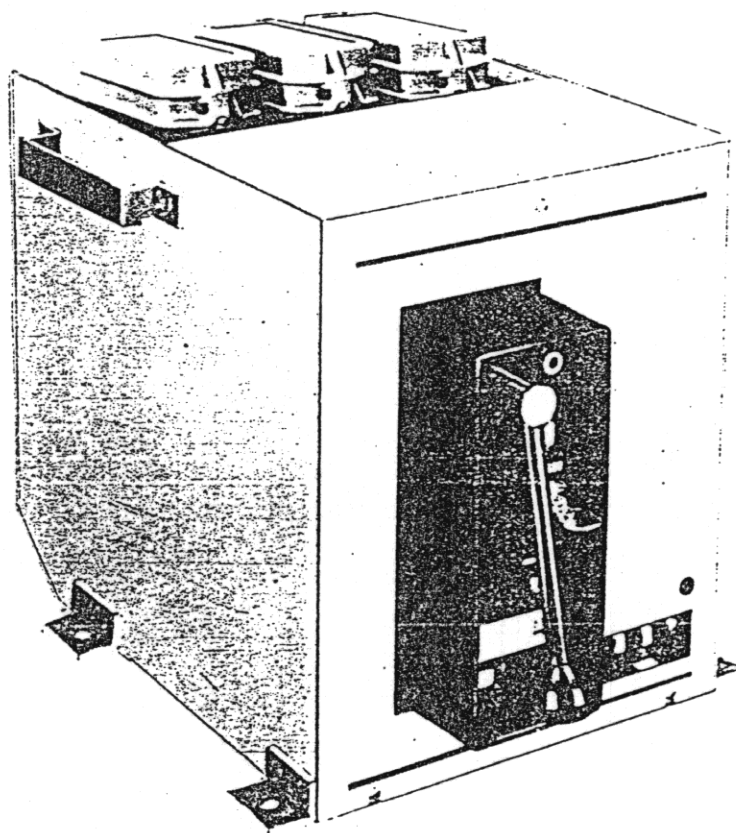


# air circuit-breakers limiting L640 to 2000 operating instructions

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**ALSTHOM**

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**UNELEC**

## receipt of equipment

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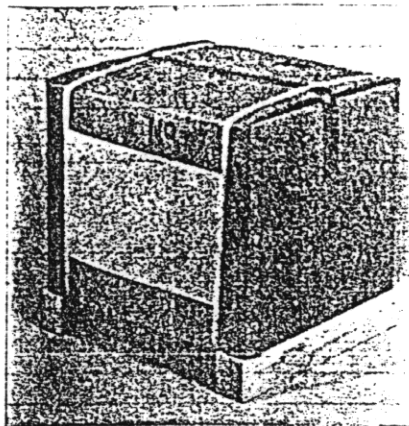
## 1 - arrival

check upon delivery that the packing is in perfect condition, if otherwise, proceed with the usual notifications.

Do not hesitate to start unpacking in the presence of the authorized agent of the Delivery Company.

Important :

We decline all responsibility for any damage that may have been suffered by our equipment during transport.

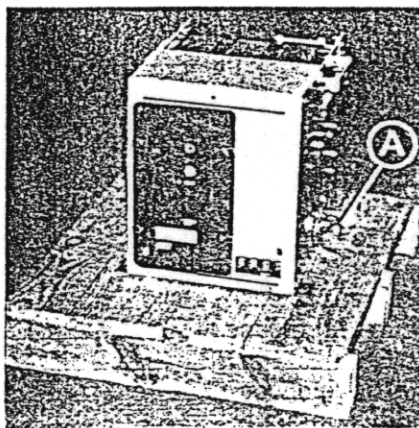


## 2 - storage

If not immediately installed, the breakers should be stored in a well ventilated place protected from ingress of dust or water spray.

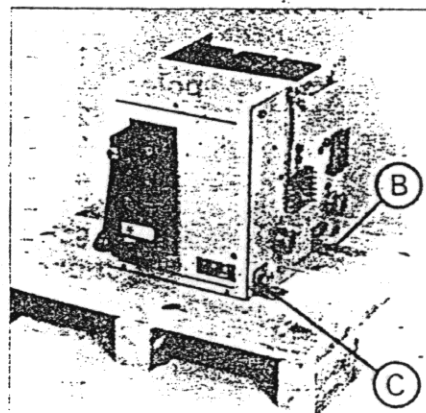
To avoid any deterioration, we recommend leaving the breakers in their protective covering, or to cover them with a waterproof cloth.

## 3 - unpacking



### a - fixed

- remove the 4 fastening screws (A)
- fit the operating handle

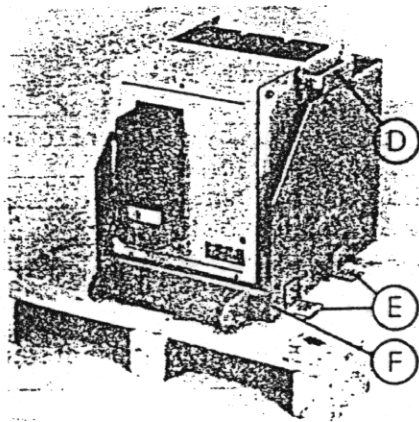


### b - withdrawable breaker without cradle

- remove the 4 fastening screws (B)
- dismantle the 4 brackets (C)
- fit the operating handle

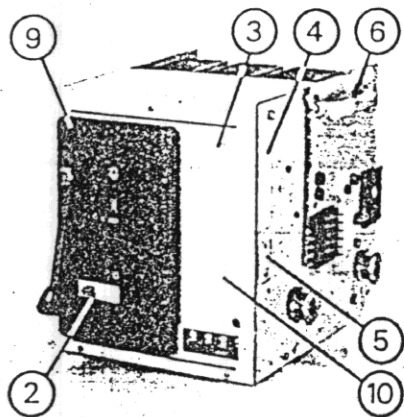
### c - withdrawable breaker

- dismantle the 2 supports (D) fixing the breaker to its cradle.
- dismantle the 4 brackets (E) fixed the cradle to the base of the packing case
- dismantle the 2 brackets (F)
- fit the operating handle.

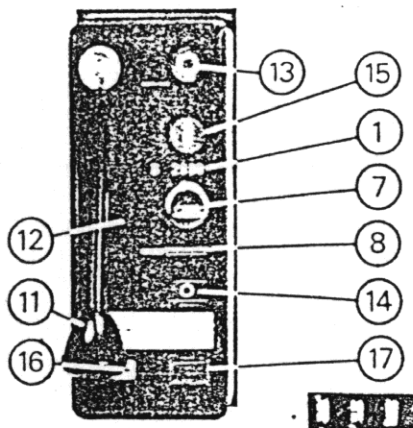


The handles at the hupper part of the side flanges are used for lifting the breaker by its contact jaws.

Set it down on a flat surface, either on the lower part or on its side flanges. Keep the bottom of the box for palletising.



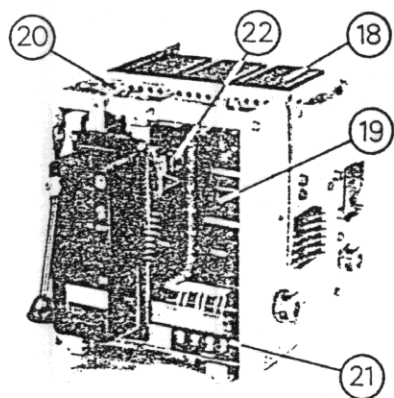
- 1 - type plate
- 2 - firm label
- 3 - rating plate
- 4 - label : power supply voltage of auxiliaries
- 5 - identification plate
- 6 - handle



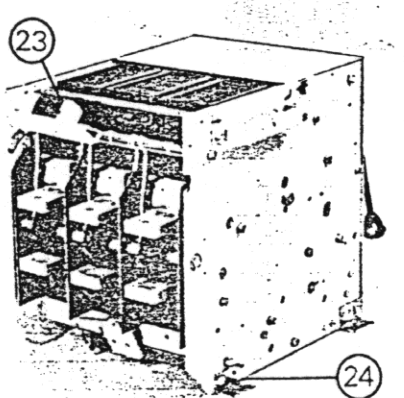
- 7 - interlocking in tripped position
- 8 - padlocking in tripped position
- 9 - joint
- 10 - front cover

- 11 - operating handle
- 12 - front panel
- 13 - trip push button and rearm (BPD)
- 14 - breaker position indicator :
  - red : closed
  - green : open
- 15 - make push button (BPEL)
- 16 - control position indicator
  - yellow : released
  - blue : set

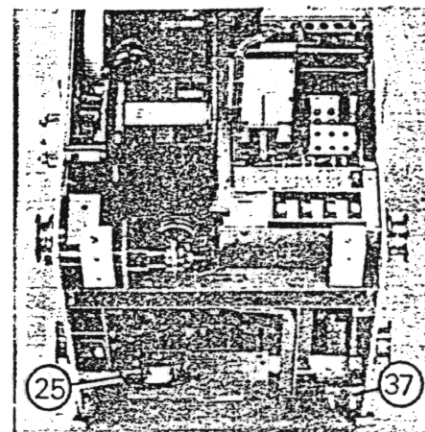
- 17 - mechanical fault indicator :
  - white : fault
  - black : normal



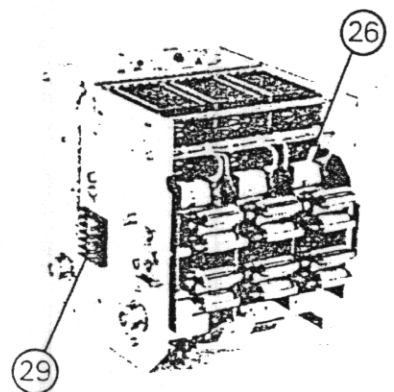
- 18 - are chute
- 19 - auxiliary contacts
- 20 - electric control motor
- 21 - releases DN-RZ
- 22 - closing prevented during undervoltage



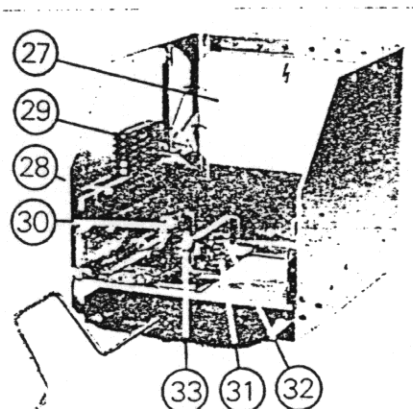
- 23 - ground connection
- 24 - connection terminals (fixed)



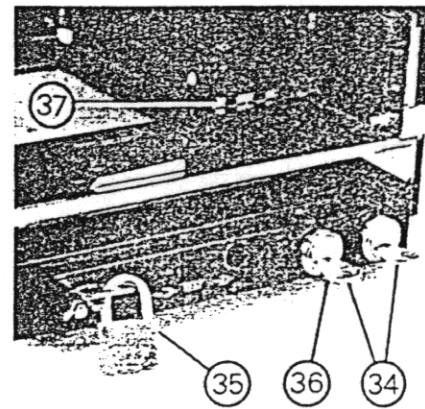
- 25 - voltmetric releases



- 26 - current transformers
- 27 - isolating shutter
- 28 - name plate
- 29 - wiring isolation
- 30 - ground connection



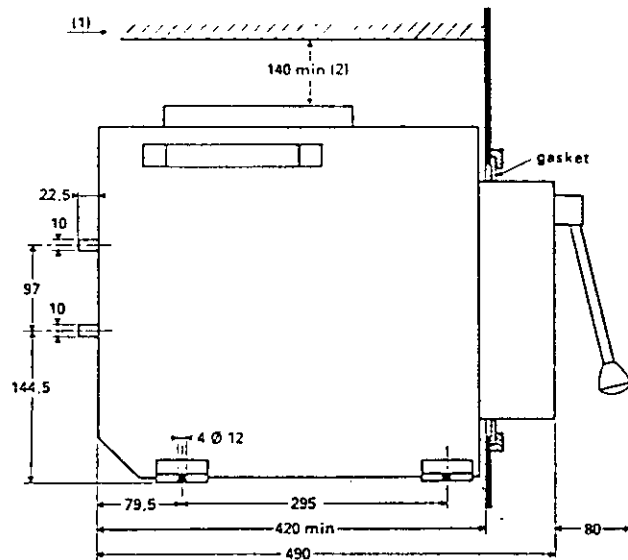
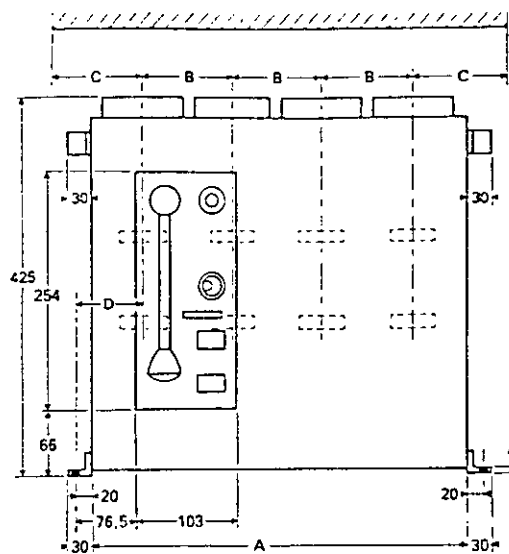
- 31 - "disconnected" position signaling contact
- 32 - "service" position signaling contact
- 33 - contact coupled with connecting control



- 34 - locking in "disconnected" position
- 35 - padlocking in "disconnected" position
- 36 - locking in "connected" position
- 37 - rating error prevention device

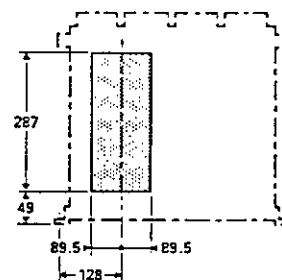
## a - fixed breaker

by side brackets (4 holes  $\varnothing 12$ ) block, if necessary, to prevent deformation when tightening.



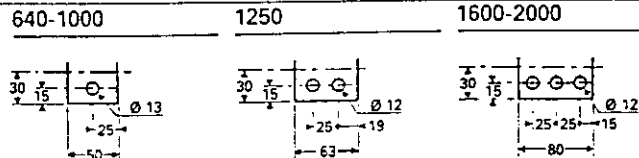
breaker	no. of poles	A	B	C	D
L 640-1000	3	318	98	101.5	81
	4	406	98	96.5	76
L 1250	3	406	115	128.5	108
	4	474	115	105	84.5
L 1600	3	406	130	113.5	93
	4	540	130	115.5	95
L 2000	3	474	150	127.5	107
	4	620	150	125.5	105

panel cutout for fitting gasket



## connecting lugs for fixed and withdrawable breakers

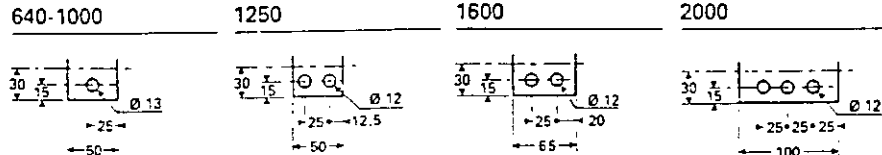
### connecting lugs for FIXED breaker



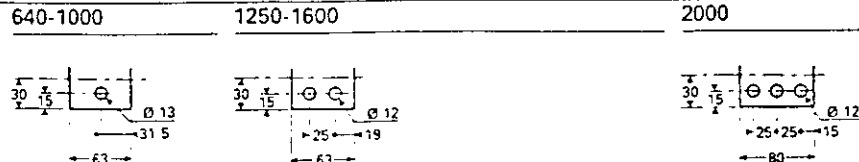
### connecting lugs for WITHDRAWABLE breaker

#### FRONT

#### REAR horizontal

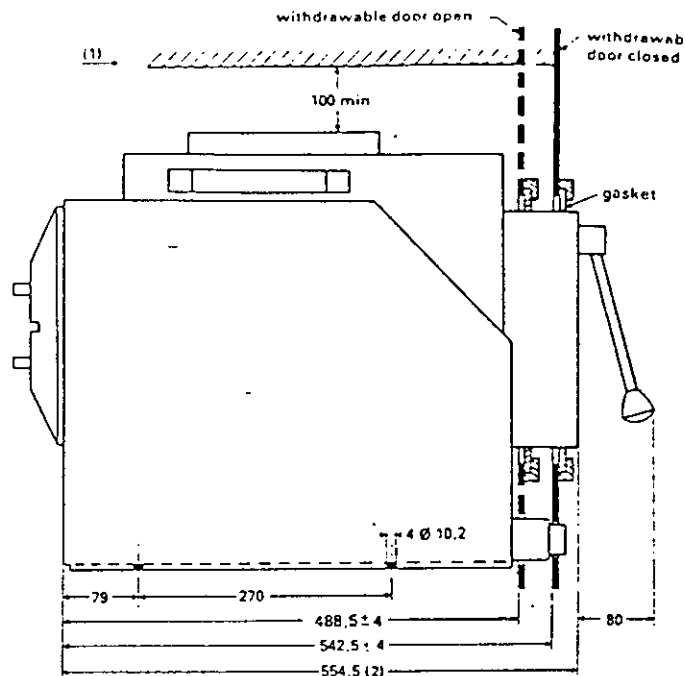
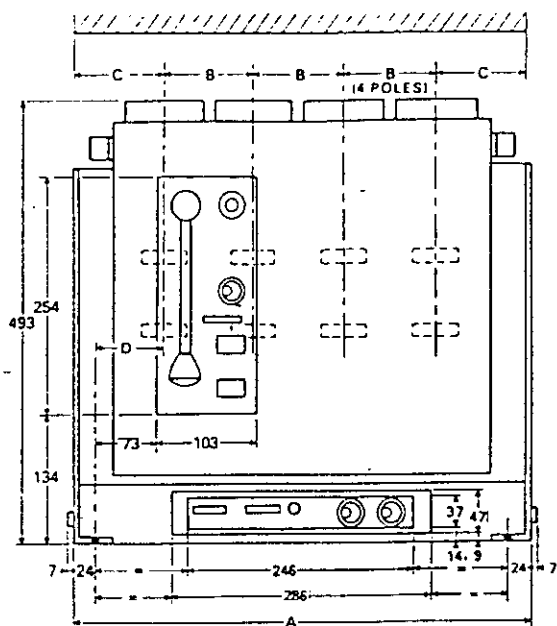


#### REAR vertical



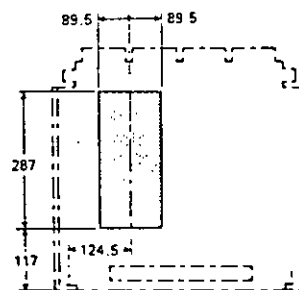
## b - withdrawable breaker

on horizontal crossmembers (4 holes  $\varnothing 10$ ) block, if necessary, to prevent deformation when tightening.



breaker	no. of poles	A	B	C	D
L 640-1000	3	399	98	101.5	77.5
	4	487	98	96.5	72.5
L 1250	3	487	115	128.5	104.5
	4	555	115	105	81
L 1600	3	487	130	113.5	89.5
	4	621	130	115.5	91.5
L 2000	3	555	150	127.5	103.5
	4	701	150	125.5	101.5

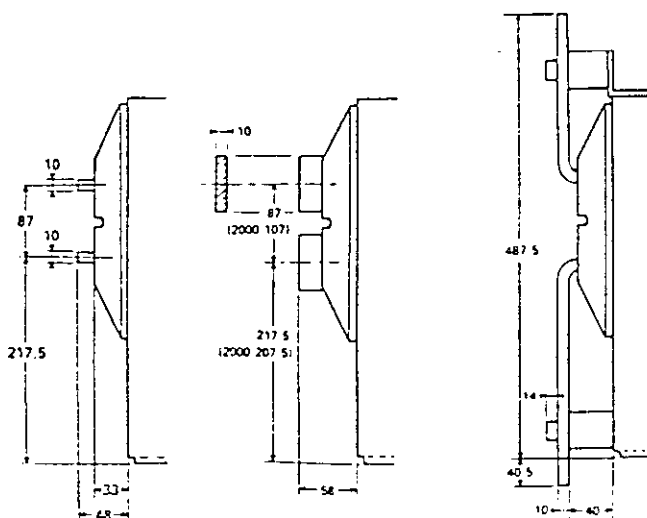
panel cutout for fitting gasket



- (1) insulator  
(2) breaker connected

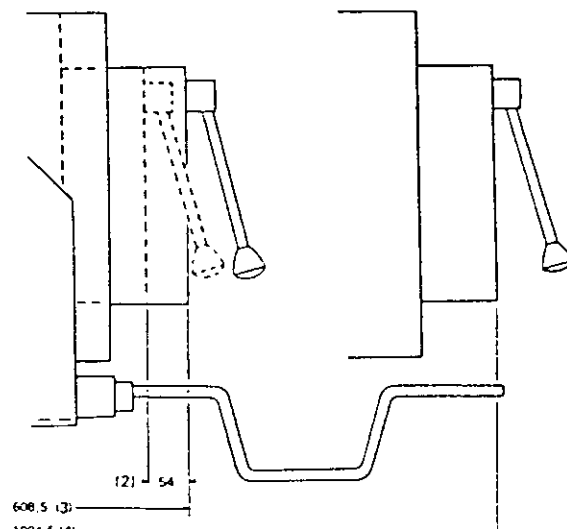
lugs

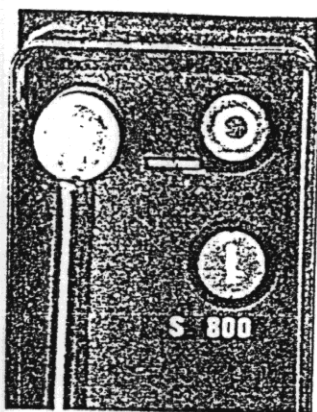
REAR horizontal REAR vertical FRONT



"disconnected-isolated" position

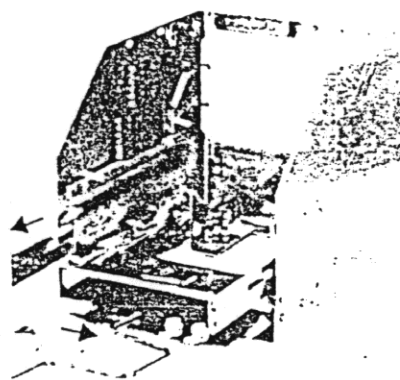
"withdrawn" position





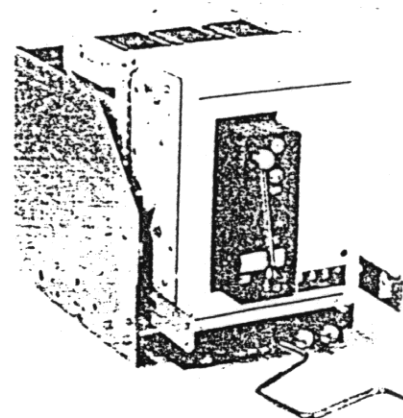
Electrically operated breaker :

- press successively on the close and open push buttons to release the energy storage spring

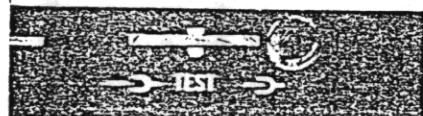
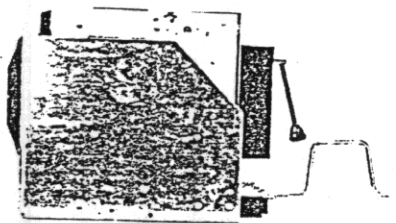


Placing the breaker in position :

- Push the pull handle to introduce the insertion crank
- Turn insertion crank counterclockwise, as far as possible.



