 T
920 3 04 H
938 3 07 A
920 3 07 C
940 3 62 N
46 0 131 W
46 0 106 E
46 0 170 R
938 3 52 E
46 0 120 F
46 0 430 E
938 3 52 E
46 0 428 G
46 0 209 V
46 0 160 P
920 3 04 H
920 3 07 C
46 0 139 E
940 3 08 Z
46 0 194 W
46 0 158 R
46 0 144 B
46 0 208 U
46 0 159 J
938 3 07 A
46 0 213 G
Motore 46 0 179 N
220V
50 Hz C.E.E.

*

GENERAL INDEX OF THE PARTS

CONNECTION BETWEEN CODE NUMBERS AND SYMBOLS

40 2 114 Q	N3 I 11
40 2 115 R	N3 I 12
40 2 145 X	N3 N 21
40 3 016 J	N3 D 16
40 4 052 X	N3 G 51
40 4 118 W	N3 H 48
40 5 121 J	N3 M 121
40 5 123 L	N3 M 123
40 7 014 L	N3 F 14
40 7 109 H	N3 T 45
40 7 110 V	N3 7 46
40 7 204 G	N3 U 34
40 8 052 B	N3 V 52
42 4 040 S	N4 G 40
43 1 021 A	N5 A 21
43 2 064 N	N5 C 4
43 2 069 T	N5 C 9
44 3 061 W	N6 E 10
47 3 012 K	N7 D 12
68 0 304 R	N5 30/4
68 0 309 W	N5 30/9
68 0 315 B	N6 30/6
68 0 317 D	N7 30/1
68 0 413 W	N6 40/5
68 0 603 M	N6 60/2
68 1 201 F	N5 25/1
68 1 204 A	N6 25/1
68 1 208 N	N5 25/4
920 2 11 T	120261
920 2 12 U	120262
920 3 02 F	120302
920 3 04 H	120304
920 3 05 A	120305
920 3 07 C	120307
922 3 02 V	122302
925 2 26 K	1252616
925 3 10 T	1253010
925 3 12 R	1253012
925 3 39 U	1253039
926 3 43 Z	1263043
926 3 44 S	1263044
938 3 05 G	138305
938 3 07 A	138307
938 3 51 D	138351
938 3 52 E	138352
940 3 08 Z	40309
940 3 62 N	40366
940 3 63 P	40367
940 6 13 A	40611
945 1 61 W	45181
945 1 90 Y	45190
945 2 21 S	45221
945 2 51 G	45281
945 3 41 A	45361
966 3 21 T	66321