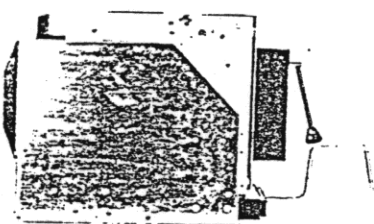
- pull the retractable rails all the way out.
- set the breaker on the rails
- push the breaker, then the rails all the way back in. This position is the "disconnected" position



positions of the breaker in its cradle

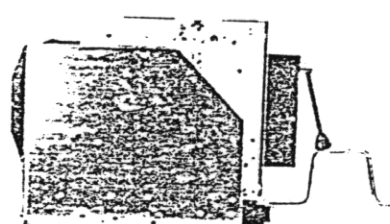
- "connected"

turn the crank clockwise, as far as possible, main and auxiliary circuits are connected.



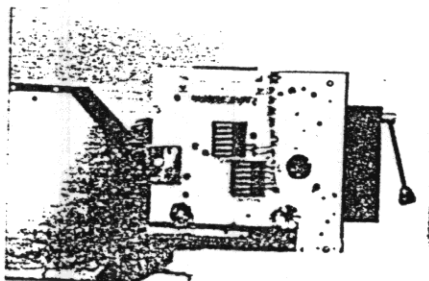
- "Test"

turn the crank and stop on the "Test" mark, main circuit isolated, auxiliary circuits connected



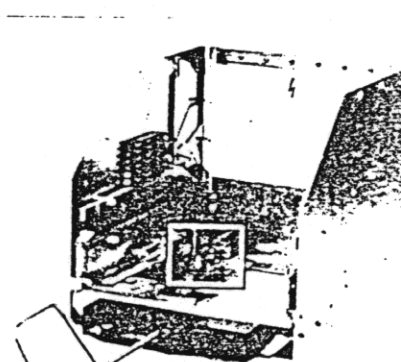
- "disconnected"

turn the crank counterclockwise, all the way, main and auxiliary circuits isolated.



- "withdrawn"

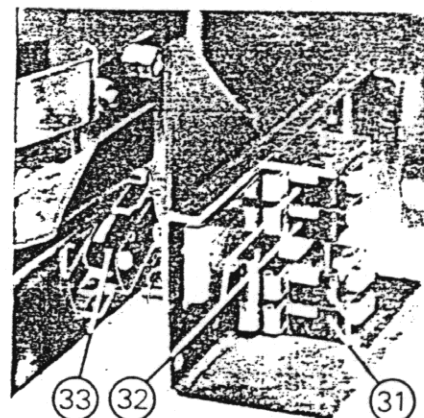
push the retractable rails all the way out and bring the breaker to extract position



position signalling contacts on cradle

- "connected"

1 or 2 contacts NO+NC with common point operated by the circuit-breaker at end of



- "disconnect"

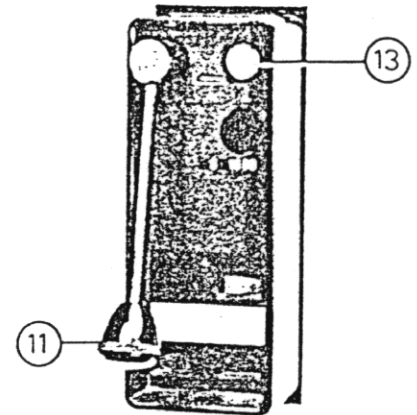
1 or 2 contacts NO + NC with a common point operated by the circuit-breaker at end of withdrawal or beyond the «test» position (31).

## circuit-breaker

### a - manual operation

- resets the overcurrent release.
  - push BPD (13) all the way in.
  - setting
  - turn the handle (11) counterclockwise
- If the opening manipulation has not already been done, the trip takes place at the beginning of the setting travel.

- closing
- turn the handle (11) clockwise until sudden closing (maximum torque at beginning of travel)
- necessity of voltage present on the MV or MVR provided.
- opening
- locally by push button (13) BPD
- remotely by voltmetric releases

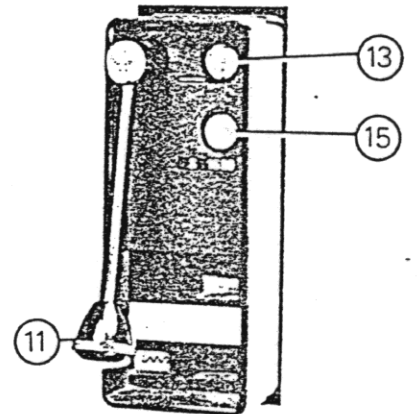


### b - electrical operation

electrical operation with stored energy : the stored energy spring is automatically set after the breaker is closed

- closing
- locally by the green trip push button (15)
- remotely by solenoid
- opening
- locally by red trip push button (13)
- remotely by voltmetric releases

- if the breaker is made by a permanent contact, after a trip, momentarily interrupt the closing command to obtain the reclosing
- closing by emergency handle :
- handle on the breaker, when deactivated, is in vertical position
- manual setting : work handle back and forth until the strain disappears



note :

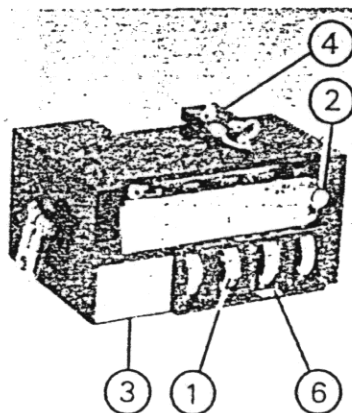
Push button BPD (13) resets the overcurrent release unless the breaker is automatically reset with or without signaling with memory.

## protection

Resets the breaker manually after operation by overload and short circuit, pressing local trip push button BPD, if the breaker is local reset

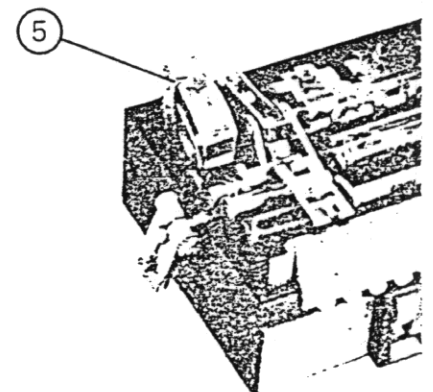
Each pole has a double ratio current transformer (CT) which energizes series the bimetallic strip and one of the windings of the solenoid

the magnetic operation threshold depends upon the choice of the current transformer connector and the choice of connector M1 or M2 on the release.



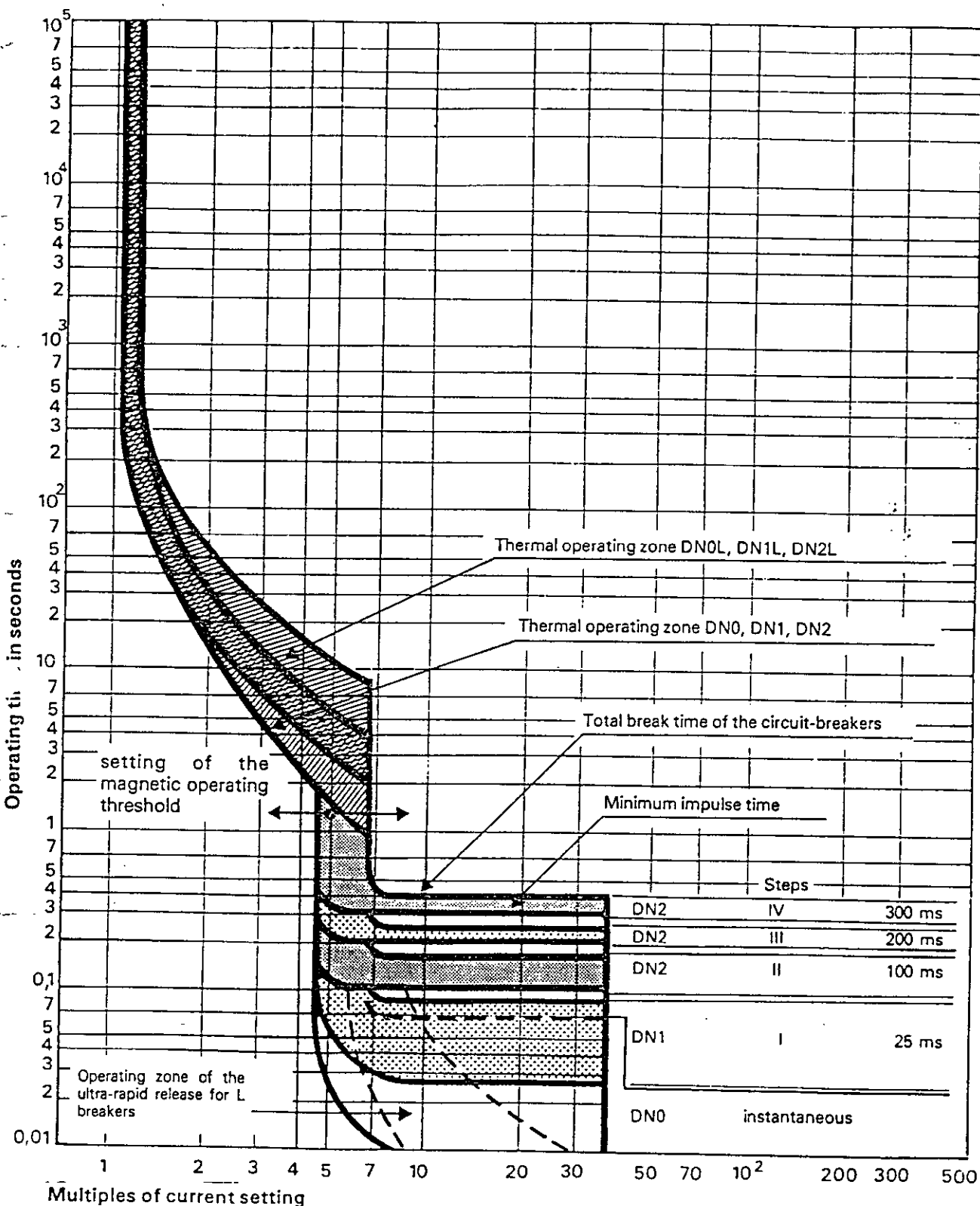
### overcurrent release DN

- 1 - setting index of each bimetal.
- 2 - "TEST" push button for



- 5 - pulse time setting index (100 to 300 ms) on DN2, DN2L
- 6 - current label

• operating zone



• setting and operating values

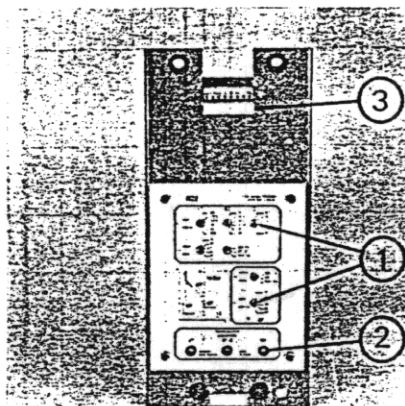
Each pole is normally equipped with an ultra-rapid release set at 7.5 times the current rating of the breaker. The operating threshold of the ultra-rapid release can be set at another value on request (see setting and operating values table).

Breaker	Release DN (overload and low short-circuit currents)				Ultra-rapide release (short-circuits)			
	current transformer type	Range of thermal adjustment in A tap	magn. operat. current in A (= 20 %)		stand. threshol (= 20 %) oper. adjustable in A	low threshol (= 20 %) oper. adjustable in A		
		0.75 to 1	DN0, 1, 2	DN0, 1, 2 A	cur. in A from	cur. in A from	to	to
			DN0, 1, 2L	DN0, 1, 2 AL				

Breaker	Release DN (overload and low short-circuit currents)								Ultra-rapide release (short-circuits)							
	current		Range of thermal		magn. operat. current in A (± 20 %)				stand. treshold (± 20 %)			low treshold (± 20 %)				
	transformer		adjustement in A		DN0, 1, 2		DN0, 1, 2 A		oper.		adjustable in A		oper.		adjustable in A	
	type	tap	0.75 to 1		DN0, 1, 2L		DN0, 1, 2 AL		cur. in A	from to		cur. in A	from to			
					tap M1	tap M2	tap M1	tap M2	7.5 In				3 In			
L 1000	640	500	375	500	2000	2700	1150	1450	7500	4500	7500	3000	2000	4500		
		640	480	640	2500	3200	1450	1800								
	1000	800	600	800	3200	4000	1800	2250								
		1000	750	1000	4000	5200	2250	2900								
L 1250	800	640	480	640	2500	3200	1450	1800	10000	6000	15000	4000	3000	6000		
		800	600	800	3200	4000	1800	2250								
	1250	1000	750	1000	4000	5200	2250	2900								
		1250	940	1250	5200	6400	2800	3600								
L 1600	1000	800	600	800	3200	4000	1800	2250	12000	6400	20000	5000	5000	6400		
		1000	750	1000	4000	5200	2250	2900								
	1600	1250	940	1250	5200	6400	2800	3600								
		1600	1200	1600	6400	8300	3600	4600								
L 2000	1250	1000	750	1000	4000	5200	2250	2900	15000	6400	20000	6000	5000	6400		
		1250	940	1250	5200	6400	2800	3600								
	2000	1600	1200	1600	6400	8300	3600	4600								
		2000	1500	2000	8300	10500	4500	5800								

### electronic relay RZ

resets the breaker manually after operation by overload and short circuit, pressing local trip push button BPDL if the breaker is local reset



- 1 - setting index
- 2 - operating signal and indicator lamp (manual resetting) equipped with a T contact
- 3 - CT (current transformer) connector label.

each protected pole of the breaker is equipped with a double ratio CT which powers relay RZ.

relay RZ powers a stricker EX to open the breaker.

This system does not require auxiliary power : supply.

Note :

To check the proper operation of relay RZ, there is a test set which can be supplied upon request (see catalog).

### • setting and operating values

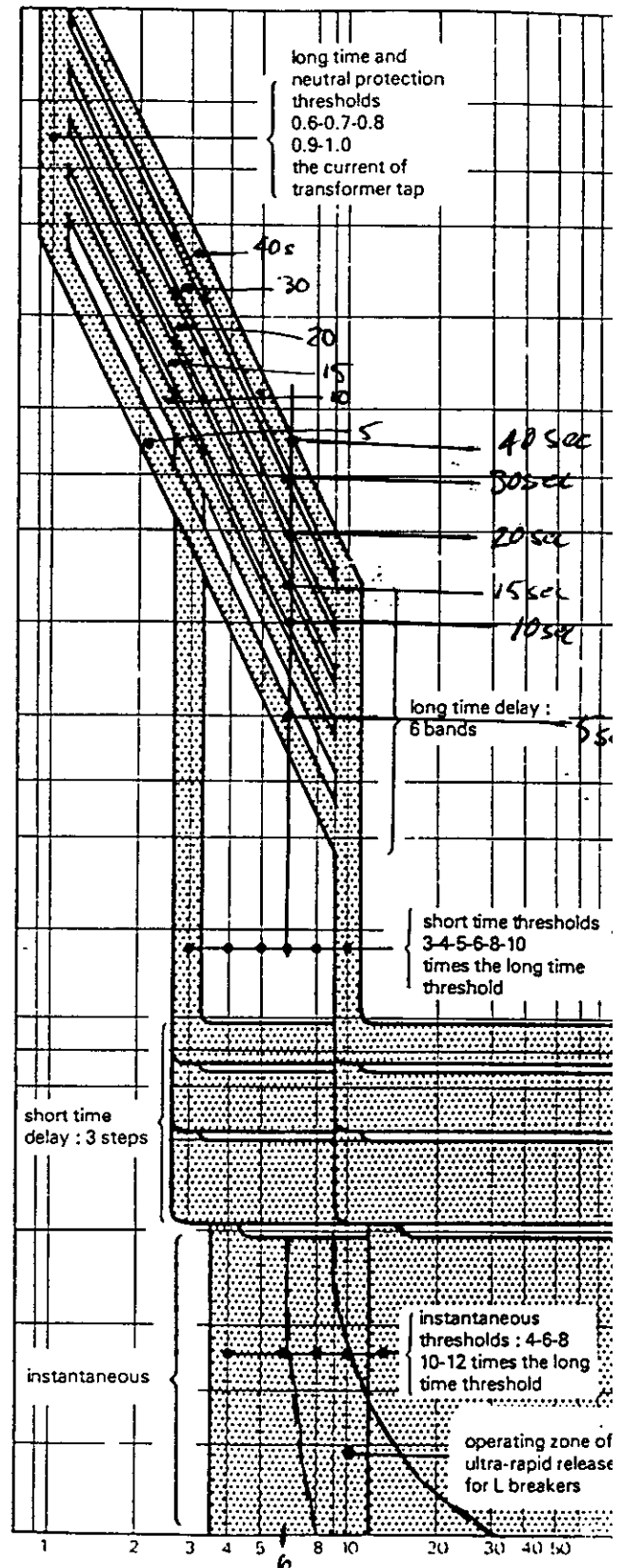
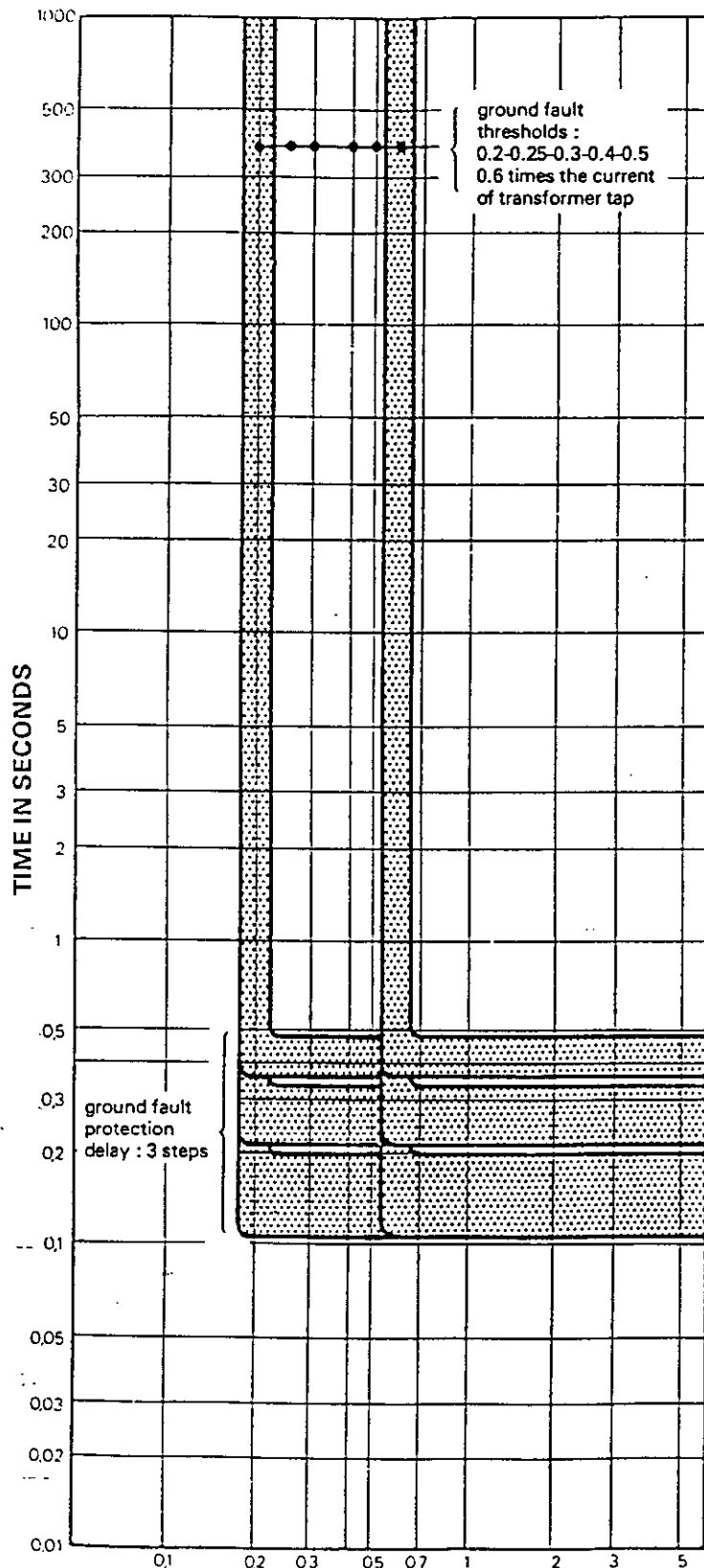
L 640	640	320	192	224	256	288	320	320	64	80	96	128	160	192
		640	384	448	512	576	640	640	128	160	192	256	320	384
L 1000	1000	500	300	350	400	450	500	500	100	125	150	200	250	300
		1000	600	700	800	900	1000	1000	200	250	300	400	500	600
L 1250	1250	640	384	448	512	576	640	640	128	160	192	256	320	384
		1250	750	875	1000	1125	1250	1250	250	312	375	500	625	750
L 1600	1600	800	480	560	640	720	800	800	160	200	240	320	400	480
		1600	960	1120	1280	1440	1600	1600	320	400	480	640	800	960
L 2000	2000	1000	600	700	800	900	1000	1000	200	250	300	400	500	600
		2000	1200	1400	1600	1800	2000	2000	400	500	600	800	1000	1200

### • ultra-rapid release setting

Breaker	standard threshold ( $\pm 20\%$ )			low threshold ( $\pm 20\%$ )		
	operating current in A	adjustable in A		operating current in A	adjustable in A	
	7.5 In	from	to	3 In	from	to
L 640	5000	4500	7500	2000	2000	4500
L 1000	7500	4500	7500	3000	2000	4500
L 1250	10000	6000	15000	4000	3000	6000
L 1600	12000	6400	20000	5000	5000	6400
L 2000	15000	6400	20000	6000	5000	6400

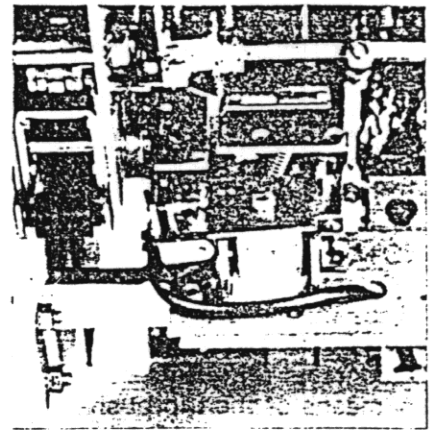
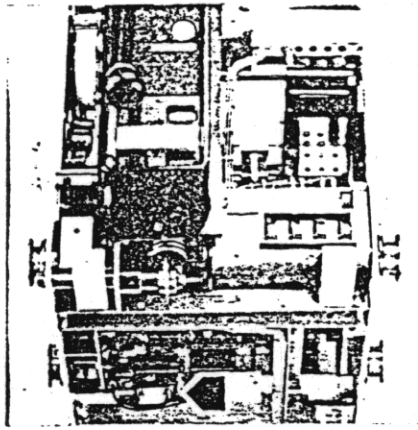
Test current value for Long Time Delay  
 = LTPU setting X 1 Ampsec X (6X)

- operating zones



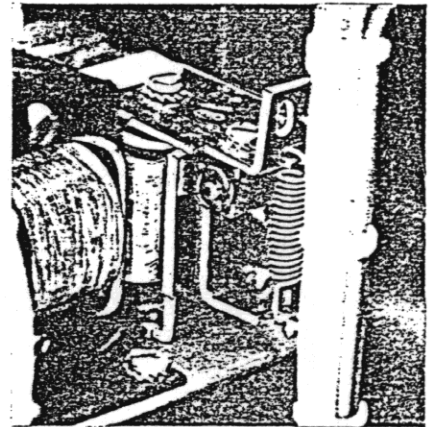
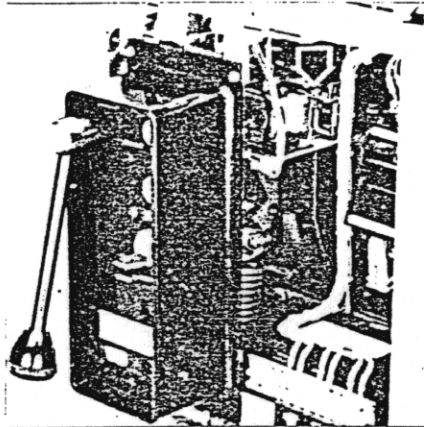
## voltmetric releases

2 releases EA, EA1, MV or MVR can be provided on the breaker. they are reset by the main shaft at the end of the trip operation if the breaker has an over-current release DN2, DN2L (time delay of 100 to 300 ms), it is preferable to provide an MVR release instead of an MV release



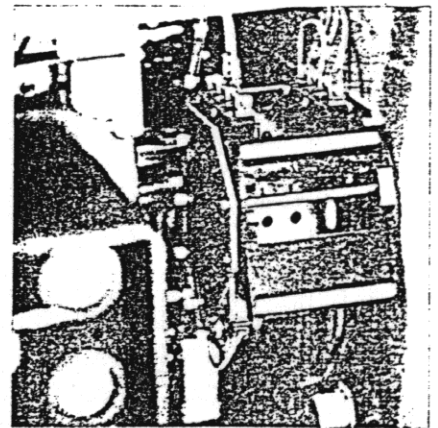
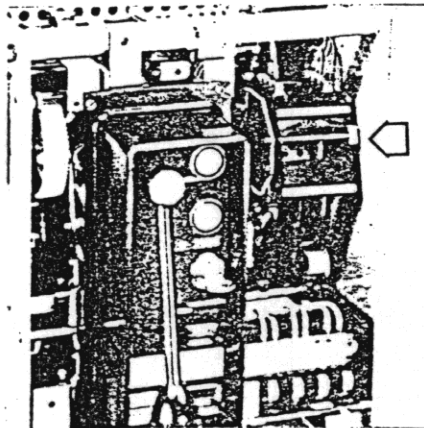
## inhibited closing

- manually-operated breaker: obtained with voltmetric releases MV and EA.
- electrical-operated breaker. special optional feature independent of the MV release but with identical characteristics



## auxiliary contacts

- 1 to 4 contacts operate at the beginning of the closing of the poles.  
CA5, CA6, CA7, CA8
- 1 to 4 contacts operate at the same time as the main poles CA1, CA2, CA3, CA4

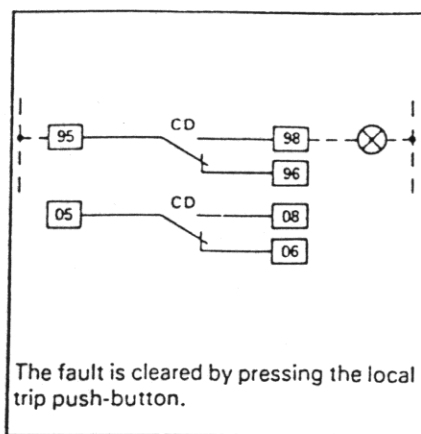


## fault signalling contacts and indicators

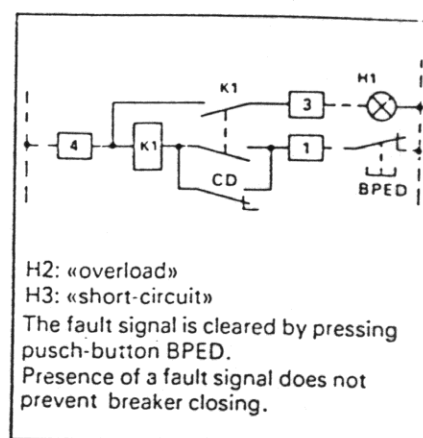
- fault : common signalling "overload and short-circuit" possibility of 2 contacts NO+NC with common point (CD) actuated upon operation, of the magneto-thermal release DN or of the electronic relay RZ

— contacts for local resetting by means of the trip push-button.

— contacts momentarily actuated for electrically-operated air circuit-breaker (on request)

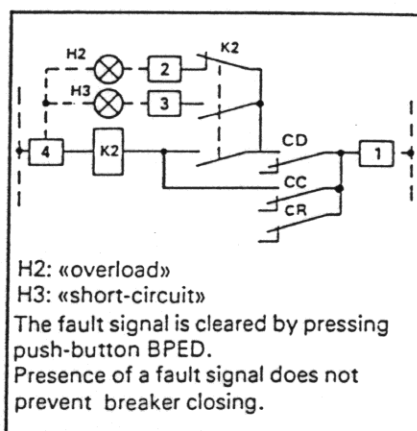


- manually and electrically-operated breaker (with local resetting)

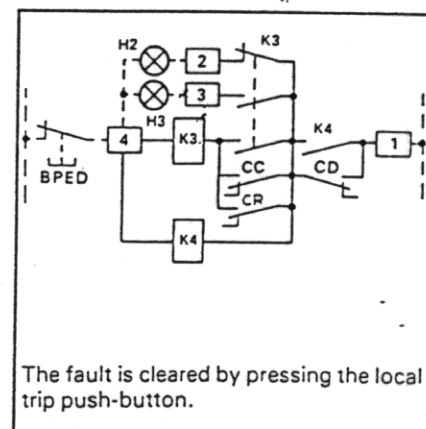


- electrically-operated circuit-breaker (with automatic resetting)

- fault : separate signalling "overload and short-circuit" can be mounted in factory on air circuit-breakers with release DN use of the adjacent contact CD with 1 contact NO+NC with common point (CC), momentarily actuated by the magnetic parts of the magneto-thermal release DN



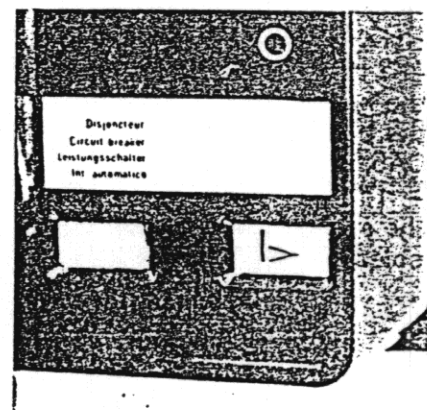
- manually and electrically-operated breaker (with local resetting)



- electrically-operated circuit-breaker (with automatic resetting)

- operation of the voltmetric releases MV, MVR, EA, EA1 momentarily actuated contacts NO+NC with common point
- C43 operated by MV or MVR
- C31 operated by EA or EA1

- voltage present on voltmetric release MV or MVR can be mounted in factory possibility of (C 43) 1 contact NO+NC with common point operated directly by the coil



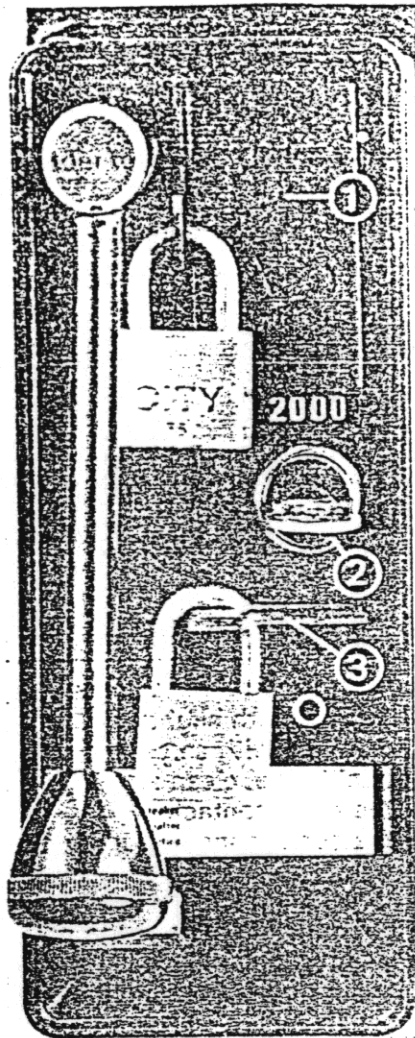
- mechanical indicator for common fault "overload and short-circuit" (only for release with local resetting)
- black : normal

## interlocking

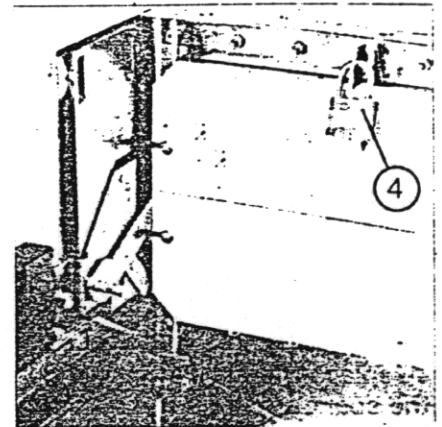
a - fixed and withdrawable circuit-breakers

(1) interlocking of buttons of local control by padlocks for electrically operated circuit-breaker : unbreakable shutter preventing access to the closing and trip push-buttons.

(3) interlocking in "tripped" position by padlocks  
— push BPDL all the way in, to pull the padlocking-tab



(2) interlocking in "tripped" position by lock  
— push BPDL all the way in, and turn the key

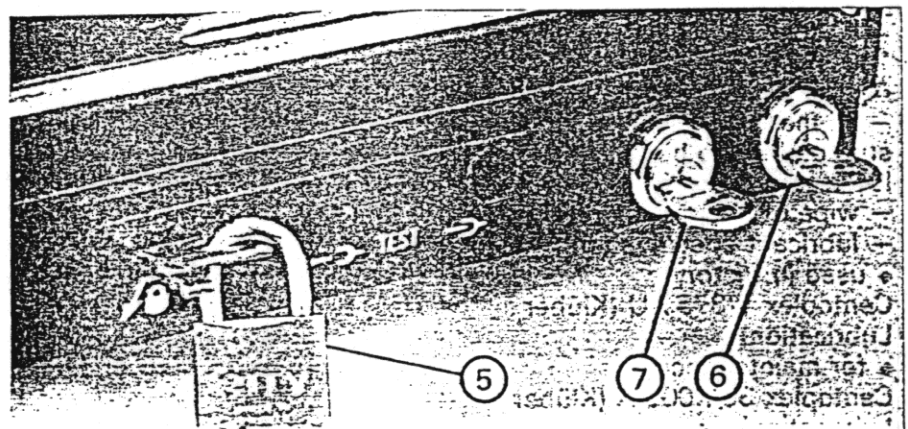


b - withdrawable circuit-breaker

(4) padlocking on isolating shutter

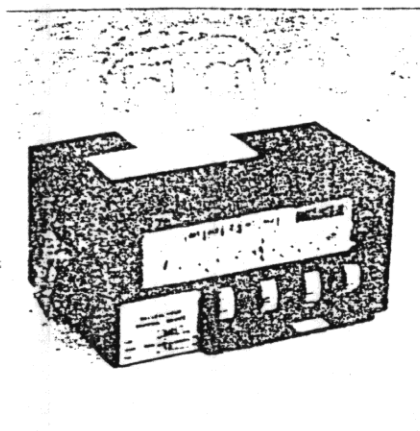
(5) interlocking in "withdrawn" position by padlocks  
standard on basic breaker model

— place the breaker in withdrawn position  
— pull out the handle  
— push the padlocking tab all the way to the left, then pull



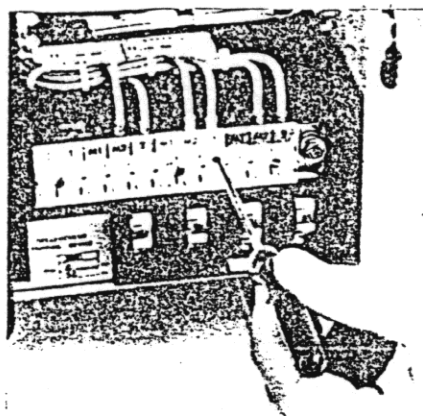
(6) interlocking in "withdrawn" position by 1 lock

(7) interlocking in "withdrawn" position by second lock or interlocking in "service" position

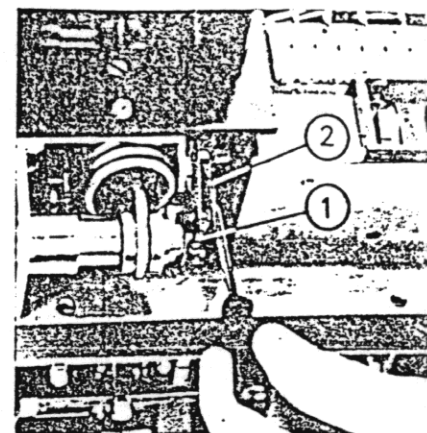


# 1 - overcurrent release DN

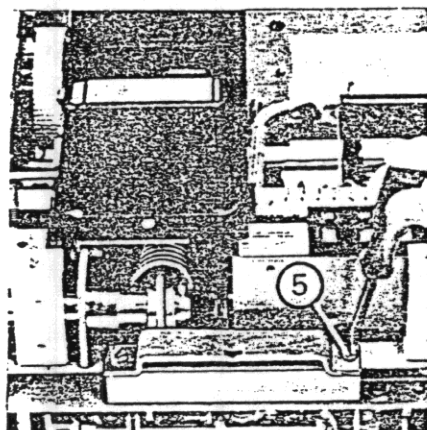
- replacement



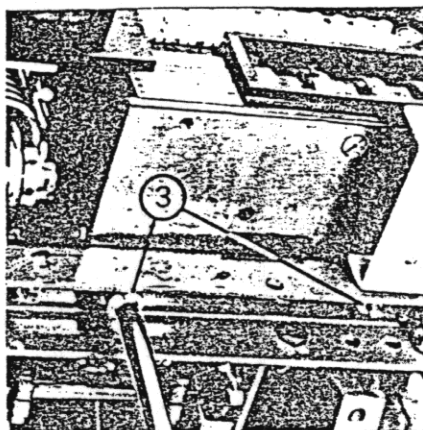
1 - 1 after removing front cover breaker in "open" position — disconnect wiring of terminals



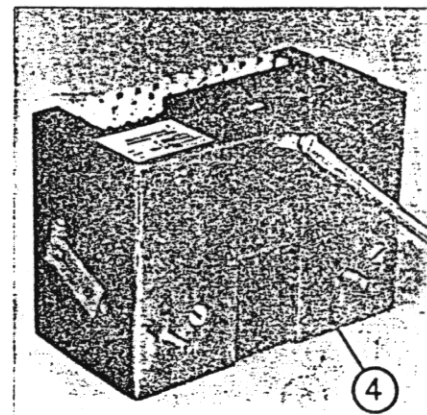
1 - 2 uncouple rod (1) of the connecting rod assembly (2)



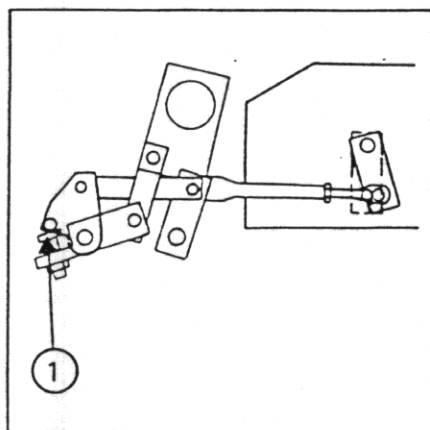
1 - 3 remove the hanging (5)



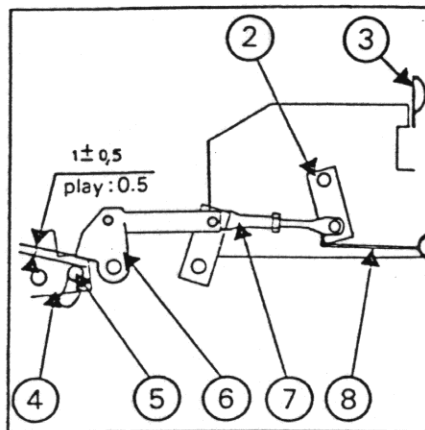
1 - 4 unscrew nuts (3)



1 - 5 remove the plate (4) with the isolating plate and put it on new release — reassemble in reverse order.

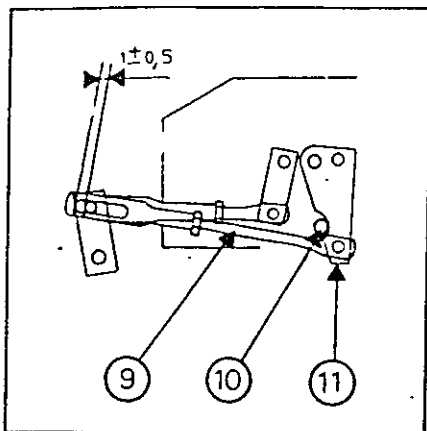


1 - 6 checking  
□ trip  
breaker in "open" position  
— reset setting screw (1)  
unscrewed as far as possible



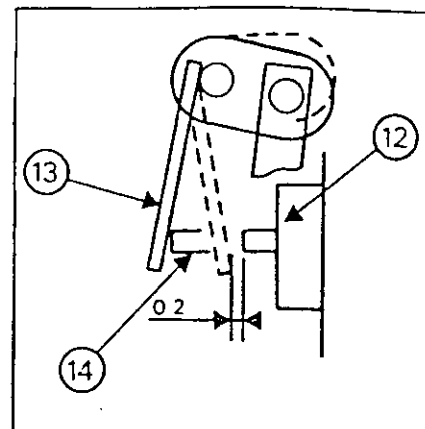
1 - 7 with the release latched, adjust rod (7) to obtain a dimension  $1 \pm 0.5$  between the striker (6) which is brought under pressure at trip and the head (5) of latching bolt (4) in

1 - 8 breaker on "closed" position.  
— check that there is a minimum play of 0.5 mm between striker (6) which comes under pressure at the release of head (5) from hook (4) in deactivated position.  
WEAR LIMIT : 0.1  
— hold crank (2) using hook (8) to prevent the release from resetting when the breaker opens and depress TEST push button (3)  
— check that the breaker trips by slowly letting go

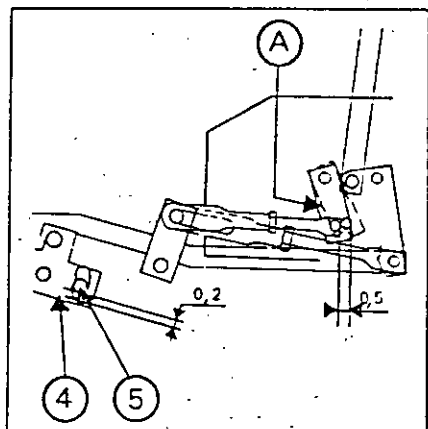


**1 - 9** reset  
breaker without trip signaling  
with memory (local reset circuit  
breaker)

**1 - 10** breaker in "open"  
position, release tripped, crank  
(11) held against stop (10)  
— adjust rod (9) to obtain  
dimension  $1 \pm 0.5$

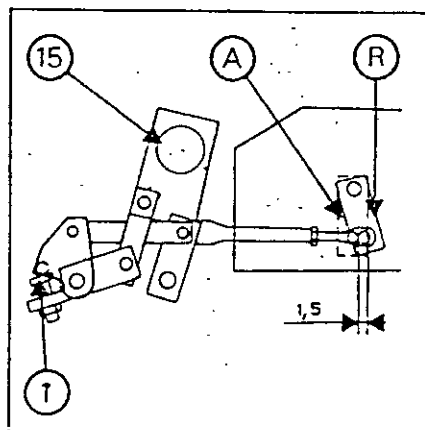


**1 - 11** push button BPD all  
the way in  
— adjust screw (13) to latch the  
release  
— unscrew one turn to obtain  
the reset safety



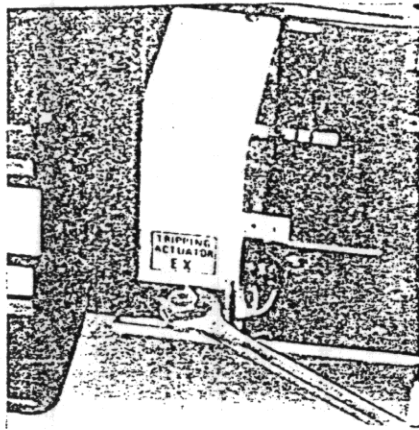
**1 - 12** press button BPD and  
check the presence of a latch  
safety margin of 0.5 mm :  
return of the release crank on  
latch  
— check the presence of a

**1 - 13** minimum play of  
0.2 mm between blade (14) and  
setting screw (13)  
— press button BPD (13) all  
the way in  
— check the presence of a  
minimum play of 0.2 mm  
between head (5) of bolt  
(4) and the end of the slot  
(A) : latched



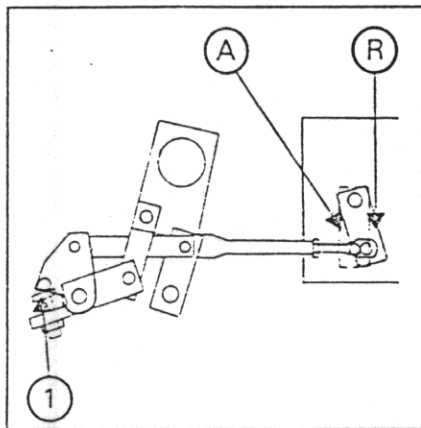
**1 - 14** fitted with a trip  
signaling  
with memory (circuit-breaker  
with automatic reset)

**1 - 15** breaker in "open"  
position  
— set screw (1) to obtain the  
latching of the release  
— screw 3/4 of a turn to obtain  
the reset safety  
— apply pressure at closing on  
shaft (15)  
— check for presence of a  
latching safety of 1.5 mm :  
return the release crank on  
latching  
WEAR LIMIT : non-latching  
(A) : latched  
(R) : reset



3 - 3 unscrew the nut

3 - 4 reassemble the new release in reverse order

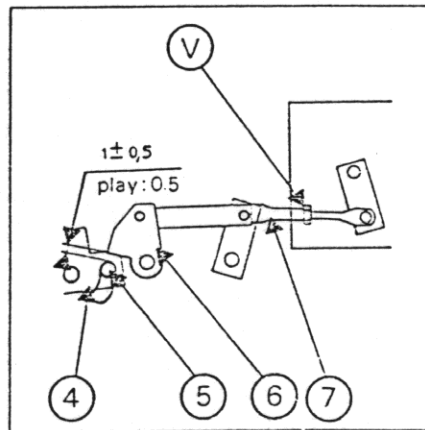


3 - 5 checking

- trip
- breaker in "open" position
- reset setting screw (1)
- unscrewed as far as possible

3 - 8 reset

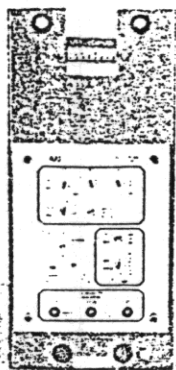
checking operations identical at DN (see page 16)



3 - 6 with the release latched, adjust rod (7) to obtain dimension  $1 \pm 0.5$  between striker (6) which comes under pressure at the release of head (5) from hook (4) in deactivated position

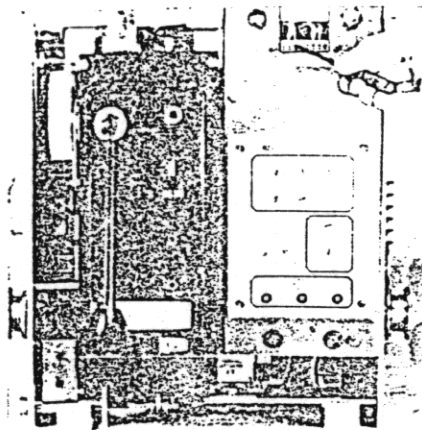
3 - 7 breaker in "closed" position

- check that there is a minimum gap of 0.5 mm between striker (6) which comes under pressure at the release of head (5) from lock bolt (4) in deactivated position
- WEAR LIMIT : 0.1
- connect the test unit and test the various functions of the instructions included in this set.
- check that the breaker trips normally at each test.

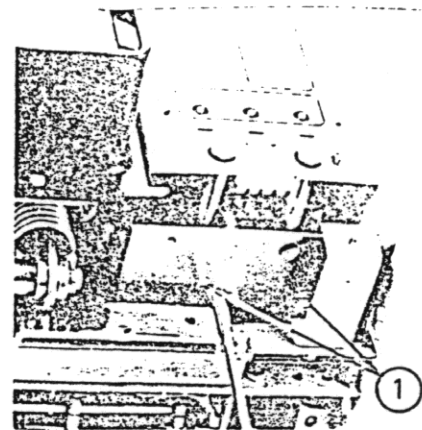


## 2 - RZ

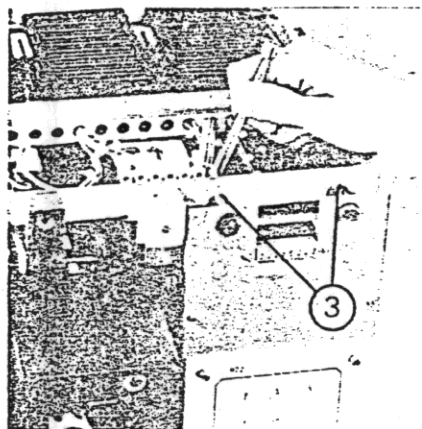
- replacement



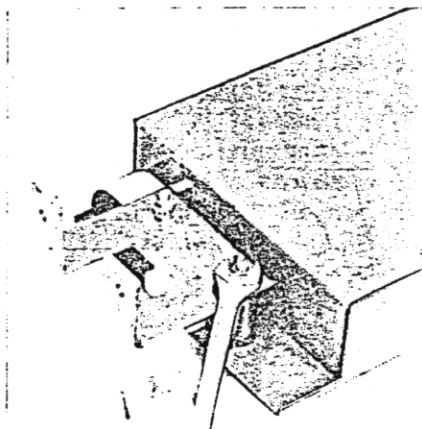
2 - 1 after removing front cover  
breaker in "open" position  
— disconned wiring of  
terminals



2 - 2 unscrew the 2 screws (1)  
of the lower support bracket (2)

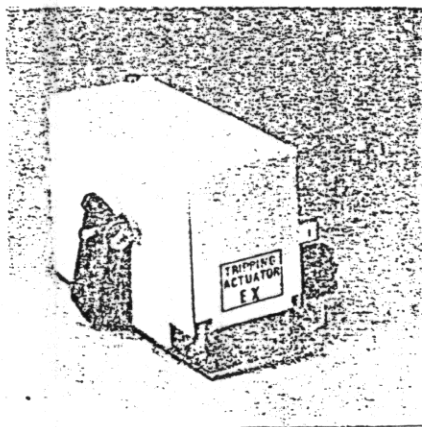


2 - 3 unscrew the 2 nuts (3) of  
upper part of the relay



2 - 4 remove the relay unit with  
lower bracket

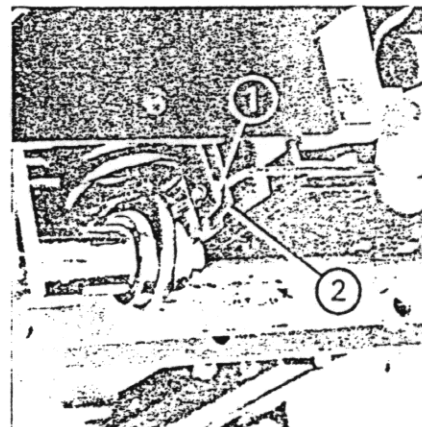
2 - 5 recover the lower bracket  
and fit it to new relay  
reassemble in reverse order  
— reconnect the wiring



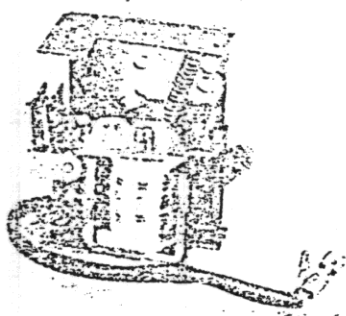
## 3 - EX

- replacement

3 - 1 remove the RZ  
(see paragraph above)

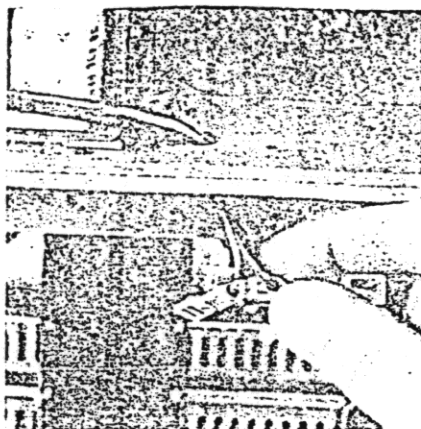


3 - 2 uncouple rod (1) of the  
connecting rod assembly (2)

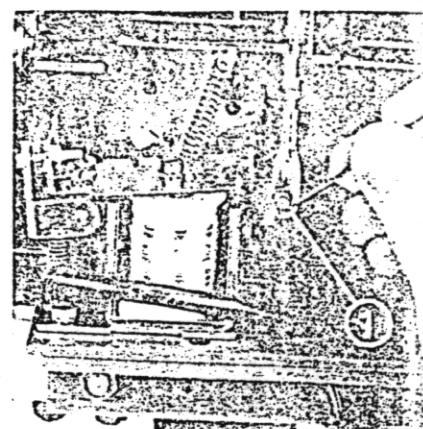


#### 4 - voltmetric releases

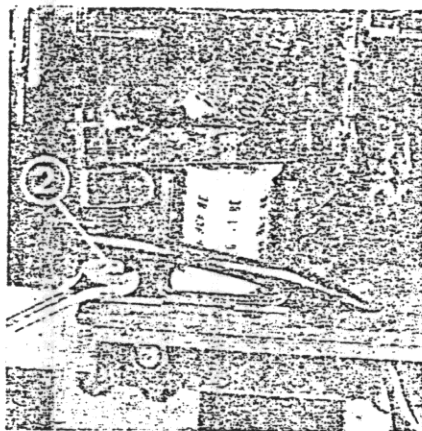
- replacement



4 - 1 disconnect the wiring from terminals

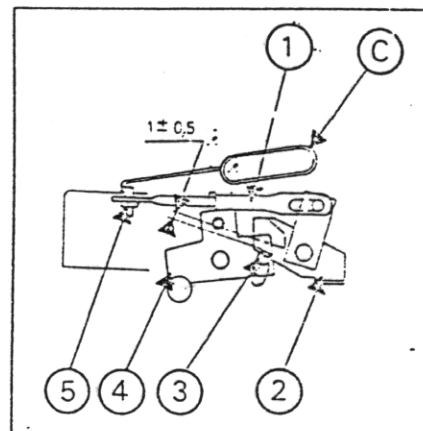


4 - 2 remove the clip (1) and uncouple rod



4 - 3 remove the 2 screws (2) and remove the release

4 - 4 reassemble in reverse order

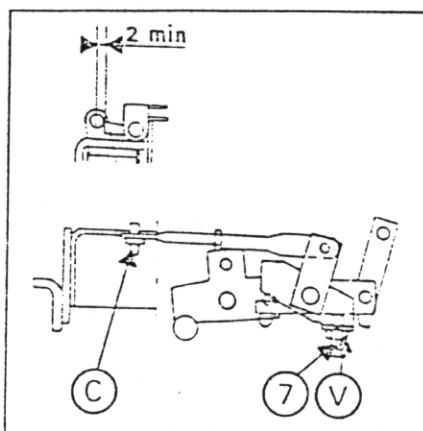


4 - 5 checking

- trip
- breaker in "open" position
- reset setting screw (7) unscrewed as far as possible

4 - 6 release latch, adjust rod (1) to obtain dimension  $1 \pm 0.5$  between the lever (2) and head (3) of locking bolt (4) in deactivated position  
WEAR LIMIT : 0.1

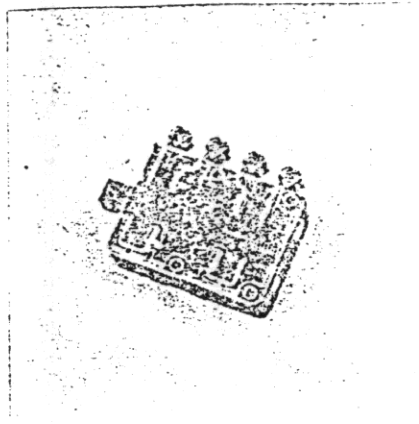
- breaker in "closed" position
- hold striker (6) with hook (C) so as to prevent reset of the release at the opening of the breaker and free the release latch
- Make sure that the breaker trips by slowly letting go



4 - 7 reset  
breaker in "closed" position  
— set screw (7) to bring striker (6) all the way forward  
— unscrew 1/2 turn

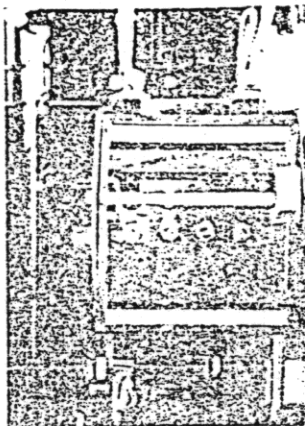
4 - 8 check for presence of a minimum reset safety margin of 2 mm.

WEAR LIMIT : no reset  
NOTE : If the breaker is fitted with 2 voltmetric releases, make sure that both work after setting.

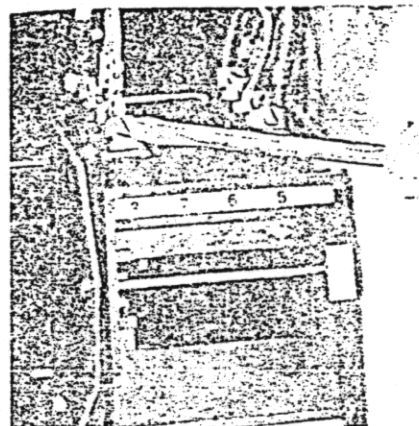


## 5 - auxiliary contacts

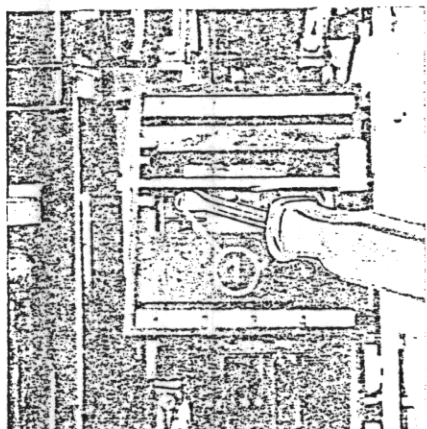
- replacement



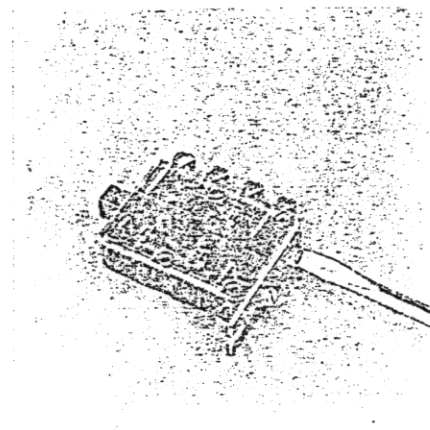
5 - 1 after removing front cover, breaker in "open" position : access to contacts 1.2.3.4. breaker in "closed" position : access to contacts 5.6.7.8.



5 - 2 disconnect the wiring

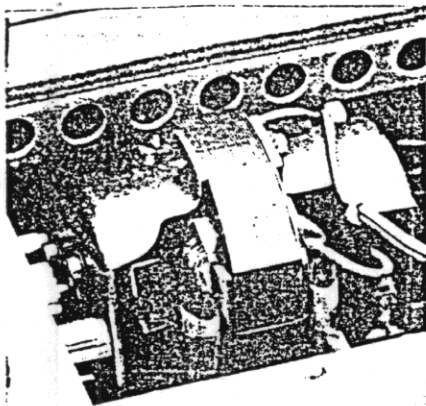


5 - 3 loosen screw (1) and remove the contact



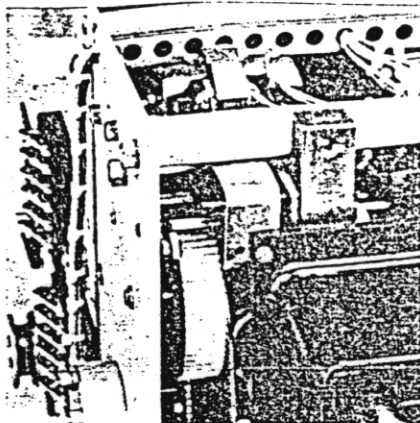
5 - 4 remove the contact from its support

5 - 5 reassemble in reverse order

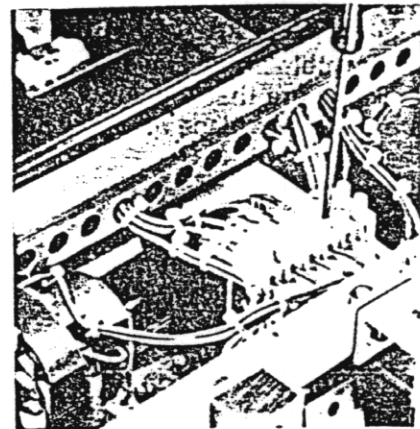


## electrical operation 6 - motor

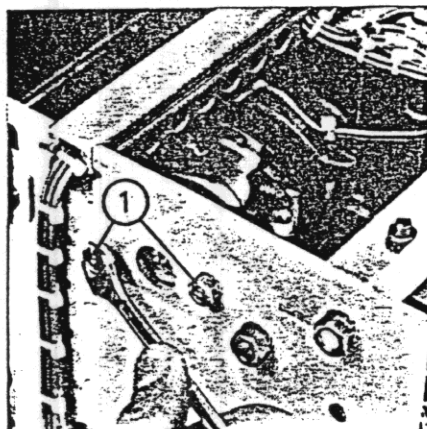
- replacement



6 - 1 after removing front cover...

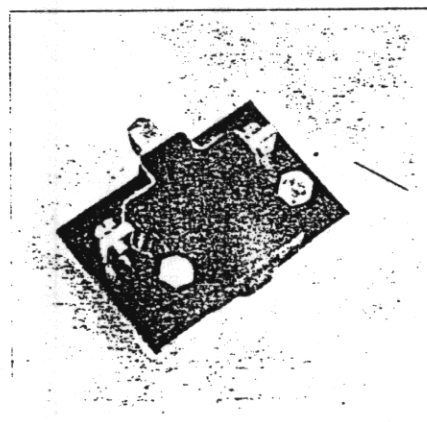


6 - 2 disconnect the wiring from terminals



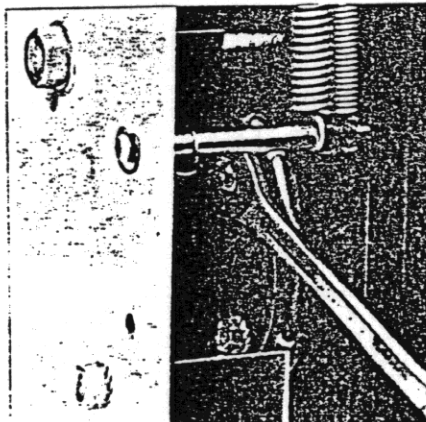
6 - 3 unscrew 2 nuts (1)  
— remove motor

6 - 4 reassemble in reverse order, making sure that there is an operating gap between the pinion and the gear wheel.  
— reconnect the wiring

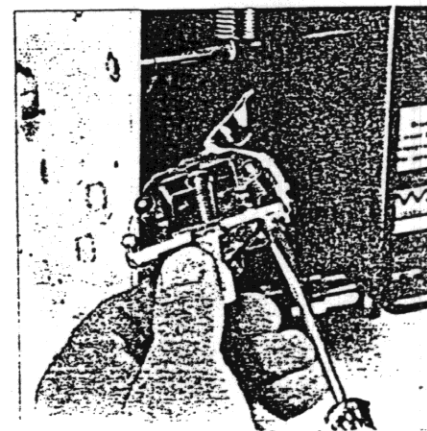


## 7 - reset limit switch

- replacement

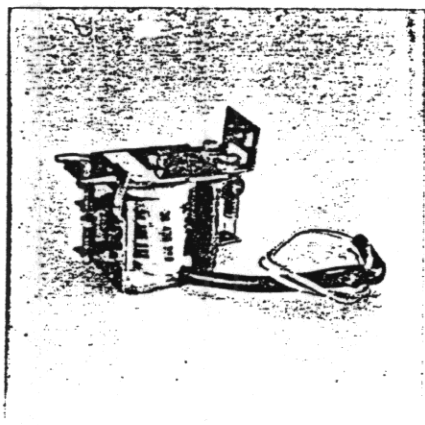


7 - 1 after removing front cover, unscrew screws (1)  
— remove contact



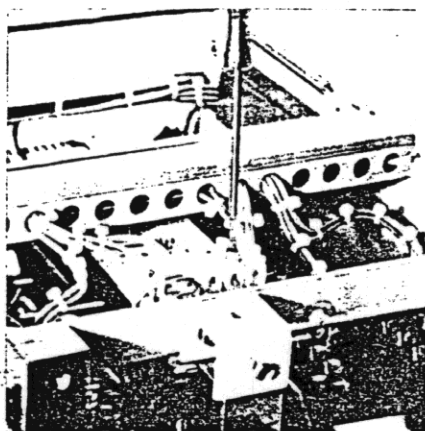
7 - 2 disconnect the wiring

7 - 3 reconnect the wiring on new contact.  
reassemble in reverse order.  
making sure that the spacers  
are always in place on the  
fastening screws.

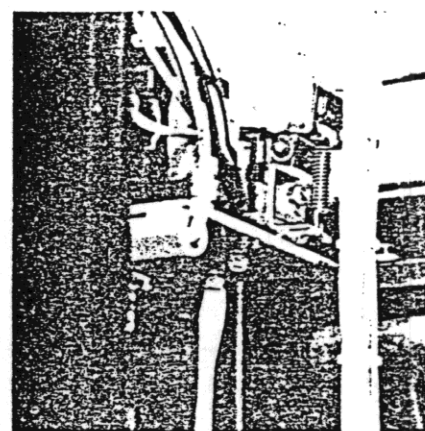


## 8 - closing prevented

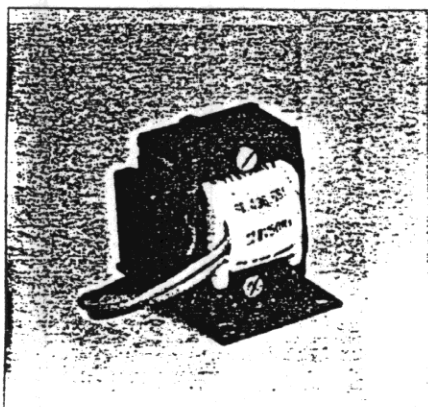
- replacement



8 - 1 after removing front cover, disconnect the wiring.

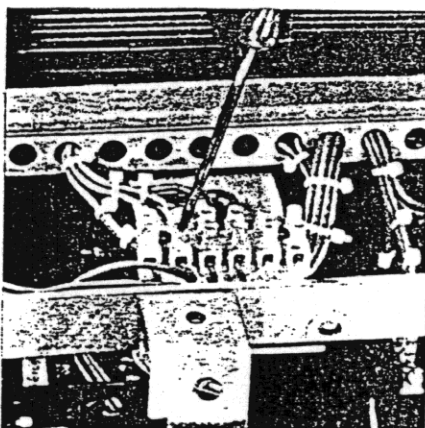


8 - 2 remove the 2 fastening screws.  
reassemble the new closing prevented in reverse order.

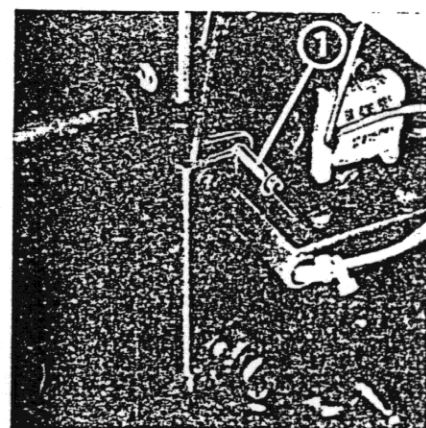


## 9 - trip solenoid

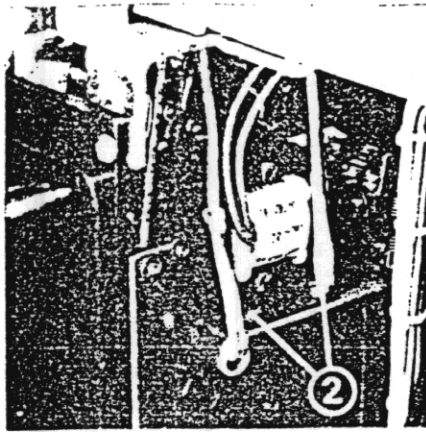
- replacement



9 - 1 after removing front cover, disconnect the wiring.

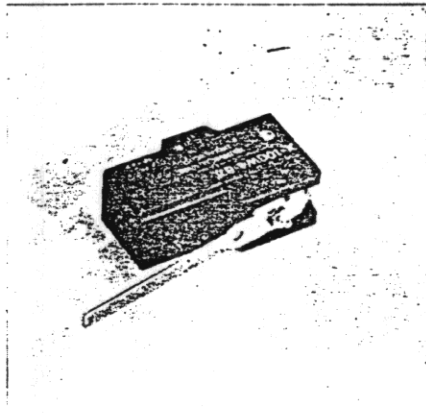


9 - 2 remove the spindle (1)



9 - 3 unscrew 4 screws (2)  
— remove solenoid

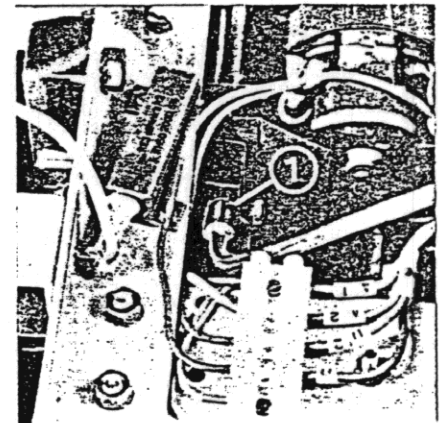
9 - 4 reassemble in reverse order.



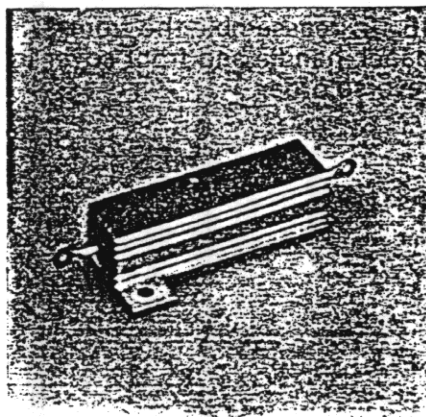
10 - insertion contact  
(for d.c. solenoid)  
• replacement



10 - 1 after removing front cover, disconnect the wiring (remove the arc chute to facilitate access to terminals)



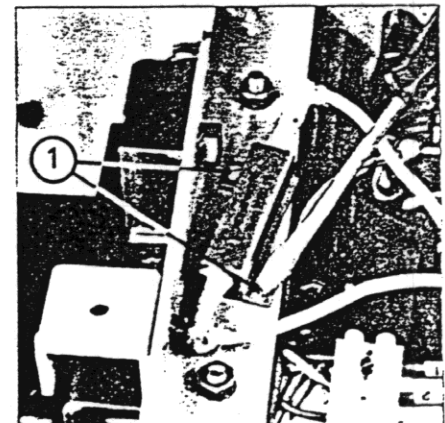
10 - 2 unscrew 2 screws (1)  
— remove contact.  
— reassemble in reverse order.



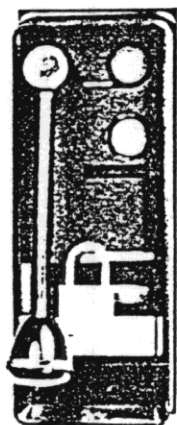
11 - economy resistor (for d.c. solenoid)  
• replacement



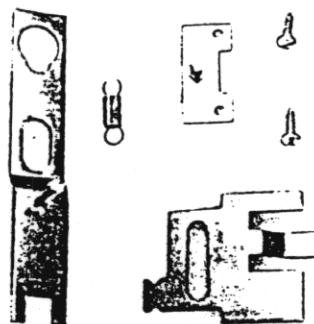
11 - 1 after removing front cover disconnect the wiring (remove the arc chute to facilitate access to terminals)



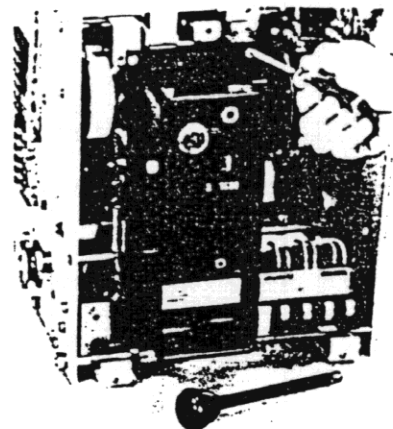
11 - 2 unscrew 2 screws (1)  
— remove economy resistor  
— reassemble in reverse order



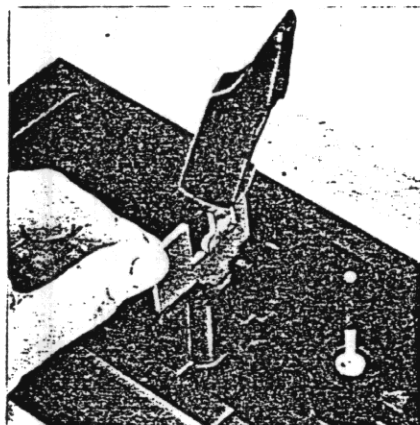
interlocking  
12 - interlocking in  
"tripped" position by  
padlocks



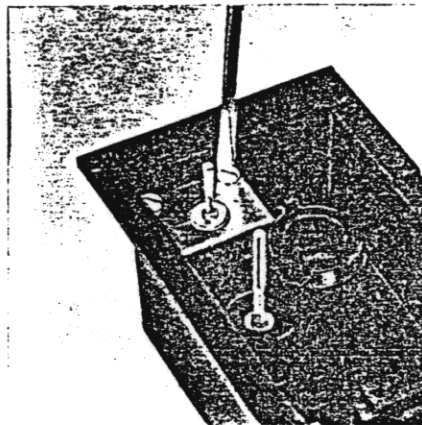
12- 1 identification



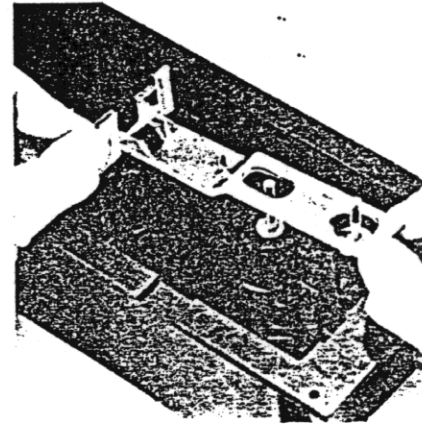
12- 2 after removing front  
cover and of the handle,  
remove the front panel



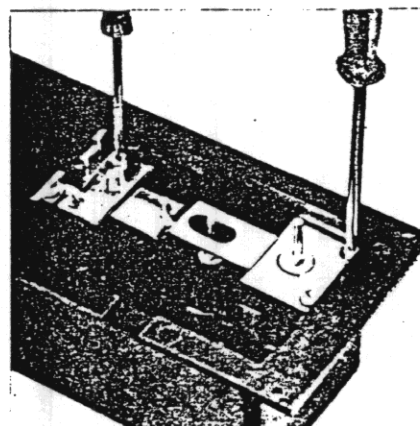
12- 3 smash the moulded cast  
of the lock



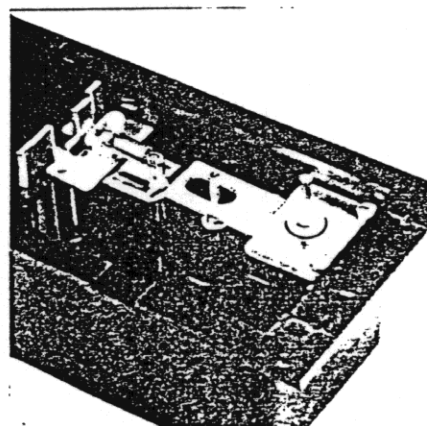
12- 4 remove the guide-plate  
of push button



12- 5 engage the connecting  
rod and lift slightly padlocking  
tab

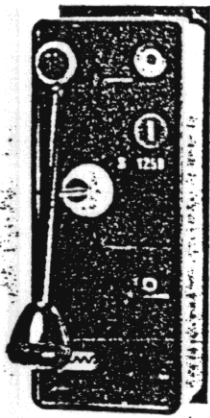


12- 6 screw back the guide  
plates

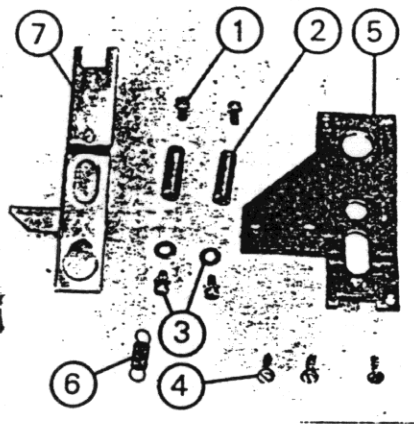


12- 7 attach the spring

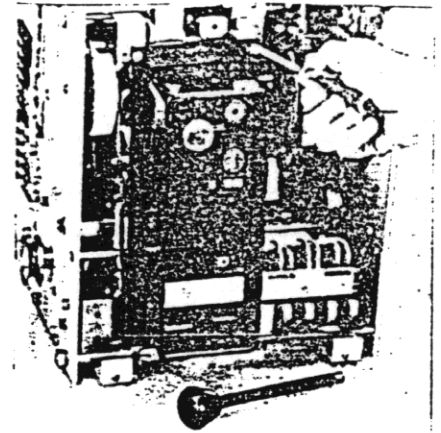
12- 8 reassemble the front  
panel, handle and front cover in  
reverse order



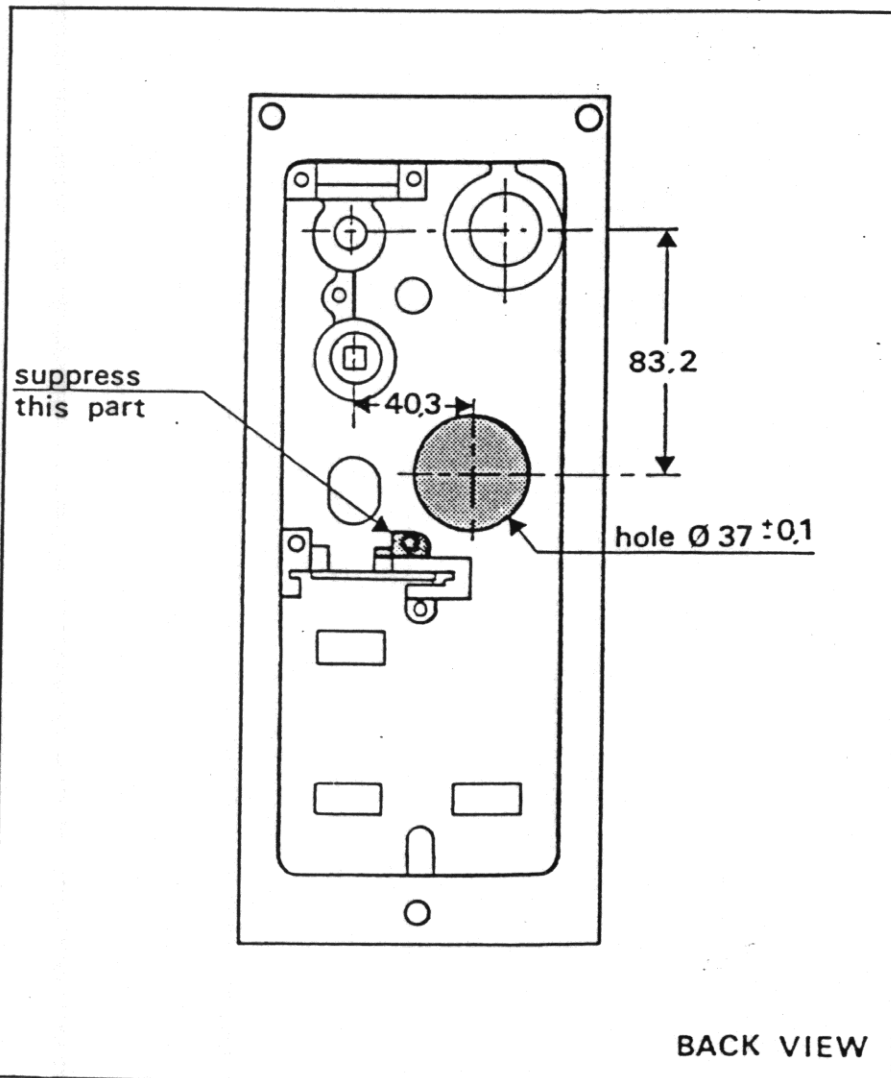
13 - interlocking in "tripped" position by kirk lock. cam type VF, option "A.O."



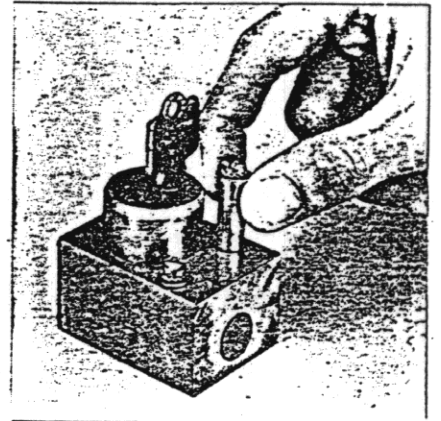
13 - 1 identification



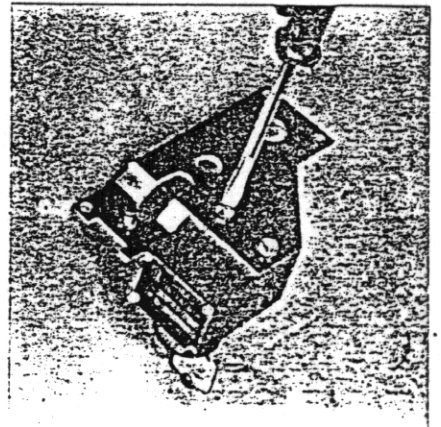
13 - 2 after removing front cover and handle, remove the front panel.



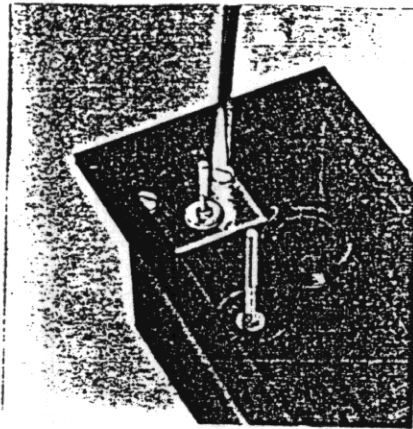
13 - 3 machine the front panel according to plan



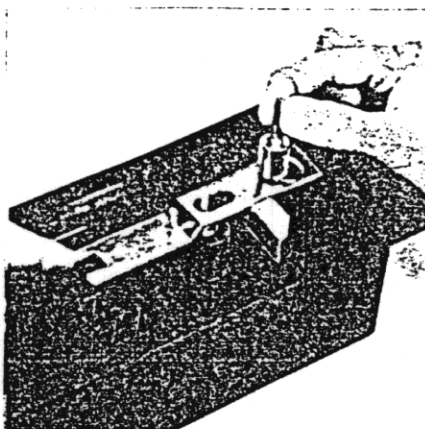
13 - 4 install the struts (2) with screws and washers (3) in the lock



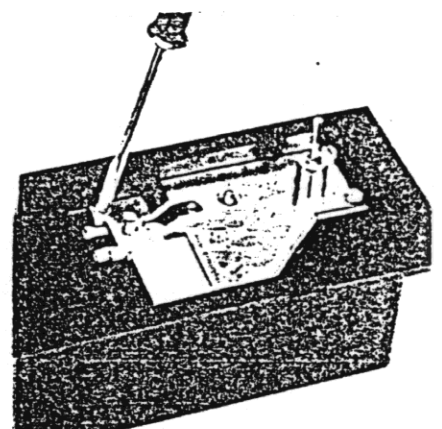
13-5 mount the lock in the support (5) with screws (1)



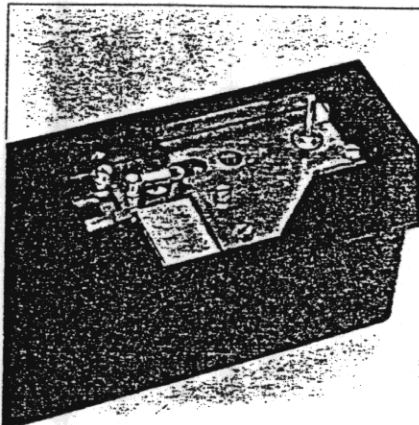
13-6 remove the guide plate of push button (useless)



13-7 engage the connecting rod (7)

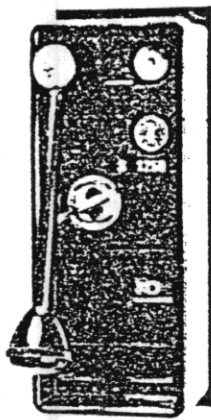


13-8 install the device lock support with 3 screws (1)

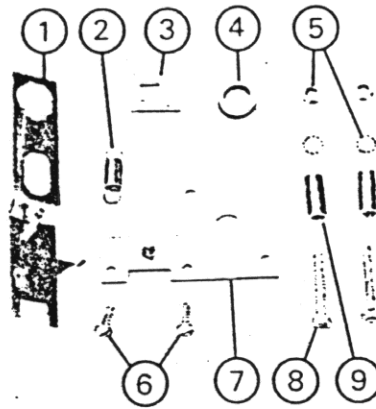


13-9 attach the spring (6)

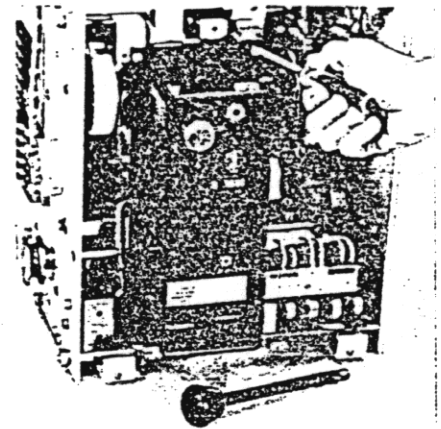
13-10 reassemble the front panel, handle and front cover in reverse order.



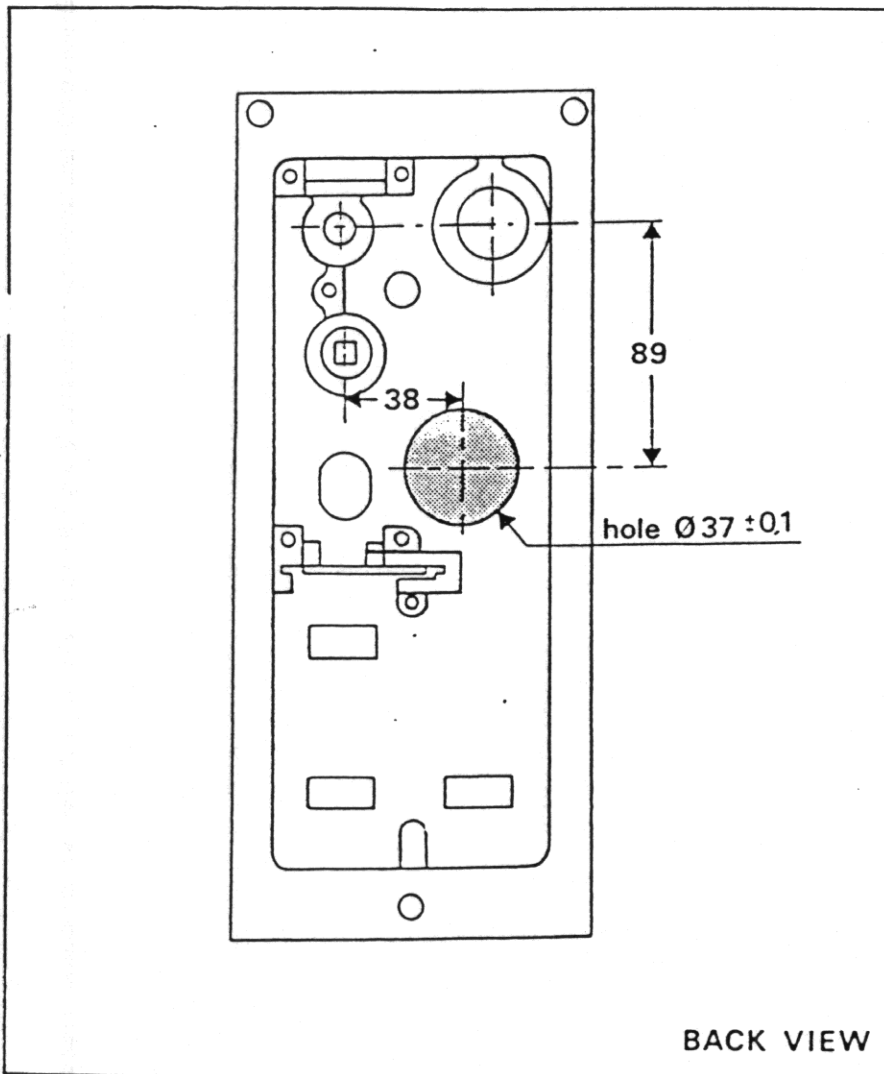
14 - interlocking in "tripped" position by Castel lock, cam type FS1



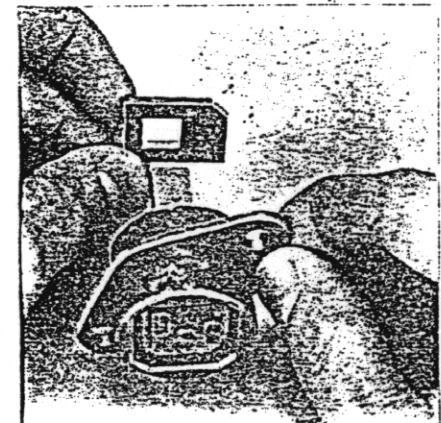
14 - 1 identification



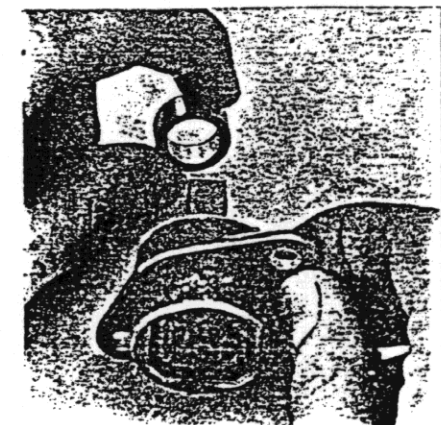
14 - 2 after removing front cover and handle, remove the front panel



14 - 3 machine the front panel according to plan



14 - 4 mount the cam (3)



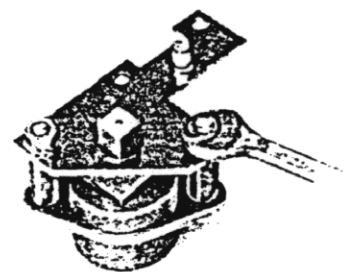
14 - 5 engage the washer (4)



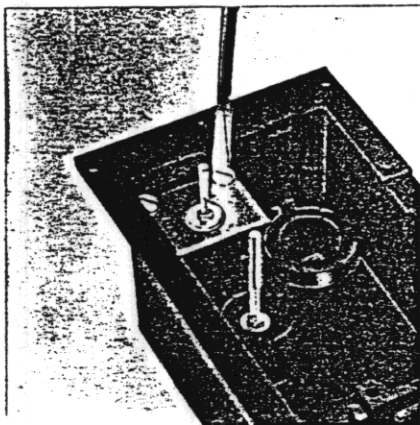
14 - 6 install the screws (8) with washers (9)



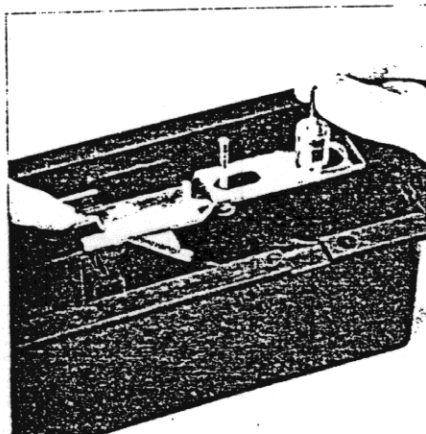
14 - 7 mount the support (7)



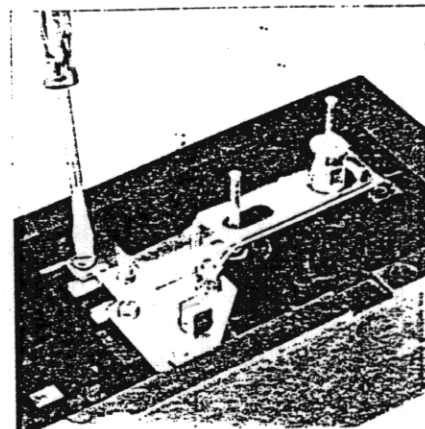
14 - 8 fix the support with washers and nuts (5)



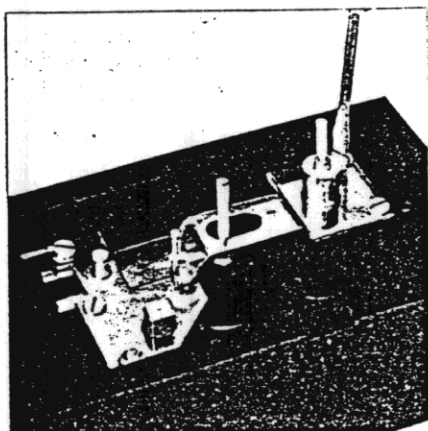
14 - 9 remove the guide plate of push button



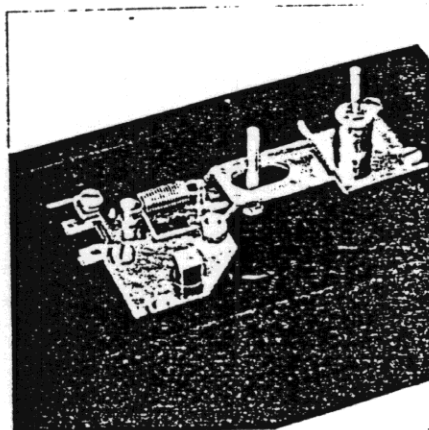
14 - 10 engage the connecting rod (1)



14 - 11 install the device lock support with 2 screws (6)

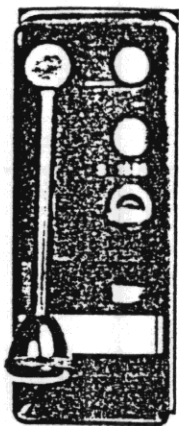


14 - 12 reassemble the guide plate



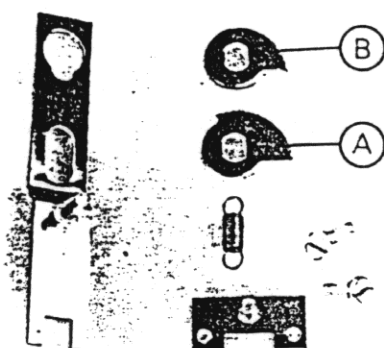
14 - 13 attach the spring (2)

14 - 14 reassemble the front panel, handle and front cover in reverse order.

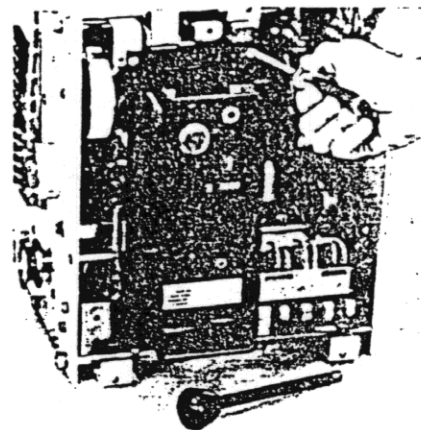


## 15- interlocking in "tripped" position by

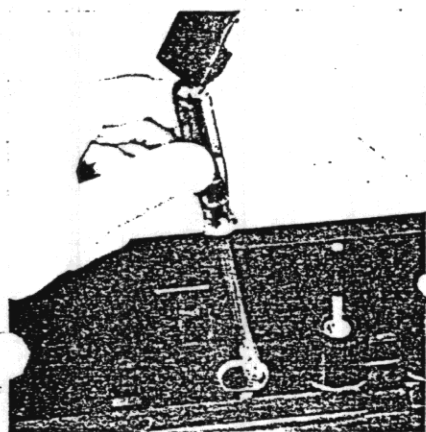
Ronis lock, cam type 1104, 1/4 turn, opening to the left or Profalux, type KS 5B 26 G4Y



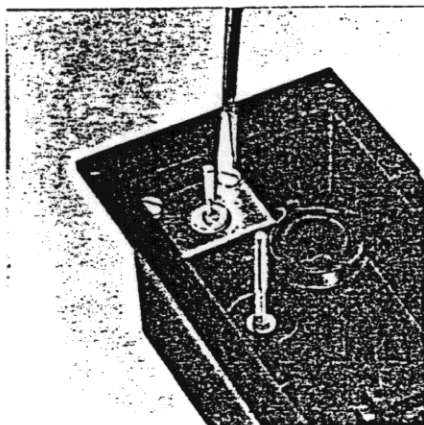
15- 1 capacity of small bag  
(a) cam for Ronis lock  
(b) cam for Profalux lock



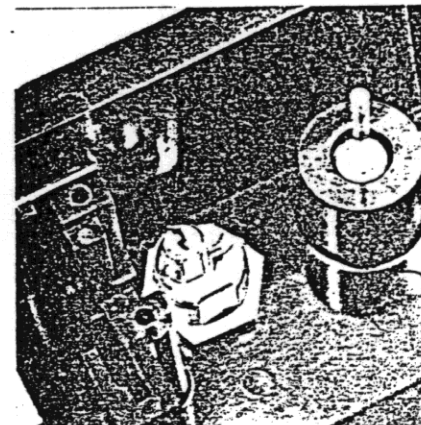
15 - 2 after removing front cover and handle, remove the front panel



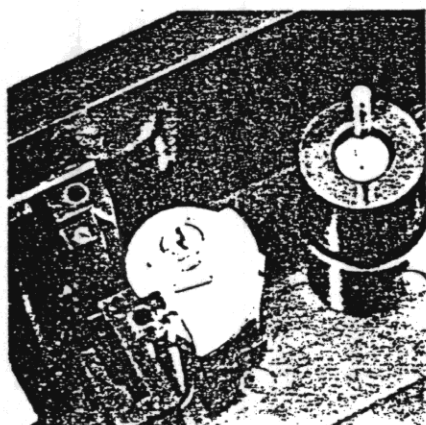
15 - 3 smash the moulded cast of the lock



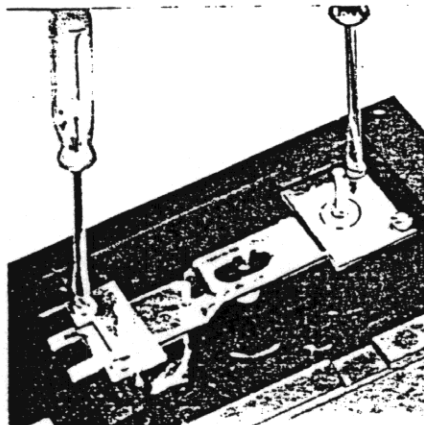
15 - 4 remove the guide-plate of push button



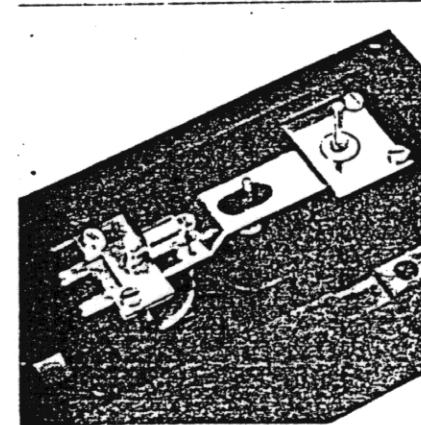
15 - 5 mount the lock



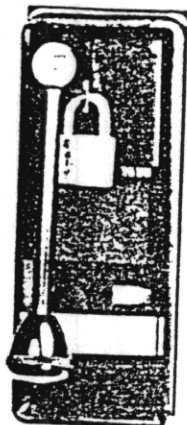
15 - 6 fixe the cam (a) or (b) according to lock



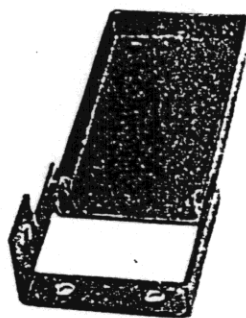
15 - 7 engage the connecting rod  
— screw back the guide plates



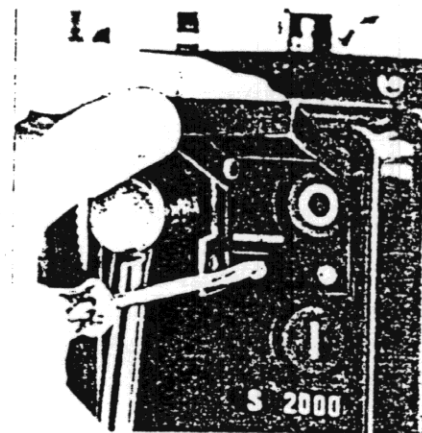
15 - 8 attach the spring  
— reassemble the front panel, handle and front cover in reverse order.



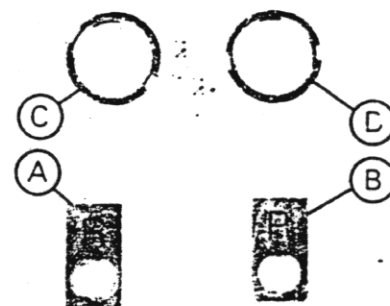
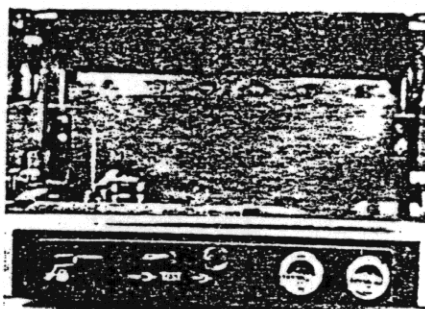
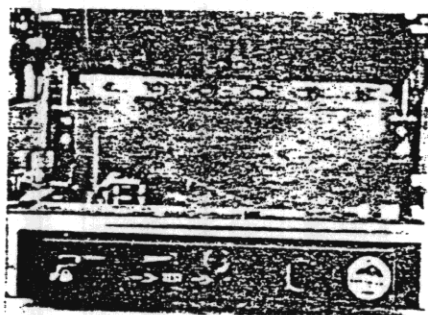
**16 - interlocking of local control by padlocks**



**16- 1 identification**



**16- 2 fix the padlocking shutter with 2 self-tapping**



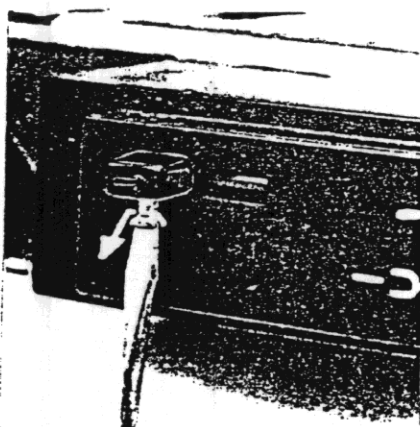
**17 - interlocking in "withdrawn" position**

□ 1 Ronis lock, cam Type 1104, 1/4 turn, opening to the right, or Profalux, type KS 5B 20 D4Y

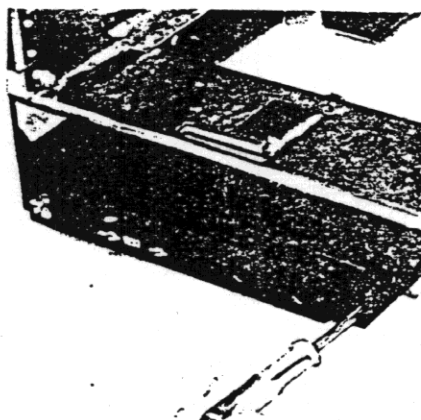
□ 2 locks

**17- 1 capacity of small bag for 1 lock**

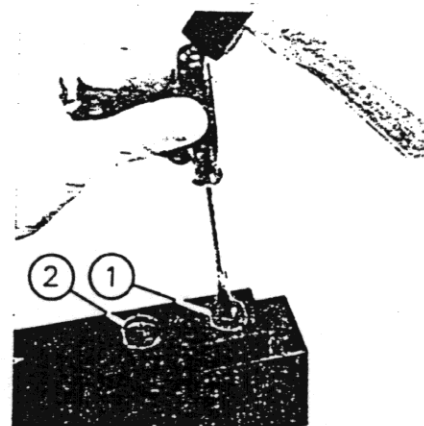
(a) cam for Ronis lock  
(b) cam for Profalux lock  
(c) nut for Ronis lock  
(d) nut for Profalux lock



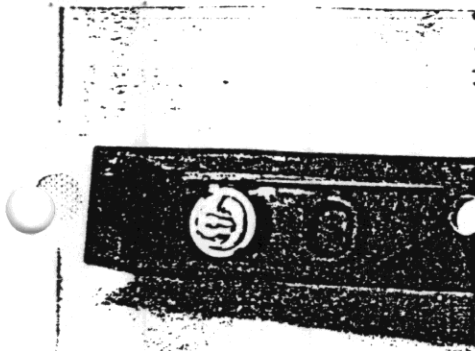
**17- 2 remove the handling case**



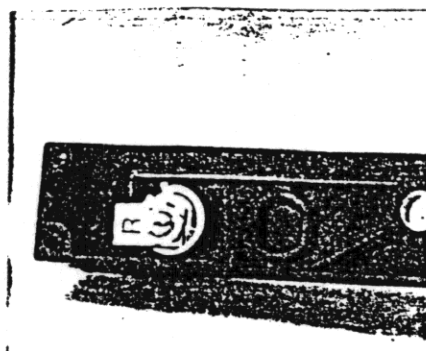
**17- 3 remove the front panel**



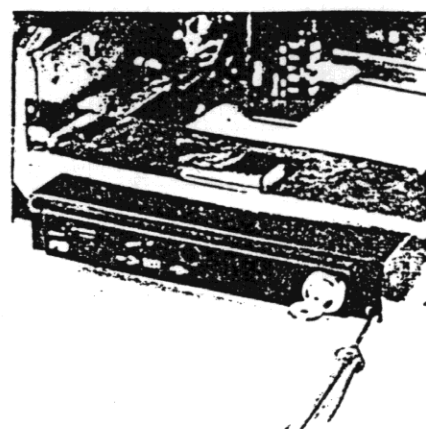
**17- 4 (1) adaptation first lock : smash the moulded cast right  
(2) adaptation second lock : smash the moulded cast left**



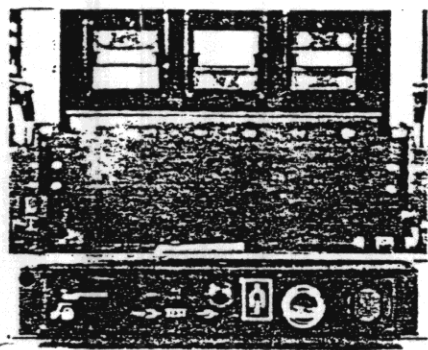
**17- 5** fit the lock with the nut  
(c) or (d)  
(c) nut for Ronis lock  
(d) nut for Profalux lock



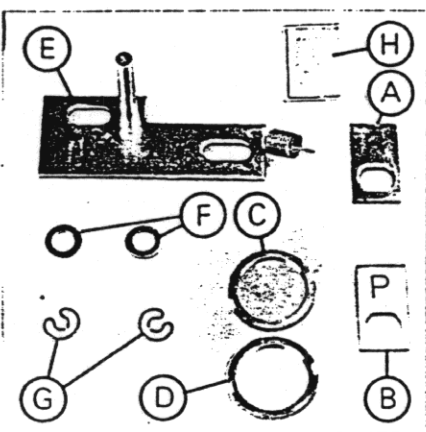
**17- 6** fit the cam (a) or (b) in  
according to lock  
(R) Ronis lock  
(P) Profalux lock



**17- 7** reassemble the front  
panel captive key (horizontal)  
— reassemble the handling  
case



**18- 2** perform operations 17-2  
and 17-3 page 30



**18- 1** identification

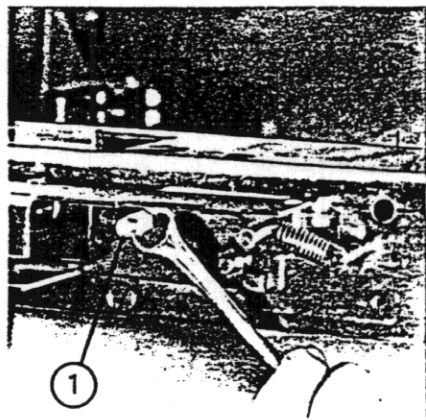
## **18- interlocking in "service" position by**

Ronis lock, cam Type 1104,  
1/4 turn, opening to the right, or  
Profalux, Type KS 5B 20 D4Y.

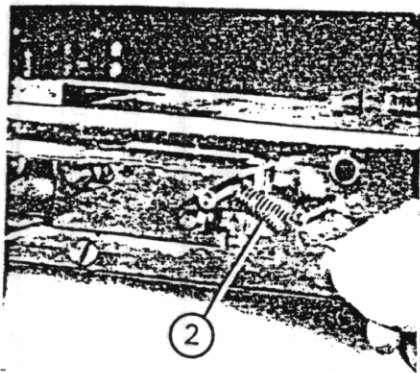


**18- 3** smash the moulded cast  
left.

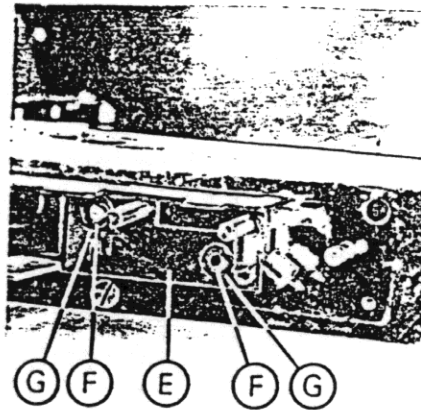
**18- 4** perform operations 17-5  
and 17-6 above



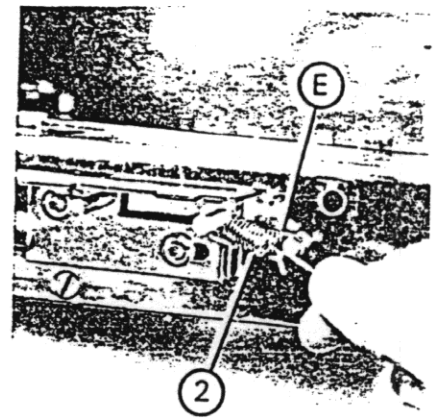
**18- 5** remove the spindle (1).



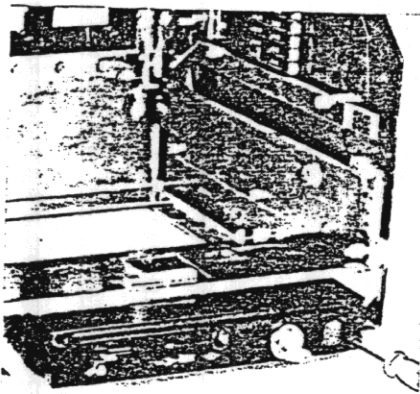
18 - 6 unhook a coil from spring (2)



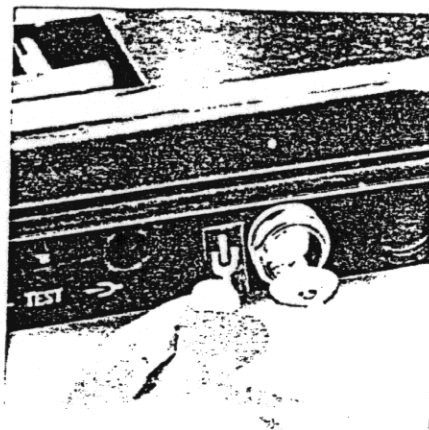
18 - 7 reassemble the bolt (E) — place the washers (F) and the clips (G)



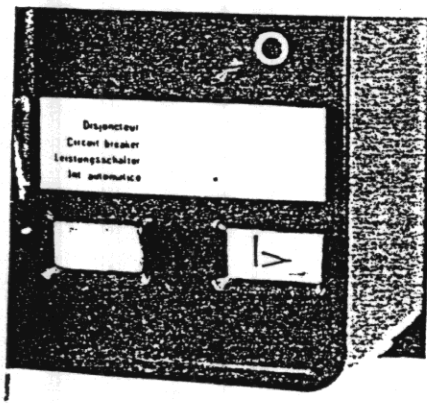
18 - 8 remount the spring of bolt (E) and the spring (2)



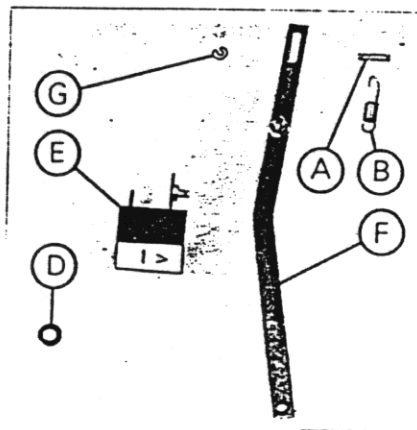
18 - 9 reassemble the front panel captive key (horizontal) — reassemble the handling case



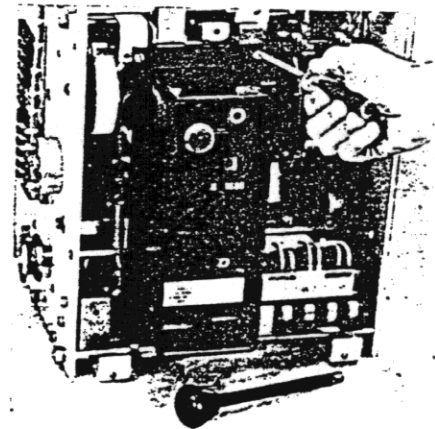
18 - 10 to paste the adhesive label



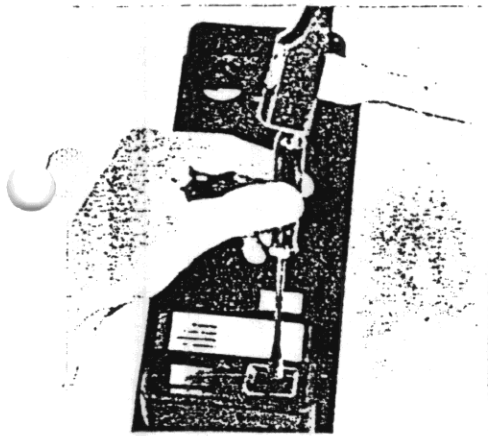
19 - mechanical fault indicator



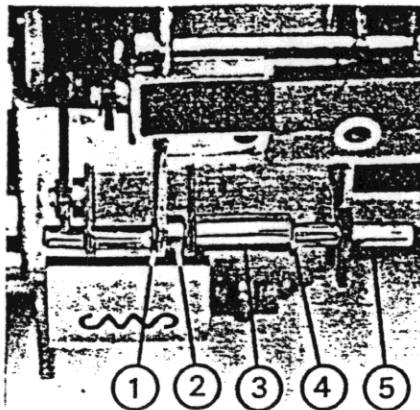
19 - 1 identification



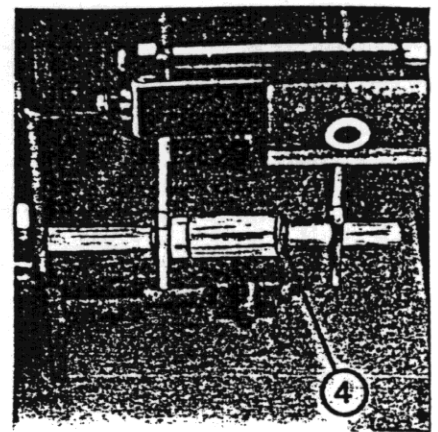
19 - 2 after removing front cover and the handle, remove the front panel



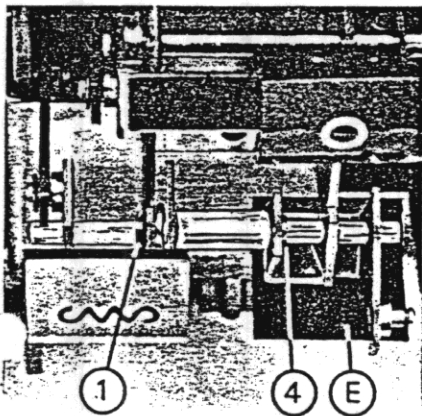
19 - 3 smash the moulded cast



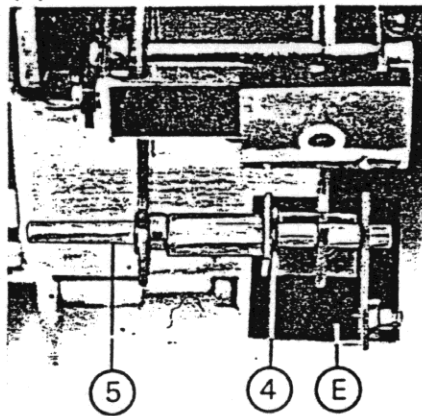
19 - 4 electrically-operated circuit-breaker  
 — remove the 2 clips (1) and (4)  
 — replace the spacer (2) by the washer (D) and move spindle (5) to left



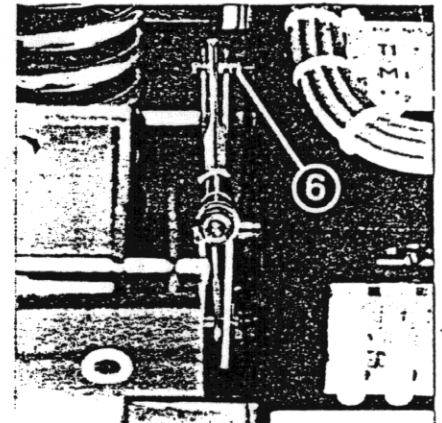
19 - 5 manually-operated circuit breaker  
 — remove the clip (4)



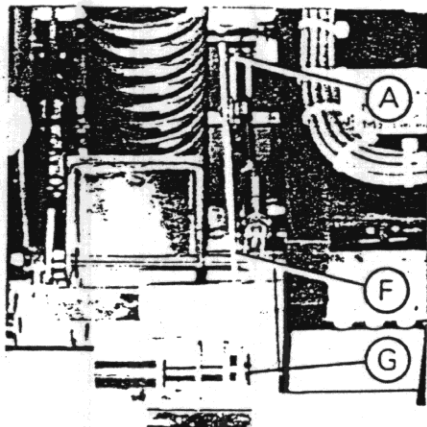
19 - 6 electrically-operated circuit-breaker  
 — reassemble the indicator (E) and replace clips (1) and (4)



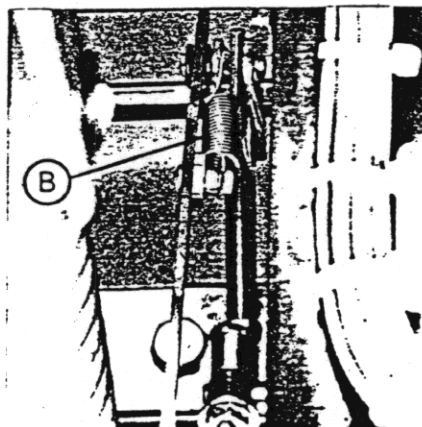
19 - 7 electrically-operated circuit-breaker  
 — reassemble the indicator (E) and move the spindle (5) left remove the clip (4)



19 - 8 remove the spindle (6) (recover the clips)



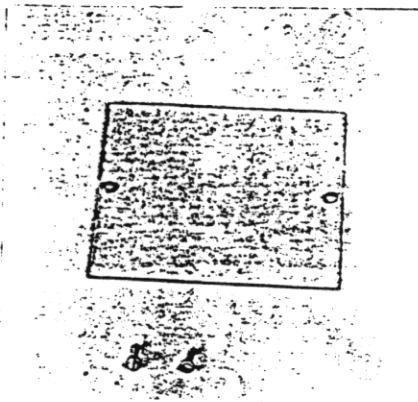
19 - 9 reassemble the connecting rod (F) with spindle (G)  
 — place the clips (G) and (6)



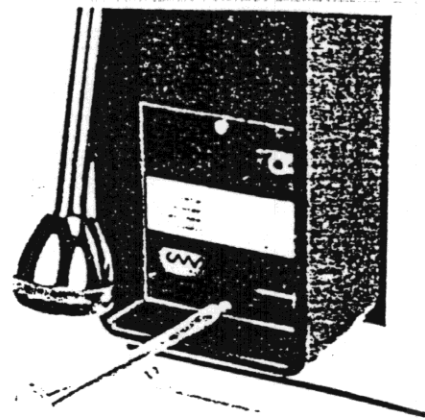
19 - 10 move the spring (B)  
 — reassemble the front panel, handle and the front cover in reverse order.



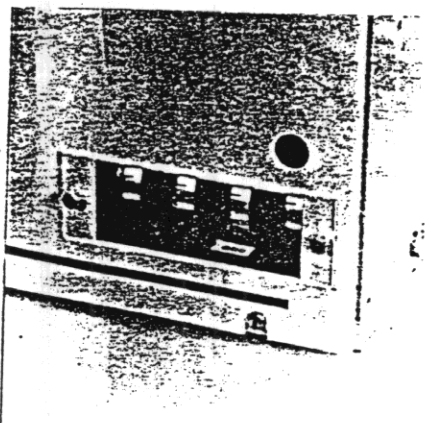
**20- IP43 for front panel**



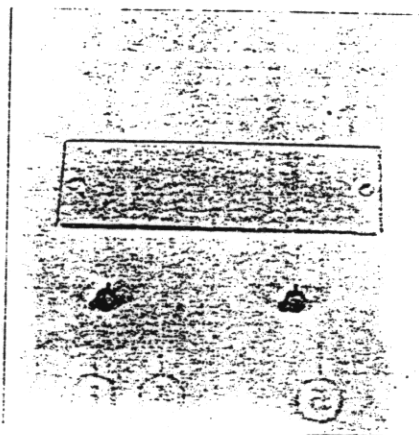
**20- 1 identification**



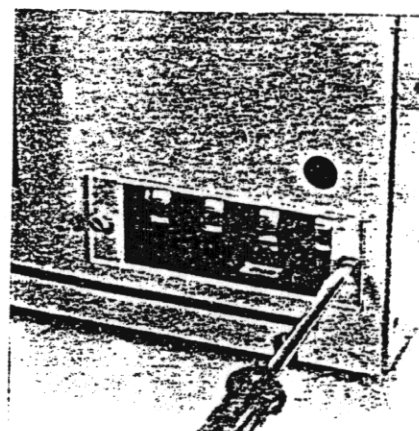
**20- 2 fix the dial-plate with 2 self-tapping**



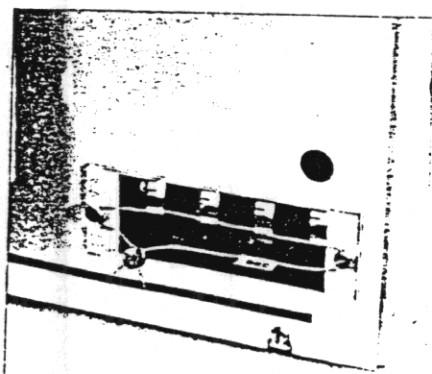
**21- dial plate**  
preventing the access at setting of DN



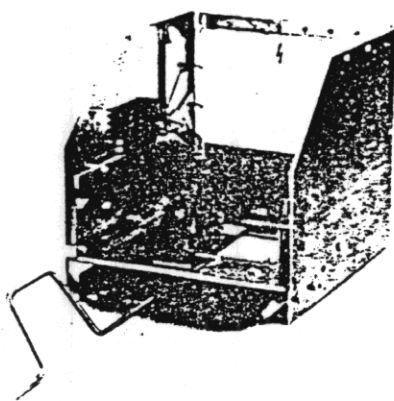
**21- 1 identification**



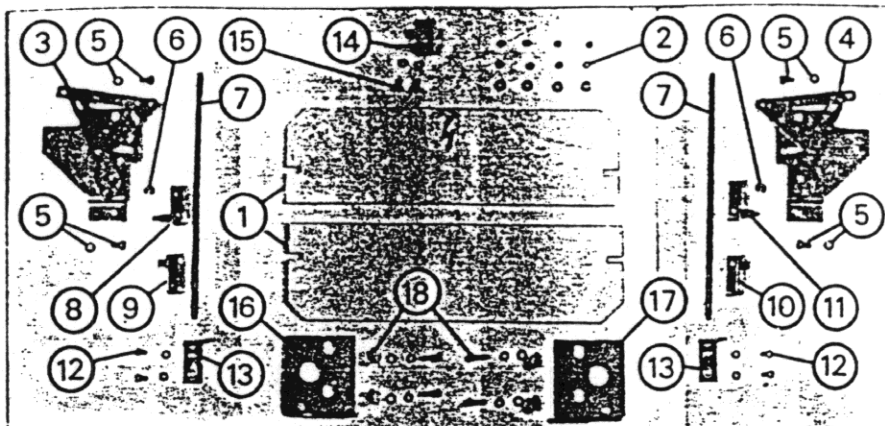
**21 - 2 fix the dial-plate with 2 screws**



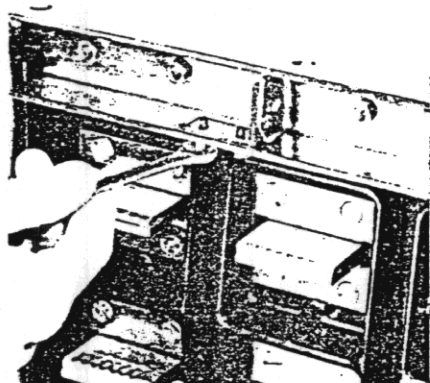
**21 - 3 possibility of sealing**



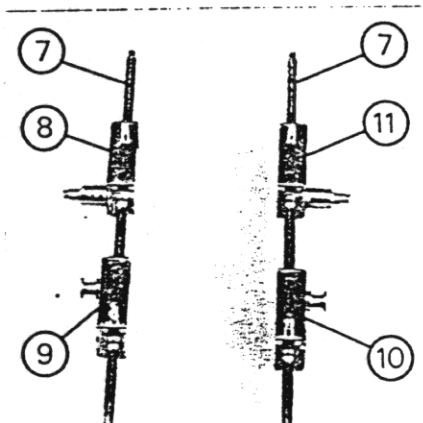
**22- isolating shutter**  
installation



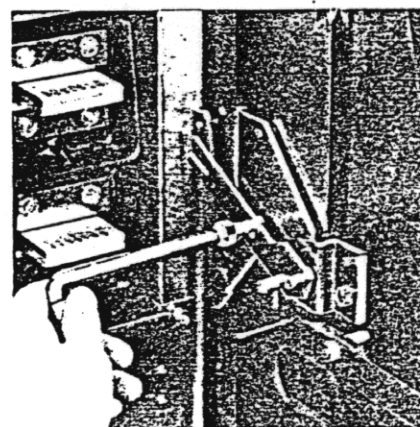
**22-1 identification**



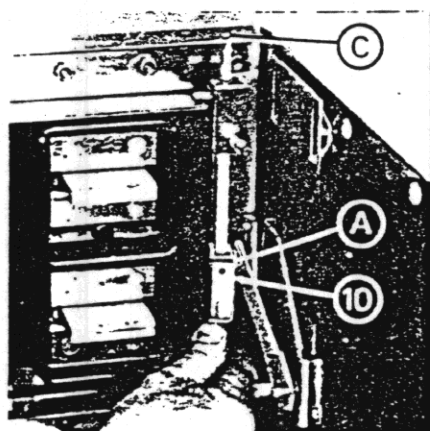
**22- 2** install the interlocking  
by padlock (14) with screws  
and washers (15)



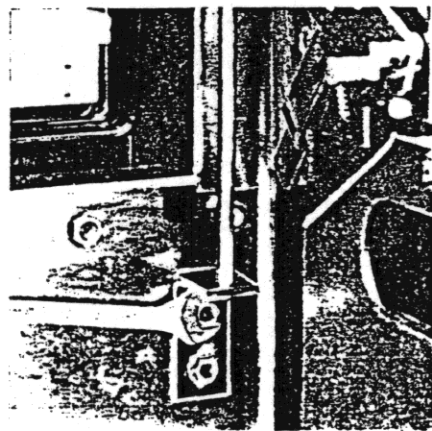
**22- 3** assemble the pieces (8),  
(9), (10) and (11) on the  
spindles (7)



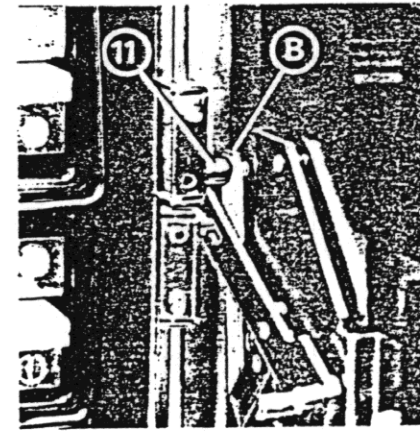
**22-4** fix the right mecanisme  
(4) on the right side with 2  
screws and washers (5)



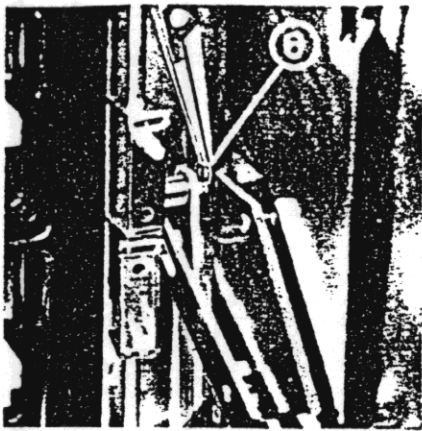
**22- 5** engage the tracking rod  
in the hole (c)  
— engage the pin (10) in the  
fork (a)



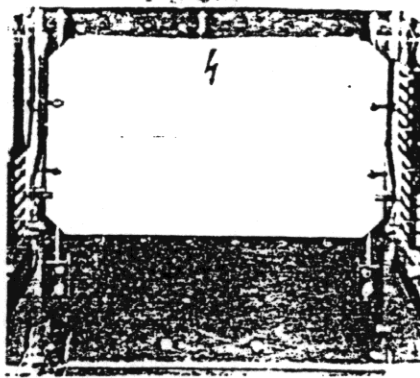
**22- 6** engage the tracking rod  
in the support (13) and fix with  
screws and washers (12)



**22- 7** engage the connecting  
rod (b) in the pin (11)



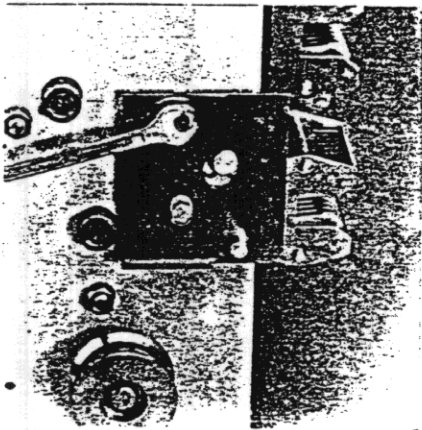
22- 8 fix the clip (6)



22- 9 after doing the same operations on the left side, install the shutters (1) with bolts and screws (2)



22 - 10 install the struts (18) in the guide plates (16 and 17) with screws and washers

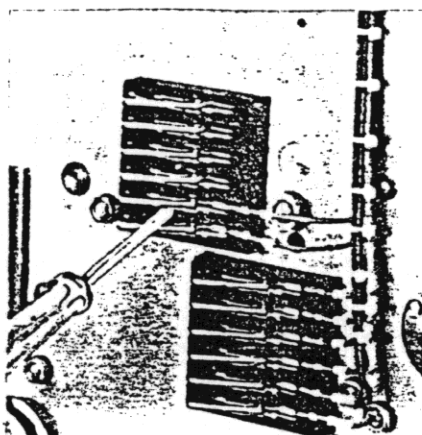


22- 11 mount the left and right device in the circuit breaker

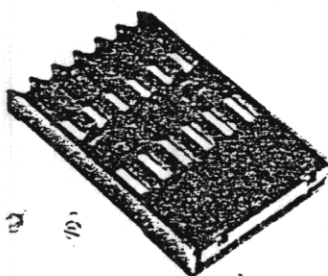


## 23 - isolating of auxiliary circuits

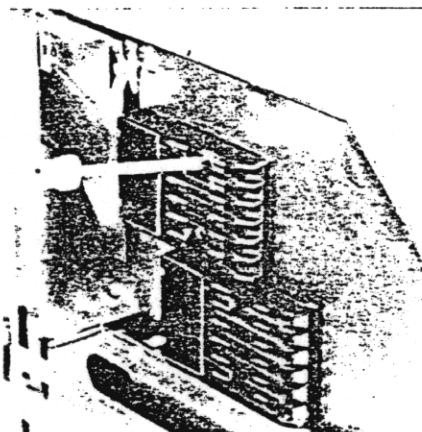
- adaptation second block moving part



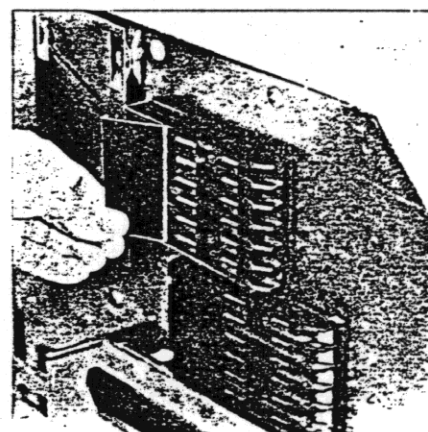
23 - 1 fix the moving part and connect the wiring



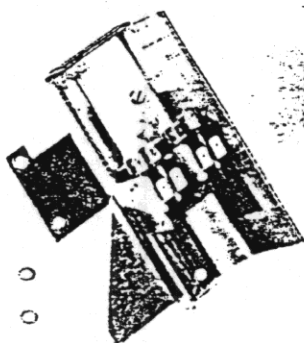
23 - 2 adaptation second block fixed part



23 - 3 fix the fixed part

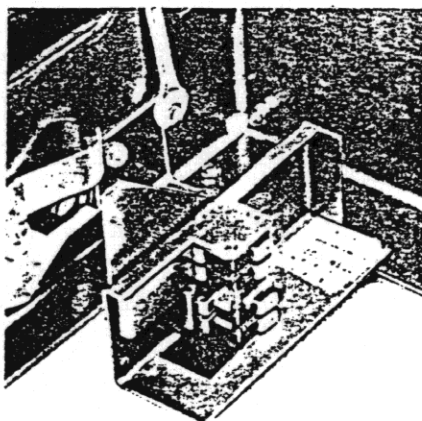


23 - 4 remove the cover for connect the wiring  
— replace the cover



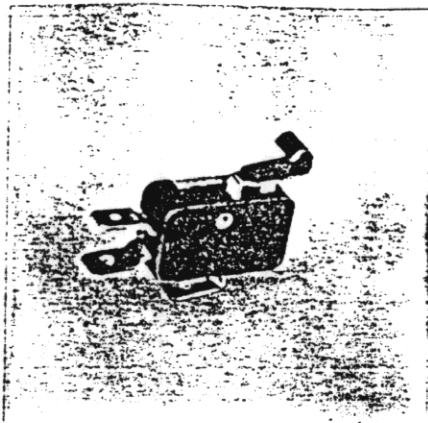
## 24 - position signalling contacts on cradle

- identification

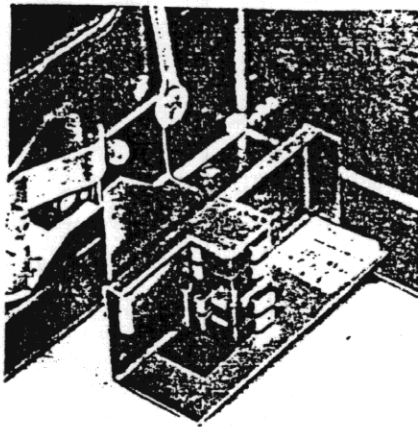


24 - 1 fix the device on 2 gudgeons on cradle, with washers and nuts

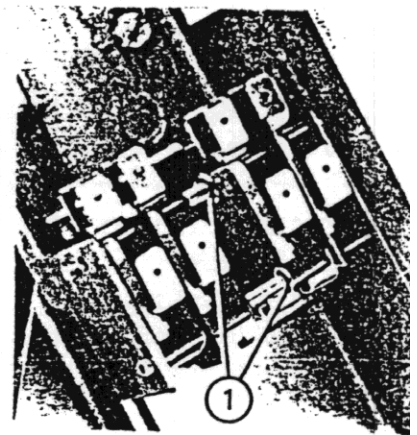
24 - 2 connect the wiring. a rubler ring is foreseen of crossing this one.



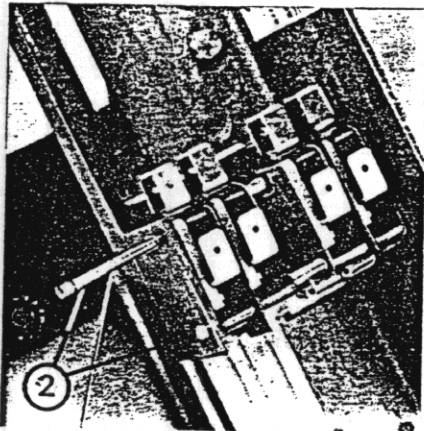
**24- 3 position signalling contacts on cradle**  
 • replacement



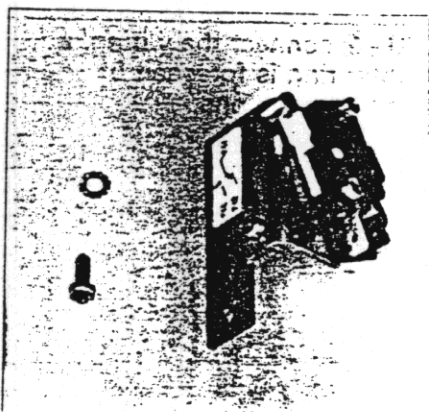
**24- 4** after disconnecting the wiring, remove the device with support to facilitate the replacement of the defective contact



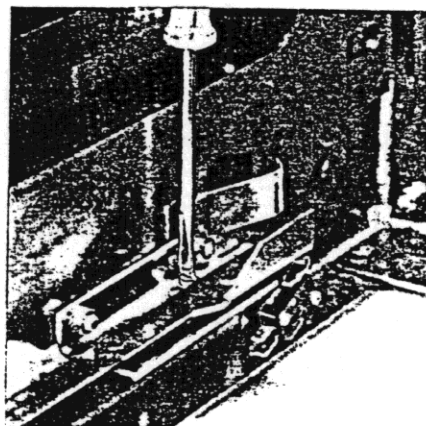
**24- 5** remove the clips (1)



**24- 6** extract the rods (2) and change the contact



**25- contact coupled with the insertion control**  
 • identification

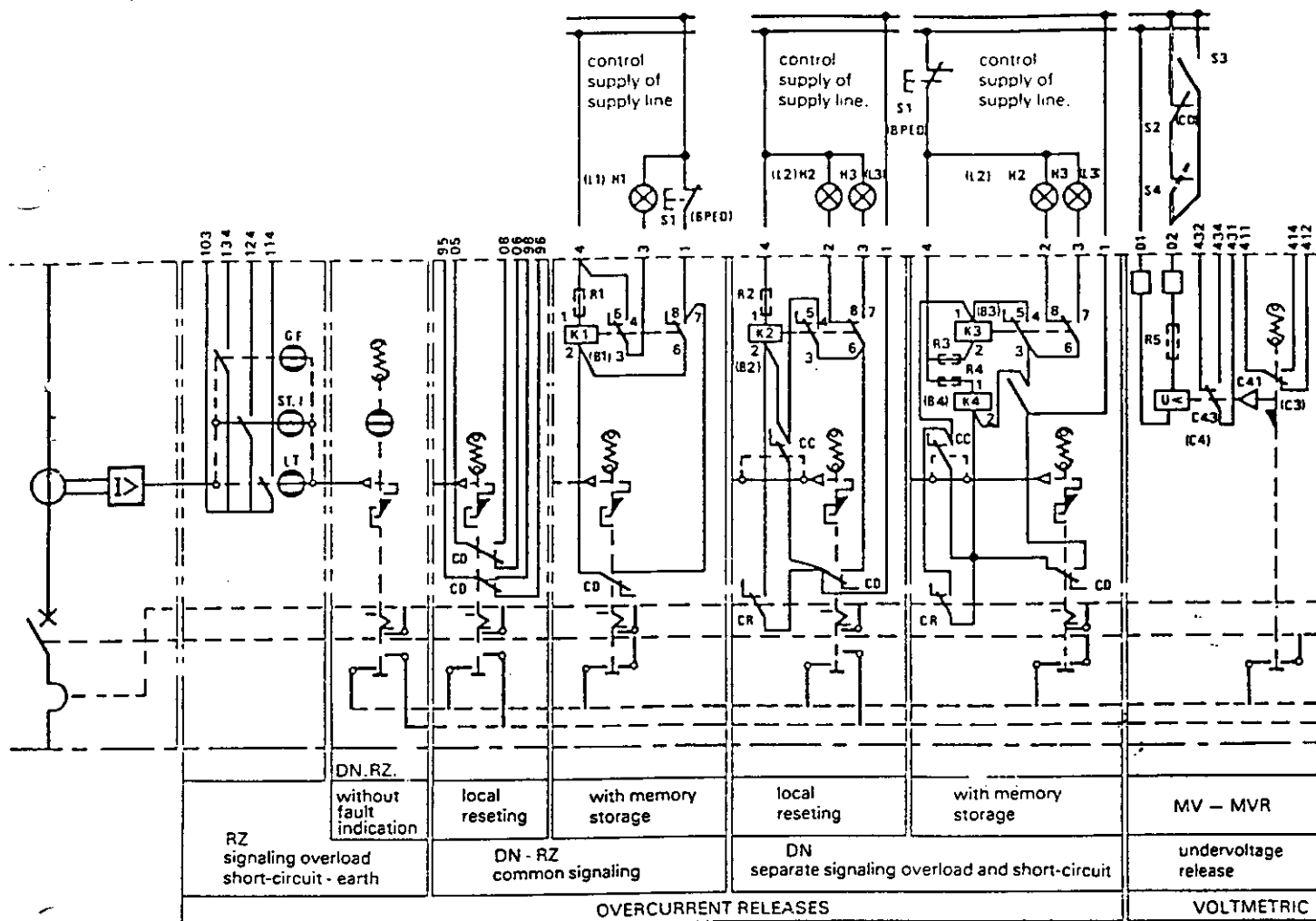


**25- 1** assemble the device and connect the wiring (through the rubler ring)

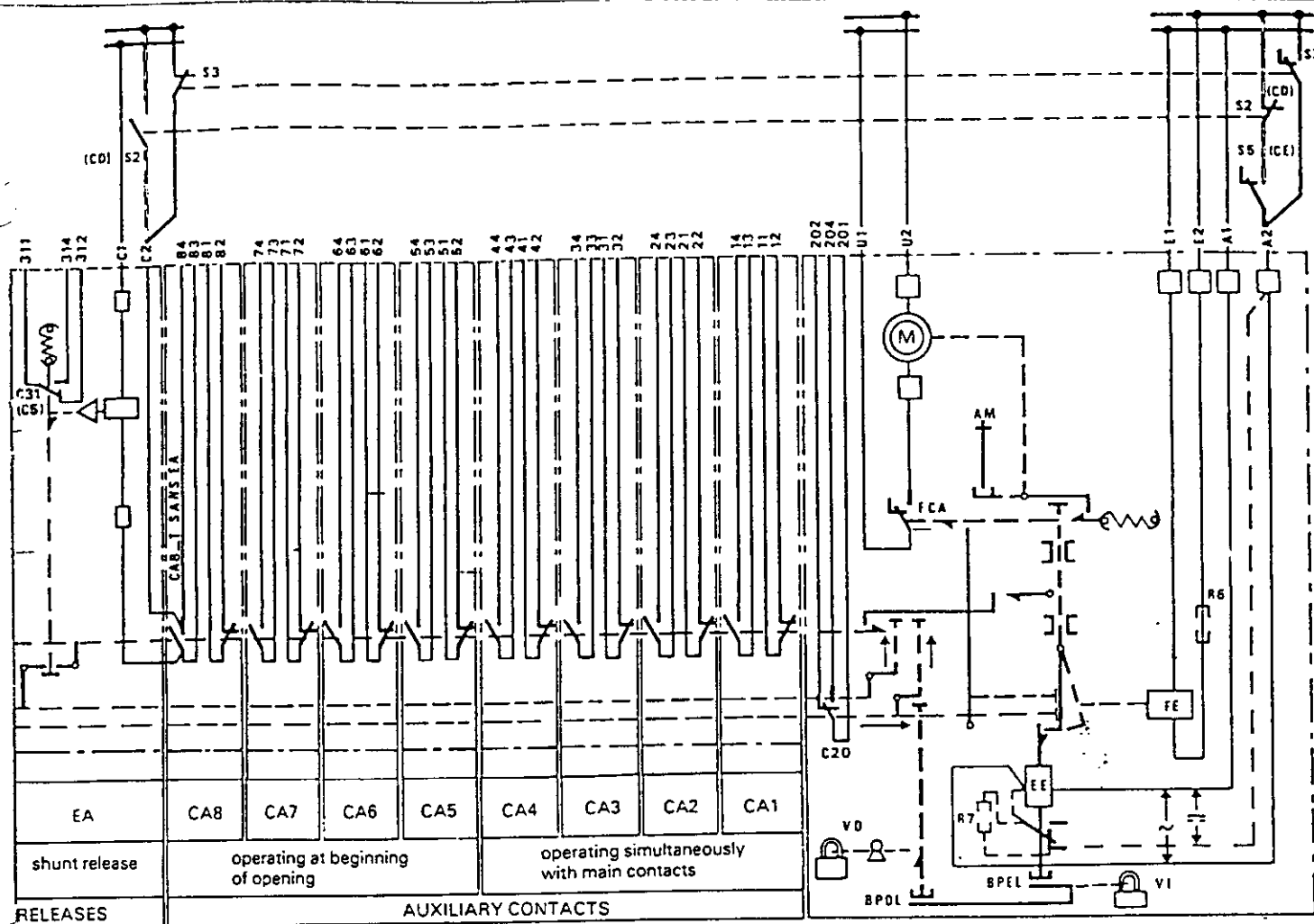
designation		number	identif. ref/page	part no.
overcurrent releases, type DN				
	DN0	1	1/15	44742-123
	DN0L	1	1/15	44742-337
	DN0A	1	1/15	84742-151
	DN0AL	1	1/15	84742-183
	DN02A	1	1/15	84742-182
	DN0M	1	1/15	84742-141
	DN1	1	1/15	44742-188
	DN1L	1	1/15	44742-338
	DN1A	1	1/15	84742-179
	DN1AL	1	1/15	84742-184
	DN02AL	1	1/15	84742-186
	DN1M	1	1/15	84742-142
	DN2	1	1/15	84742-140
	DN2L	1	1/15	84742-139
	DN2A	1	1/15	84742-180
	DN2AL	1	1/15	84742-185
	DN2M	1	1/15	84742-143
overcurrent releases, type RZ				
- without indicator lamps				
	RZ1	1	2/17	84750-063
	RZ2	1	2/17	84750-064
	RZ3	1	2/17	84750-143
- with indicator lamps				
	RZ1	1	2/17	84750-065
	RZ2	1	2/17	84750-066
	RZ3	1	2/17	84750-144
striker EX			3/17	84750-008
voltmetric releases				
EA 50 ~ 60 Hz	24 V	2	4/19	84735-101
	48 V	2	4/19	84735-102
	127 V	2	4/19	84735-103
	220 V	2	4/19	84735-104
	380-415 V	2	4/19	84735-105
	500-600 V	2	4/19	84735-105
EA d.c.	24 V	2	4/19	84734-035
	48 V	2	4/19	84734-036
	110-120 V	2	4/19	84734-037
	220-240 V	2	4/19	84734-037
EA1 50 ~ 60 Hz	127 V	2	4/19	84735-106
	220 V	2	4/19	84735-107
	380-415 V	2	4/19	84735-108
	500 V	2	4/19	84735-109
	600 V	2	4/19	84735-110
MV 50 Hz	24 V	2	4/19	84733-116
	48 V	2	4/19	84733-117
	127 V	2	4/19	84733-118
	220 V	2	4/19	84733-119
	380 V	2	4/19	84733-120
	415 V	2	4/19	84733-121
	500-600 V	2	4/19	84733-122
MV d.c.	24 V	2	4/19	84732-056
	48 V	2	4/19	84732-057
	110 V	2	4/19	84732-058
	120 V	2	4/19	84732-059
	220 V	2	4/19	84732-060
	440 V	2	4/19	84732-061
	500 V	2	4/19	84732-062
	600 V	2	4/19	84732-063

designation		number	identif. ref. page	part n°
MV 60 Hz	220 V	2	4/19	84733-123
	380-415 V	2	4/19	84733-120
	500-600 V	2	4/19	84733-121
MVR 50 Hz	24 V	2	4/19	84733-124
	48 V	2	4/19	84733-125
	127 V	2	4/19	84733-126
	220 V	2	4/19	84733-127
	380 V	2	4/19	84733-128
	415 V	2	4/19	84733-129
	500-600 V	2	4/19	84733-130
MVR 60 Hz	24 V	2	4/19	84733-124
	48 V	2	4/19	84733-125
	127 V	2	4/19	84733-126
	220 V	2	4/19	84733-131
	380 V	2	4/19	84733-132
	415-500 V	2	4/19	84733-128
	600 V	2	4/19	84733-129
auxiliary contacts 1T+1R		8	5/20	84512-179
setting motor for electrical control				
50-60 Hz	48 V	1	6/21	82723-187
	127 V	1	6/21	82723-189
	220 V	1	6/21	82723-190
d.c.	24 V	1	6/21	82723-186
	48 V	1	6/21	82723-187
	110 V	1	6/21	82723-188
	220 V	1	6/21	82723-190
make solenoid for electrical control				
50 Hz	48 V	1	9/22	82114-006
	127 V	1	9/22	82114-012
	220 V	1	9/22	82114-013
	380 V	1	9/22	82114-014
d.c.	24 V	1	9/22	82115-004
	48 V	1	9/22	82115-006
	110 V	1	9/22	82115-007
	220 V	1	9/22	82115-009
60 Hz	48 V	1	9/22	82114-007
	127 V	1	9/22	82114-008
	220 V	1	9/22	82114-009
	380 V	1	9/22	82114-010
economy resistor for d.c. make solenoid				
24 V R 11 $\Omega$		1	11/23	44611-120
48 V R 41 $\Omega$		1	11/23	44611-119
110 V R 195 $\Omega$		1	11/23	44611-118
220 V R 900 $\Omega$		1	11/23	44611-117
economy resistor insertion contacts for make sonneloid		1	10/23	2556-264
prevented make device for electrical control				
50 Hz	24 V	1	8/22	82623-051
	48 V	1	8/22	82623-052
	127 V	1	8/22	82623-053
	220 V	1	8/22	82623-054
	380 V	1	8/22	82623-055

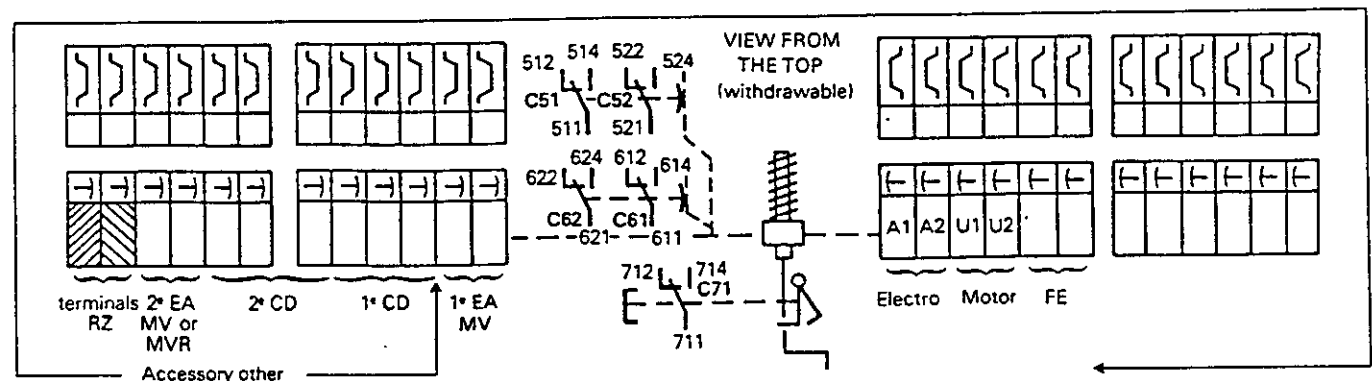
designation		number	identif. ref. page	part n°
d.c.	24 V	1	8 / 22	82623-064
	48 V	1	8 / 22	82623-065
	110 V	1	8 / 22	82623-066
	120 V	1	8 / 22	82623-067
	220 V	1	8 / 22	82623-068
	440 V	1	8 / 22	82623-069
	500 V	1	8 / 22	82623-070
	600 V	1	8 / 22	82623-071
60 Hz	24 V	1	8 / 22	82623-058
	48 V	1	8 / 22	82623-059
	127 V	1	8 / 22	82623-060
	220 V	1	8 / 22	82623-061
	380-415 V	1	8 / 22	82623-062
	500-600 V	1	8 / 22	82623-063
contacts for pl ugged in or unplugged position for plugging in breaker				
a.c./d.c.		4	24 / 37	2556-273
contact coupled with the plug-in control		1	25 / 38	84517-257



OVERCURRENT RELEASE		EE	Remote closing electro-magnetic
CD	Fault indication contact.	BPDL	Local trip push-button.
CC	Short circuit indication contact.	BPEL	Local closing push-button (inoperative permanent command of local tripping).
CR	Ultra-rapid release fault contact		
K1 à K4	Fault indication relay.	S2	Remote tripping control.
R1 à R4	Series resistor for 220V ===	S5	Remote closing control.
H1	Fault overload and short circuit indicator.	S3	Remote control 2. way closing and tripping switch.
H2	Fault overload indicator.		
H3	Fault short circuit indicator.	C20	Contact coupled to the local resetting push-button BPDL.
S1	Fault cancelling push-button.	R6	Series resistor for certain d.c. voltages.
GF	Ground fault indicator.	FE	Prevented closing by undervoltage protection.
ST-I	Tripping instantaneous or short times indicator (short circuit).		
LT	Tripping long times indicator (overload).	R7	Economy resistor (remote closing electro-magnetic) for d.c. voltages.
VOLTMETRIC RELEASE		VD	Breaker in «open» position.
C41	Trip contact MV-MVR.	VI	Shutter preventing local closing or tripping.
C43	Undervoltage contact MV-MVR.		
C31	Trip contact EA.		
R5	Series resistor for certain d.c. voltages.		
S4	Optionnal disconnecting switch MV-MVR (breaker out-of service).	WITHDRAWABLE	
ELECTRICAL OPERATION WITH STORED ENERGY		C51.C52	Contact in «service» position.
M	Resetting motor.	C61.C62	Contact in «isolated» position.
		C71	Contact pre-trip coupled with-plugging



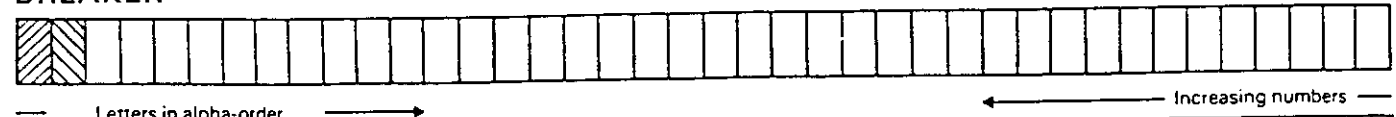
## WITHDRAWABLE



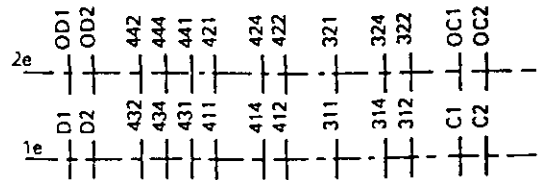
EA-MV-CD-EE-M-FE-Terminals RZ: Make reserved emplacements  
Accessory other: increasing numbers, clockwise (if it's disposable, make reserved emplacements).

## FIXED BREAKER

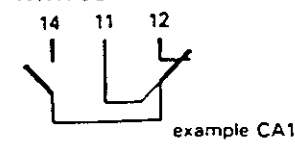
Above view of breaker (40 terminals max)



### LABELLING OF 2 RELEASES OF THE SAME TYPE



### AUXILIARY CONTACTS WITH COMMON POINT



### CONTROL WIRING

